

**In search of the 'good anaesthetic' for hip fracture repair: difference, uncertainty and ideology in an age of evidence-based medicine.**

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## Declaration

This thesis is my own work, and has not been submitted in substantially the same form for the award of a higher degree elsewhere. No sections of this thesis have been published.

79844 words.

A handwritten signature in grey ink, appearing to read 'Clifford L Shelton', written over a faint rectangular box.

**Clifford L Shelton, 5<sup>th</sup> June 2019**

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## Glossary of Abbreviations

AAGA	Accidental awareness under general anaesthesia; when a patient is aware, or able to recall events, despite an (unsuccessful) attempt to administer general anaesthesia.
AAGBI	The Association of Anaesthetists of Great Britain and Ireland; a professional representative body
ABG	Arterial blood gas; a test which measures the partial pressures of oxygen and carbon dioxide, and the concentration of hydrogen ions (expressed as pH) and bicarbonate ions in the arterial blood. It is often used as part of the assessment of respiratory function.
ACF	Academic Clinical Fellowship; a 3-year integrated clinical-academic training post, funded by the National Institute for Health Research. In addition to the usual clinical training, supervision, formal research training and protected time for research are provided.
ACLS:	Advanced Cardiac Life Support; a protocolised approach to the management of cardiac arrest. In the UK is it more often referred-to as Advanced Life Support (ALS).
AMT:	Abbreviated Mental Test; a brief screening test for dementia and delirium.
AQ	Advancing Quality; a set of care criteria which, if met in a specified proportion of all patients, result in a hospital receiving additional funding.
ASA	American Society of Anesthesiologists; typically used as a shorthand for <i>ASA Physical Status Classification</i> or <i>ASA grade</i> , a scale of patients' fitness ranging from I (no systemic illness) to IV (moribund).
ASAP	Anaesthesia Sprint Audit of Practice; a national study of hip fracture anaesthesia practice.
BIS	Bispectral index; a depth-of-anaesthesia monitor which is based on the electroencephalogram (EEG).
BJA	the British Journal of Anaesthesia; the journal of the RCoA.
BP	Blood pressure; the pressure exerted on the walls of the arteries, usually measured in millimetres of mercury (mmHg).
BPT:	Best Practice Tariff; a set of care criteria which, if met for a given patient, results in a hospital receiving additional funding.
CSL	Compound Sodium Lactate; an intravenous fluid with an electrolyte content similar to that of blood plasma.
DGH	District General Hospital; a non-specialist hospital.
DHS	Dynamic Hip Screw, a surgical implant used in the repair of extracapsular hip fractures.
EBM	Evidence-based medicine; an approach which aims to promote scientific evidence as the basis for medical practice.

ETT	Endotracheal tube; a flexible tube inserted into the trachea and usually sealed with an inflatable cuff to protect and maintain the airway during anaesthesia.
GA	General anaesthetic or general anaesthesia; induced unconsciousness for the purpose of facilitating surgery or some other potentially painful or distressing procedure.
GMC	The General Medical Council; the UK medical regulator. Its duties include maintaining the medical register and issuing licenses to practice.
FICB	Fascia iliaca compartment block; a 'compartment' nerve block which involves injecting a large volume of local anaesthetic solution between the iliacus muscle and its overlying fascia. This space contains the femoral, obturator and lateral cutaneous nerves of the thigh, sensory nerves relevant to both hip fracture and the surgery to repair it.
FRCA	Fellowship of the Royal College of Anaesthetists; the professional examination which must be passed to progress through training in anaesthesia.
INR	International normalised ration; a measure of blood coagulation based on the ratio of the patients' prothrombin time to a control value. A normal INR is between 0.9 and 1.2. A higher ratio indicates impaired coagulation.
IPPV	Intermittent positive pressure ventilation; breathing provided by a machine which forces air into the patient's lungs under pressure.
LMA	Laryngeal mask airway; a device with an inflatable cuff that sits above the glottis. Used to maintain a patent airway during anaesthesia.
MAC	Minimum alveolar concentration; a measure of the dose of an inhaled anaesthetic agent. One MAC is the dose at which 50% of patients of a given age will not move in response to a standard surgical stimulus.
NAP5	The Fifth National Audit Project of the RCoA and AAGBI; a national observational study to investigate the prevalence and risk-factors for accidental awareness under general anaesthesia.
NHFD	the National Hip Fracture Database; an ongoing project to collect data on patients with hip fractures, their treatments, and outcomes, in England, Wales and Northern Ireland.
NHS	the National Health Service; the primary provider of public healthcare in the UK.
NICE	the National Institute for Health and Care Excellence (formerly National Institute of Clinical Excellence); an organisation which assesses the usefulness of clinical technologies and issues clinical guidance.
NOF	Neck of femur; the process of bone that connects the femoral head and the femoral shaft. Though they not strictly synonymous from an anatomical perspective, the term 'fractured NOF', or simply 'NOF' are

used interchangeably with 'hip fracture' (my preferred term in this thesis) and 'proximal femoral fracture'.

ODP	Operating department practitioner; a healthcare professional of similar professional standing to a nurse, who specialises in the operating theatre environment. Roles include anaesthetics (assisting the anaesthetist), 'scrub' (assisting the surgeon) and 'recovery' (caring for patients as they recover from anaesthesia and before they are sent back to the ward).
RCoA	the Royal College of Anaesthetists; the regulator of anaesthesia in the UK.
RCT	Randomised controlled trial; an experimental study design based on randomly allocating participants into groups which receive different interventions.
SHO	Senior house officer: junior trainee doctors who have completed at least one year of postgraduate training. Though the term has been officially superseded (SHOs are now foundation year 2 doctors, core trainee doctors, and specialty trainee doctors in years 1-2) it is still commonly-used because it usefully denotes a 'tier' of clinical responsibility.
SIGN	the Scottish Intercollegiate Guidelines Network; an organisation which produces clinical guidelines in order to 'improve the quality of health care for patients in Scotland by reducing variation in practice and outcome.' It is comprised of representatives from the Scottish medical royal colleges, and of professions allied to medicine.
SpO <sub>2</sub>	Peripheral arterial oxygen saturation; the percentage of arterial haemoglobin which is bound to oxygen.
TIVA	Total intravenous anaesthesia; maintenance of anaesthesia with agents infused intravenously.

## In search of the ‘good anaesthetic’ for hip fracture repair: difference, uncertainty and ideology in an age of evidence-based medicine.

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### Abstract

Hip fracture is a common life-threatening injury amongst frail elderly people and early surgical fixation under anaesthesia is advocated. It has long been suspected that mode of anaesthesia (general anaesthesia, induced unconsciousness; regional anaesthesia, interruption of sensation using local anaesthetic) influences outcome, however ‘conventional’ studies have consistently failed to demonstrate if this is the case.

A similar proportion of patients receive regional and general anaesthesia; apparently decided more by institutional culture rather than clinical requirements. This variation is perceived by many as a scandal, and efforts are underway to ‘standardise’ anaesthesia. Standardisation is controversial however; anaesthetists seemingly cannot agree on what a ‘good anaesthetic’ actually is.

In this ethnography I work with anaesthesia’s ‘scandalous’ variation in three contrasting hospitals. I ask how patients, anaesthetists and others understand, experience and enact the good anaesthetic. By adopting this approach, I have radically reconceptualised how hip fracture anaesthesia is described, what it consists of, and what is important about it.

Blending a science and technology studies approach with my own perspective as a practicing anaesthetist, and drawing on sociological theory about boundaries, uncertainty and standardisation, I propose that a ‘good anaesthetic’ is not regional or general. These classifications fail to recognise the nuance and complexity that define ‘good’. I contend that, to patients, anaesthetists and their colleagues, a good anaesthetic: *gets done today, withstands uncertainty, treads lightly and is easily forgotten.*

Hip fracture anaesthesia is not as it first appears. Though evidence-based medicine makes divisions along ‘obvious’ lines, it fails to consider the goals and ideologies that underpin practice. In this thesis I explain why we must reconsider how hip fracture anaesthesia is understood. By asking ‘how, why and when?’ rather than simply ‘what?’, I offer a vital and different approach to evidence and practice for researchers, clinicians and patients.

## Prologue

This is a study about ‘good’ anaesthesia; a concept that has become increasingly relevant to me in recent years. As I have progressed through clinical training, my concerns have shifted. Initially I worried about ‘technical’ things: putting intravascular catheters, endotracheal tubes, and regional anaesthetic injections in the right place was the first hurdle. Then I worried about ‘flying solo’; working without immediate supervision, managing the technical things whilst also making decisions and being a useful part of the clinical team. Having attained some level of proficiency in these I went on to worry about exams. My early concerns about ‘competency’<sup>1</sup> left little room for anything else, but as I have moved into the final years of my training, I find myself mainly concerned not about if I can do things, but if I do them *well*.

Emerging from the fray of ‘core’ and ‘intermediate’ anaesthetic training in possession of the Fellowship of the Royal College of Anaesthetists (FRCA) examination, the structured pathway of competency acquisition begins to relent, replaced by an opportunity to be more self-directed through choosing sub-specialty interests. Already juggling the demands of an Academic Clinical Fellowship (ACF)<sup>2</sup> with recently becoming a father, I had promised myself and my family that I was going to avoid the additional exams and training required for intensive care or cardiac anaesthesia, yet I enjoyed the challenge of dealing with unwell patients and providing urgent care. Considering my journey through various training rotations, I felt that two areas of

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<sup>1</sup> Competency based training was introduced in the UK in the early 2000’s. Progress is measured by the attainment of ‘competencies’, derived from analysis of the job-role for which the training programme has been developed (e.g. Leung 2002)

<sup>2</sup> The *Integrated Academic Training Path* (which includes ACFs) combines the ‘competency-based’ clinical training administered by local education and training boards with academic training administered by universities (Funston et al 2015).

practice met this specification: obstetric anaesthesia, in which the need for emergent delivery of the fetus must be balanced against maternal comorbidities and technical difficulties, and orthopaedic trauma in which high-risk elderly patients require anaesthesia for urgent hip fracture surgery. On this basis I provisionally applied to undertake advanced training in obstetric and regional anaesthesia.<sup>3</sup>

In parallel however, was the question of how to progress in my academic career; my ACF at Lancaster University was entering its final year and I needed to decide whether to apply for funding for doctoral study. If successful, I would forfeit my advanced clinical training and undertake a doctorate in lieu. My first notion was to focus on the acute obstetric setting, however on hearing about a potential source of funding for research of relevance to older people I reconsidered my topic. Serendipitously, in March 2014 I received my monthly copy of *Anaesthesia*<sup>4</sup>, which included a paper by White et al reporting the first nationwide audit of anaesthetic practice in hip fracture surgery in the UK using data from the National Hip Fracture Database (NHFD). This paper found no difference in outcome between general and regional anaesthesia and concluded in an unexpected fashion: instead of the usual declaration that more research is required, the authors instead proposed a redirection ‘towards finding “best” methods of [general] and spinal anaesthesia’ (p228). My search for the ‘good anaesthetic’ was underway.

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<sup>3</sup> There is no ‘advanced module’ in orthopaedic trauma but regional anaesthesia is useful for this work.

<sup>4</sup> *Anaesthesia* is distributed to members of the Association of Anaesthetists of Great Britain and Ireland (AAGBI), a professional representative body which has approximately 11,000 members (AAGBI 2018); the total number of practicing anaesthetists in the UK is thought to be around 14,000 (Royal College of Anaesthetists 2016).

## Part I: Induction

## Chapter 1: In Search of the Good Anaesthetic

'Any idiot can use anaesthetics.'

'That's what I'm afraid of...'

**Purported exchange between Oxford university academics and Lord Nuffield, c1937  
(Oxford Mail, 2014).**

When William Morris, Lord Nuffield, founder of the Oxford-based Morris Motor Company, proposed to endow Europe's first professorial chair in anaesthesia, his proposal was met with scepticism. Anaesthesia was a developing specialty in the 1930's, and the role of the anaesthetist had yet to be established. As the above exchange demonstrates, anaesthesia was perceived by many simply as a means to facilitate surgery and was not considered to be deserving of academic attention (Stallworthy 1978). Nuffield however had experienced anaesthesia as a patient. His initial experiences had been distressing; prior to 1930 the only available anaesthetic drugs were chloroform, diethyl ether and nitrous oxide, inhaled via a facemask. Latterly however Morris had been anaesthetised for an appendicectomy by Dr Robert Macintosh, who would later become the first Nuffield Professor of Anaesthesia (Norman 2002).

Macintosh had used a new drug, hexobarbitone, which was administered intravenously. The difference in the experience between the anaesthetic administered by Macintosh and those that Nuffield had experienced previously led him to assume that his operation must have been cancelled when in fact it had proceeded uneventfully under unexpectedly high-quality anaesthesia (Snow 2009). It is believed that this noteworthy event inspired Nuffield to later insist on the formation of an academic department of anaesthesia at Oxford University, thereby establishing it as an academic specialty in the UK (Stallworthy 1978, Snow 2009).

The way in which anaesthesia is provided can be referred-to as *anaesthetic technique*. At the most superficial level this may be classified by *mode* into general or regional<sup>5</sup> anaesthesia. However, anaesthesia of any mode involves numerous individual steps, and each step can be undertaken in multiple different ways. An examination of the resources used in the training of anaesthetic doctors illuminates the role of *technique*. Looking at my own bookshelf, the *Oxford Handbook of Anaesthesia*, pocket-sized with a wipe-clean cover, stands out (my copy is the second edition: Allman and Wilson 2006). Whereas my other anaesthetic texts are preserved in suspiciously good condition, my *Handbook* is dog-eared and battered from years of use, its move to the bookshelf being a relatively recent occurrence. It used to belong in my work bag where I could quickly consult it if I needed to know what to do.

The *Handbook* (2006) is designed for use in the clinical environment to provide a quick reference to the ‘considerations’ for different surgeries and comorbidities, and the management of emergencies. Looking through its pages the novice anaesthetist can read that some patients require specific physiological conditions, such as the need to maintain systemic vascular resistance for a patient with aortic stenosis.<sup>6</sup> Likewise, some surgical procedures require operating conditions that are better facilitated by certain anaesthetic techniques, for example laparoscopic surgery<sup>7</sup> is difficult to

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<sup>5</sup> Regional anaesthesia involves the use of local anaesthetic drugs to ‘block’ sensory nerves. This can be done within the spinal canal using a spinal or epidural injection (together termed neuraxial anaesthesia), by targeting peripheral nerves; or by infiltrating local anaesthetic around the area of the operation.

<sup>6</sup> A form of heart disease which is caused by a constricted aortic valve. It is a relatively common comorbidity amongst hip fracture patients (e.g. Loxdale 2012). Because the outflow from the left ventricle is obstructed, vasodilation cannot be compensated-for by an increase in cardiac output. This results in a fall in blood pressure and a consequent decrease in cardiac perfusion – a ‘vicious cycle’. Aortic stenosis will be revisited in Chapter 5.

<sup>7</sup> Also known as ‘keyhole’ abdominal surgery; relaxed musculature is required in order that the peritoneum can be ‘insufflated’ to create sufficient space for surgery.

perform without the use of muscle relaxants. The patient and the surgery therefore shape anaesthetic choices by guiding the anaesthetist to close down what are seen as unsuitable options. Regarding the choice of anaesthesia for laparoscopic cholecystectomy<sup>8</sup> for example, the technique in the *Handbook* is presented as a *fait accompli*: ‘GA, ETT, IPPV’<sup>9</sup> (p538). At this level of granularity, anaesthetic technique is what philosopher and anthropologist of science Bruno Latour (1987) refers to as ‘black boxed’: it is uncontested; an ‘anaesthetic fact.’ Though many surgical operations have a corresponding ‘black boxed’ anaesthetic, for other procedures the technique is unstable. The setting of this study, anaesthesia for hip fracture, is one such scenario. Here, the *Handbook* presents a wide range of options, essentially covering the entire scope of anaesthetic practice,<sup>10</sup> and states that ‘there is little evidence to support one technique over another’ (p492).

The descriptions of *technique* in reference texts tend to be minimalist in the extreme. The nine letters that make up ‘GA, ETT, IPPV’ offer almost no description of how to ‘do’ anaesthesia; one cannot therefore learn to be an anaesthetist only by reading textbooks. As explained by Pope et al (2013) in their study of how anaesthetists acquire expertise in clinical practice, training involves experiential learning and the gradual acquisition of tacit knowledge. As Nuffield’s example demonstrates, one general anaesthetic (GA) may be quite different from the next for both anaesthetist and patient. What is not clear from this story is what made Macintosh’s anaesthetic

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<sup>8</sup> ‘Keyhole’ removal of the Gallbladder. The story of the laparoscopic cholecystectomy will be revisited in Chapter 6.

<sup>9</sup> This abbreviation is part of the language of anaesthetics: ‘general anaesthesia, endotracheal tube, intermittent positive pressure ventilation’.

<sup>10</sup> General anaesthesia (both spontaneously-breathing and IPPV), neuraxial anaesthesia, nerve blocks, and local anaesthesia are all presented as possibilities, as standalone techniques and in combination.

so superior. Three features present in the description could offer an explanation: the use of a new (better?) anaesthetic agent, the care of a particular (expert?) anaesthetist, and the perceptions of the individual patient (Nuffield appreciated the subtleties of anaesthetic technique even if some of his contemporaries did not.)

### **Hip Fracture, Frailty and Anaesthetic Practice**

Hip fractures are an increasing concern for public health. They are a common major traumatic injury amongst frail elderly people: approximately 65,000 cases occur in England every year, the mean age of incidence is 82 years, and the most common mechanism of injury is a fall from standing height or less (e.g. White and Griffiths 2011, White et al 2014a, Nevitt and Cummings 1992). In order to minimise pain and the risk of complications, early surgical repair is advocated (e.g. Johansen et al 2017); despite this however, the risk of death remains high, generally between five and 10 per cent within 30 days, and up to 30% at one year (White and Griffiths 2011, White et al 2014a, Boulton et al 2016). Hip fracture patients often have multiple medical and social considerations, and their clinical complexity appears to be increasing (Baker et al, 2014). This offers some explanation as to why recovery is often incomplete: about one-third of hip fracture patients who live in their own home at the time of injury require institutional care thereafter (Keene et al, 1993. Johansen et al 2013).

The above numbers, obtained from epidemiological studies, outline the fragile situation of the hip fracture patient and highlight the importance of minimising the adverse impacts both of their injury and the healthcare interventions they undergo for it to be repaired. Anaesthesia is one such intervention, and it has long been suspected that anaesthetic mode influences outcomes. This formed the focus of the national

audit (White et al 2014a) which has inspired my research question. This study found no significant difference in mortality at five or 30 days when regional and general anaesthesia were compared; the authors suggested an explanation for their findings (p228):

‘... the absence of a difference might indicate that [general anaesthesia] or spinal anaesthesia as definitions of anaesthesia might be too broad in the context of hip fracture repair, and disguise differences between ‘good’ and ‘bad’ techniques...’

Reading this comment, effectively a call for a more nuanced appreciation of *technique*, I considered my own practice as a hip fracture anaesthetist and how it had changed over the years. Early in my career (circa 2010), as a senior house officer, I rotated<sup>11</sup> to a small district general hospital (DGH), which was often not sufficiently staffed to cover all of its out-of-hours anaesthetic activity. As part of my on-call duties, it therefore sometimes fell to me to provide anaesthesia for the trauma list. Thrown by circumstance into anaesthetising hip fracture patients, I was aware that it was the usual institutional practice to provide spinal anaesthesia with approximately 3ml of 0.5% heavy bupivacaine<sup>12</sup> supplemented with diamorphine<sup>13</sup>, and I did this when possible. However, I was not particularly experienced at spinal anaesthesia and failure to insert the needle into the correct anatomical location was therefore not an infrequent occurrence. As a result, I provided GA ‘by default’ in a substantial proportion of cases, using a technique with which I was comfortable: intravenous

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<sup>11</sup> Junior doctors move from hospital to hospital every few months as part of a training ‘rotation’.

<sup>12</sup> A local anaesthetic agent which blocks neuronal transmission; ‘heavy’ bupivacaine is combined with a glucose solution so that it sinks in the cerebrospinal fluid when used in spinal anaesthesia, allowing some control over which nerve roots are blocked through manipulating the position of the patient.

<sup>13</sup> An opioid known colloquially as heroin, when used in spinal anaesthesia it provides postoperative analgesia.

induction with propofol<sup>14</sup> followed by volatile<sup>15</sup> maintenance. Furthermore, I was not experienced in peripheral nerve blockade so tended to administer sedation for insertion of the spinal, and intravenous opioid analgesia was part of my general anaesthetic technique. Over the years I have maintained a link with the small DGH, which remains somewhat understaffed, and in times when my salary has been reduced (i.e. whilst working at the University) I try to do one or two trauma lists per month on a locum basis. As I have progressed in my training my techniques have changed substantially: I am happy to provide either general or spinal anaesthesia and try to make the decision to administer these based largely on patient preference providing there are no strong contraindications to one or the other. Examination of my anaesthetic logbook indicates that I provide approximately equal numbers of general and spinal anaesthetics, administered (at the time of writing) according to two basic 'recipes':<sup>16</sup>

- For spinal anaesthesia: a fascia iliaca compartment block (FICB)<sup>17</sup> prior to positioning<sup>18</sup>, then a spinal anaesthetic with 1.5-2.0ml of 0.5% heavy bupivacaine (given with the patient positioned injured side down; position

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<sup>14</sup> An intravenous anaesthetic agent, commonly used for induction of anaesthesia.

<sup>15</sup> Volatile anaesthetics are a group of halogenated ethers which cause narcosis when inhaled.

<sup>16</sup> This comparison between anaesthesia and cookery is borrowed from Dr Willmott, my clinical supervisor when I was in my second year of anaesthetic training. He wore shoes decorated with pictures of cooking utensils when working in theatre; I once asked him why he wore chef's footwear and he explained that anaesthesia is like making a meal: the ingredients are vital, but how they are combined is just as important. He saw the role of the anaesthetist as being like that of the chef – understanding how ingredients work together. This is distinct from the pejorative phrase 'cookbook medicine' (e.g. Lambert 2006), which implies following the same directions without thought in every circumstance.

<sup>17</sup> A 'compartment' block which deposits local anaesthetic around the femoral, obturator and lateral cutaneous nerves of the thigh; sensory nerves relevant for hip fracture surgery.

<sup>18</sup> The injection for spinal anaesthesia is made in the patient's lower back, typically between the spinous processes of third and fourth lumbar vertebrae. In order to make this possible the patient must be sat upright or rolled onto their side; these are painful manoeuvres with a broken hip.

maintained for approximately five minutes after injection to attempt to lateralise the spinal block). Sedation only if requested by the patient.

- For GA: inhalational induction with sevoflurane<sup>19</sup>, then a spontaneously-breathing maintenance with a laryngeal mask airway (LMA)<sup>20</sup> or ETT<sup>21</sup>. FICB under GA prior to surgery, supplemented with intravenous paracetamol.

Both of my recipes represent prototypes; on occasion I modify them to account for patient factors (for example, the presence of heart valve disease) or surgical factors (e.g. anticipated complex or prolonged procedure).

Reflecting on my journey in hip fracture anaesthesia, I could see that my recipes and the reasons for opting for one mode or another had changed substantially over the course of my training, but considering White et al's concept of 'good' and 'bad' techniques (2014a) it is difficult to know if my former or present practices (or any of the many intermediate stages) could be deemed to be 'good'. Even at the most basic level of patient mortality, there is no system in place to routinely inform trainee anaesthetists if their patients die postoperatively, and follow-up is made challenging by patients moving to different wards, care being transferred to different teams, and the demands of a working schedule which has never included time for follow-up. What then, in the absence of formal data about my own outcomes, inspired my change in practice? In honesty, my path is not entirely clear to me; I believe that my current techniques are shaped by a multiplicity of the evidence presented in the current

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<sup>19</sup> An inhalational anaesthetic agent, inhalational induction uses inhaled agents to induce unconsciousness.

<sup>20</sup> An airway device which sits on top of the larynx to maintaining a patient airway.

<sup>21</sup> The ETT passes through the larynx and is sealed with an inflatable cuff, forming a more 'definitive' airway than then LMA.

anaesthetic literature, what experts in the field suggest, and things that I have ‘borrowed’ from other anaesthetists. In addition, there is also a substantial contribution from an iterative process of ‘trying things out’ to see how well they work in my hands.

Contemporaneous with my development as an anaesthetist, there has been a steady increase in the publication of national guidelines for anaesthesia. The first of these of relevance to hip fracture was published in 2007 by the British Orthopaedic Association. This guideline, known as ‘the blue book’, focused predominantly on the surgical and orthogeriatric aspects of fracture management and adopted a restrained and neutral stance on anaesthetic technique, stating: ‘there remains considerable uncertainty on a fundamental aspect of hip fracture care – namely the choice of anaesthetic technique’ (p18). In 2009 this was followed by the Scottish Intercollegiate Guideline Network (SIGN) guideline, which had influence throughout the UK.<sup>22</sup> Somewhat ambitiously, it aims to cover all facets of hip fracture care from pre-hospital assessment to rehabilitation and discharge. It therefore has limited space for each component and dedicates only one-and-a-half pages to anaesthetic practice. Notably, matters pertaining to technique are phrased not as directions but suggestions, the guideline’s preference for neuraxial anaesthesia and regional nerve blocks limited only to a recommendation that they ‘be considered’.

The first document to centre on anaesthesia was the 2011 guideline from the Association of Anaesthetists of Great Britain and Ireland (AAGBI)<sup>23</sup> on the

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<sup>22</sup> The Scottish Medical Royal Colleges have regulatory powers which extend throughout the UK.

<sup>23</sup> In 2019, the AAGBI was re-branded as the Association of Anaesthetists (AoA). However, in this thesis I will use AAGBI as this name is contemporary with my data.

*Management of Proximal Femoral Fractures* (Griffiths et al). This 30-page document is endorsed by a number of professional bodies including the Age Anaesthesia Association<sup>24</sup>. Though the text contains more detailed advice on anaesthetic technique than the SIGN document, these recommendations are not described in the guideline summary on the first pages of the document; instead, this concentrates on organisational concerns (Figure 1).

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1. There should be protocol-driven, fast-track admission of patients with hip fractures through the emergency department.

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  2. Patients with hip fractures require multidisciplinary care, led by orthogeriatricians.

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  3. Surgery is the best analgesic for hip fractures.

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  4. Surgical repair of hip fractures should occur within 48 hours of hospital admission.

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  5. Surgery and anaesthesia must be undertaken by appropriately experienced surgeons and anaesthetists.

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  6. There must be high-quality communication between clinicians and allied health professionals.

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  7. Early mobilisation is a key part of the management of patients with hip fractures.

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  8. Pre-operative management should include consideration of planning for discharge from hospital.

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  9. Measures should be taken to prevent secondary falls.

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  10. Continuous audit and targeted research is required in order to inform and improve the management of patients with hip fracture.
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Figure 1: Summary of the AAGBI guidance  
(Griffiths et al 2011; p1-2)

In 2014 the NHTD conducted a study of anaesthesia care known as the Anaesthesia Sprint Audit of Practice (ASAP) (Boulton et al 2014). The name is significant here; ‘audit’ constitutes a particular form of study in healthcare. Unlike research, which aims to generate original knowledge, audit claims simply to measure practice against a defined set of standards (e.g. Benjamin 2008). In the case of ASAP these (Figure 2) were derived from the AAGBI document (Griffiths et al 2011), and in doing-so an important distinction was made; what started as ‘guidelines’ became ‘standards.’

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<sup>24</sup> The Age Anaesthesia Association describes itself as ‘a collaboration of health professionals from anaesthetic, surgical and medical backgrounds with the shared mission of attaining age-equal access to and improved outcomes for older people undergoing surgery’ (date unknown).

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1. Patients should be anaesthetised by a consultant or specialist with similar clinical experience.

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  2. Spinal / epidural anaesthesia should be considered for all patients.

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  3. Spinal anaesthetics should be administered using heavy bupivacaine (< 10mg) with the patient positioned laterally (bad hip down)

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  4. Co-administration of intrathecal opioids should be restricted to fentanyl.

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  5. If sedation is required this should be midazolam or propofol.

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  6. Supplemental oxygen should always be provided.

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  7. Inhalational agents should be considered for the induction of general anaesthesia.

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  8. Spontaneous ventilation should be used in preference to mechanical ventilation.

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  9. Consider intraoperative nerve blocks for all patients undergoing surgery.

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  10. Neuraxial and general anaesthesia should not be combined.

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  11. Hypotension should be avoided.

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  12. Patients should be routinely assessed for the occurrence of bone cement implantation syndrome.
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Figure 2: The 12 ASAP standards

(from Boulton et al 2014; p6)

Is compliance with ‘standards’ the same as providing a ‘good’ anaesthetic? Reflecting on my own practice I can identify two areas in which I do not comply: I am not a consultant,<sup>25</sup> and I do not routinely administer additional oxygen to un-sedated patients intraoperatively unless their arterial oxygen saturation falls<sup>26</sup>. Are my anaesthetics therefore not good? I would contend that it is possible to comply with the 12 ASAP standards and still practice ‘badly’ – for instance, the manner in which the consent process is conducted, the treatment of the patient with dignity and compassion, and the precision of practical skills could all be argued to be of equal (if not greater) importance to many of the factors specified in ASAP. Furthermore, *how* techniques are undertaken may be of more significance than *if* they are undertaken: an example from my own story is my frequent failures to achieve spinal anaesthesia

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<sup>25</sup> I feel somewhat conflicted about my ‘non-compliance’ with this standard. I started providing hip fracture anaesthesia before the AAGBI guidelines were published and, despite my inexperience, didn’t worry too much about taking on the trauma list. Now, despite having gained nine more years of experience, I may be seen as acting beyond my competence. Some reassurance is found in the literature: White et al (2016a) found no difference in outcomes when anaesthesia for hip fracture repair was provided by sub-consultant grades.

<sup>26</sup> The percentage of the haemoglobin in the patient’s arterial blood which is bound to oxygen. It is measured using a ‘probe’ which is usually placed on a finger.

as a junior trainee<sup>27</sup>. Not only do such abortive attempts at lumbar puncture involve a burden of pain for the patient, but the time wasted constitutes an 'opportunity cost' which could be used to help others; this situation is undesirable on multiple fronts.

How best to avoid the prolonged attempts at spinal anaesthesia? Elderly patients often develop 'difficult backs' as vertebral interspaces narrow and ligaments calcify, and this is further compounded in the hip fracture setting by the challenge of positioning a patient who is in pain. Possible strategies to mitigate these challenges include designating orthopaedic trauma as a 'specialist' field and thereby limiting practice to expert anaesthetists, using ultrasound imaging to identify the site of needle insertion, providing analgesia or sedation to facilitate positioning, having a low threshold for conversion to general anaesthesia, or not attempting spinal anaesthesia in the first place and using GA as a primary technique. But these strategies have associated negatives: as Ramlogan and Niazi (2015) point out, if only experienced anaesthetists undertake spinal anaesthesia then how do the inexperienced learn? Does the use of imaging technology diminish other aspects of practical skills? My own ethnographic study in the context central venous cannulation (2016) suggests that it may. Is the use of systemic analgesia and sedation appropriate if, as Deiner and Silverstein (2009) suggest, it increases the risk of postoperative confusion? And is GA an appropriate default mode if, as found by Strøm et al (2014) post-operative pain control is less reliable as a consequence?

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<sup>27</sup> This circumstance also features prominently in the published ethnographic work of Smith et al 2006.

## Unpacking 'Good'

This is a study about good anaesthesia, but 'good' can mean many different things and has particular connotations in the medical context. Collins' Dictionary<sup>28</sup> (2016) contains 29 definitions of 'good' when used as an adjective; those relevant to the concept of a 'good anaesthetic' include 'suitable or efficient for a purpose', 'not negative, bad, or mediocre', 'reliable, safe, or recommended', 'comfortable', 'beneficial or advantageous', and 'morally excellent or admirable; virtuous; righteous'. The concept at the centre this study, the 'good anaesthetic' is therefore multidimensional, and maximising one form of 'good' may diminish another. For example, revisiting the earlier example of the prolonged attempt at spinal anaesthesia, an effort to make the postoperative period more 'comfortable' for the patient may make the anaesthetic less 'efficient'. The pursuit of different 'goods' may therefore go some way to explaining the diversity of anaesthetic mode used for hip fracture repair in a healthcare environment which, as outlined above, is moving towards standardisation.

What is the relationship between standardisation and good? Drawing on the 'McDonaldization' thesis of sociologist George Ritzer (2000), who used the example of the fast food restaurant to explain the effects of 'rationalization' on American Society, Timmermans and Epstein (2010) outline an apparent double standard. Whilst *standardisation* carries connotations of 'dull sameness, the suppression of individuality in the service of industrial uniformity' (p71), *standards* (which

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<sup>28</sup> The Oxford English Dictionary is perhaps the conventional resource, but I use Collins' Dictionary throughout this thesis. To me, Collins' presentation of example sentences makes it a more useful in explaining social contexts.

standardisation is predicated upon) are typically deemed to be aspirational. Considering Ritzer's work and the above dictionary definitions, 'McDonaldization' is consistent with certain goods: a visitor to a branch of the eponymous restaurant chain will certainly find it to be 'reliable' (i.e. the food is the same the world over) and 'efficient for a purpose' (i.e. supplying paying customers with food); indeed, these are two of the core components of Ritzer's theory. But can this approach be 'recommended' on the basis of the versions of good that it is able to offer? Whilst Ritzer acknowledges that there are advantages, he argues that there is an 'irrationality of rationality' where cultures of standardisation and individuals intersect, stating that 'rational systems are unreasonable systems... they deny the basic humanity, the human reason, of the people who work within or are served by them' (p154). In healthcare such 'human reason' is often described in terms of 'patient-centredness'.

Patient-centredness is of undeniable importance in healthcare; but is it important in the context of this study? To what extent does a patient participate in their anaesthetic? Sociologist Stefan Hirschauer, in his ethnography of surgery (1991), depicts patients as non-participants, describing how they are turned 'into objects' in preparation for surgery through the process of anaesthesia and the surgical field. However, as Harry Collins (1994) pointed out in his critique of Hirschauer, the anaesthetist maintains a view of the patient's face from behind the 'blood brain barrier'<sup>29</sup> thus maintaining the patient's role as a 'person'. Furthermore, as Collins

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<sup>29</sup> In physiology, the blood-brain barrier separates the circulation and the central nervous system and prevents noxious substances entering the brain. In the language of the operating theatre it is also the surgical drape used to separate the surgeon's work area from that of the anaesthetist (the surgeon is 'the blood', and the anaesthetist is 'the brain') (Anonymous 2016).

critically explores, regional anaesthesia allows the patient to remain awake and in verbal contact with the clinical team during surgery. This is not addressed by Hirschauer yet is of great relevance to this study as data from the NHFD indicates that 42% of patients receive spinal anaesthesia (with or without sedation) for hip fracture repair, thus remaining rousable, if not necessarily awake.

In cases where patients undergo a general anaesthetic, the anaesthetic team manages the transitions between consciousness and unconsciousness and the anaesthetic is therefore the only part of surgical process that the patient experiences consciously. The communication that facilitates these 'significant moments' in anaesthetic practice, as observed in Smith et al's ethnography of expertise in anaesthesia (2005), may simply be 'functional' – designed to inform or facilitate the technical practice of anaesthesia, but can also be 'descriptive' – offering explanation to the patient, and 'evocative' – the use of pleasant or familiar metaphors, typically in order to reassure. The latter two of these communication strategies indicate a sensitivity to the patients' experience which suggests that the perception of the patient as a 'person' is foremost in the mind of many anaesthetic providers. Drawing on data from the same study, Goodwin (2008) explains how anaesthetic care remains patient-centred even when the patient is unconscious: although the patient loses the ability to communicate verbally, they still act through the technologies by which they are monitored, allowing them to maintain 'agency without intentionality' (p348). Because of the representation of patients' needs conveyed by the monitor, Goodwin contends, anaesthetists have to 'work with the patient rather than impose a trajectory' (p361).

Further evidence for the importance of patient-centredness in anaesthetic practice is seen in Larsson and Holmstrom's focus group-based study (2013), in which anaesthesia nurses discussed how 'excellent' anaesthetists perform in the operating theatre. Based on their study and previous literature-based research (Holmstrom and Röing 2010), they develop their definition of patient-centredness (p119):

'By patient-centredness, we mean that caregiver and patient strive to find common ground, agreement on treatment, and shared decision-making. The healthcare provider should be sensitive to the patient's individual needs, knowing how to respond to them.'

Contrasting Larsson and Holmstrom's definition (2013) to the work of Goodwin (2008) raises questions about the degree to which patient-centredness relies on the conscious participation of the patient. Though 'agreement on treatment' and 'shared decision-making' appear to require interaction in the conventional sense, sensitivity to the needs of the patient may not, and appears to be compatible with Goodwin's conceptualisation of 'working with' the (unconscious) patient. The role of cognition in patient-centredness is particularly pertinent in the setting of hip fracture surgery, in which a substantial proportion of patients have a degree of cognitive impairment; raising the possibility that for some patients the monitor, the blood tests, or the physical observations may be a more effective advocate than the patient themselves. Descriptions of patient-centredness focus on the individual; being 'patient-centred' may therefore be a legitimate reason not to standardise. This tension was summarised by professor of medicine Al Mulley in his discussion of variation in the context of productivity in the NHS (2010; p214):

'If all variation were bad, solutions would be easy. The difficulty is in reducing the bad variation, which reflects the limits of professional knowledge and failures in its application, while preserving the good variation that makes care patient centred.'

Here, Mulley contends that variation in healthcare can be both 'good' and 'bad' and suggests that this dichotomy is defined by what the variation represents. In the context of hip fracture anaesthesia, it is evident from the ASAP results (Boulton et al 2014) that on the basis of mode, anaesthesia is characterised by variation (Figure 3): Hospitals at one end of the continuum provide around 90% general anaesthesia, and at the other end 80% spinal anaesthesia, with every degree of variation represented in-between. This is seen by some as definitive evidence of 'bad' variation; an opportunity to improve the quality and safety of patient care. Speaking at the 2014 *ASAP Data Gatherers' Meeting*, NHS England National Clinical Director for Trauma and orthopaedic surgeon, Chris Moran, contrasted the mode of anaesthesia graph (Figure 3) with what he presented as the uniform practices of his surgical colleagues in managing intertrochanteric hip fracture with dynamic hip screws (DHSs)<sup>30</sup>. Invoking Henry Ford<sup>31</sup>, another industrial analogy for standardisation, he reminded anaesthetists that 'variation kills reliability', and challenged them to reflect on their practice.

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<sup>30</sup> A device consisting of a lag screw which is inserted into the femoral head, and a plate which is affixed to the lateral wall of the femoral shaft. The screw can slide over a stem attached to the plate, causing the fracture to compress as load is applied.

<sup>31</sup> I have been unable to verify if this phrase is attributable to Henry Ford.

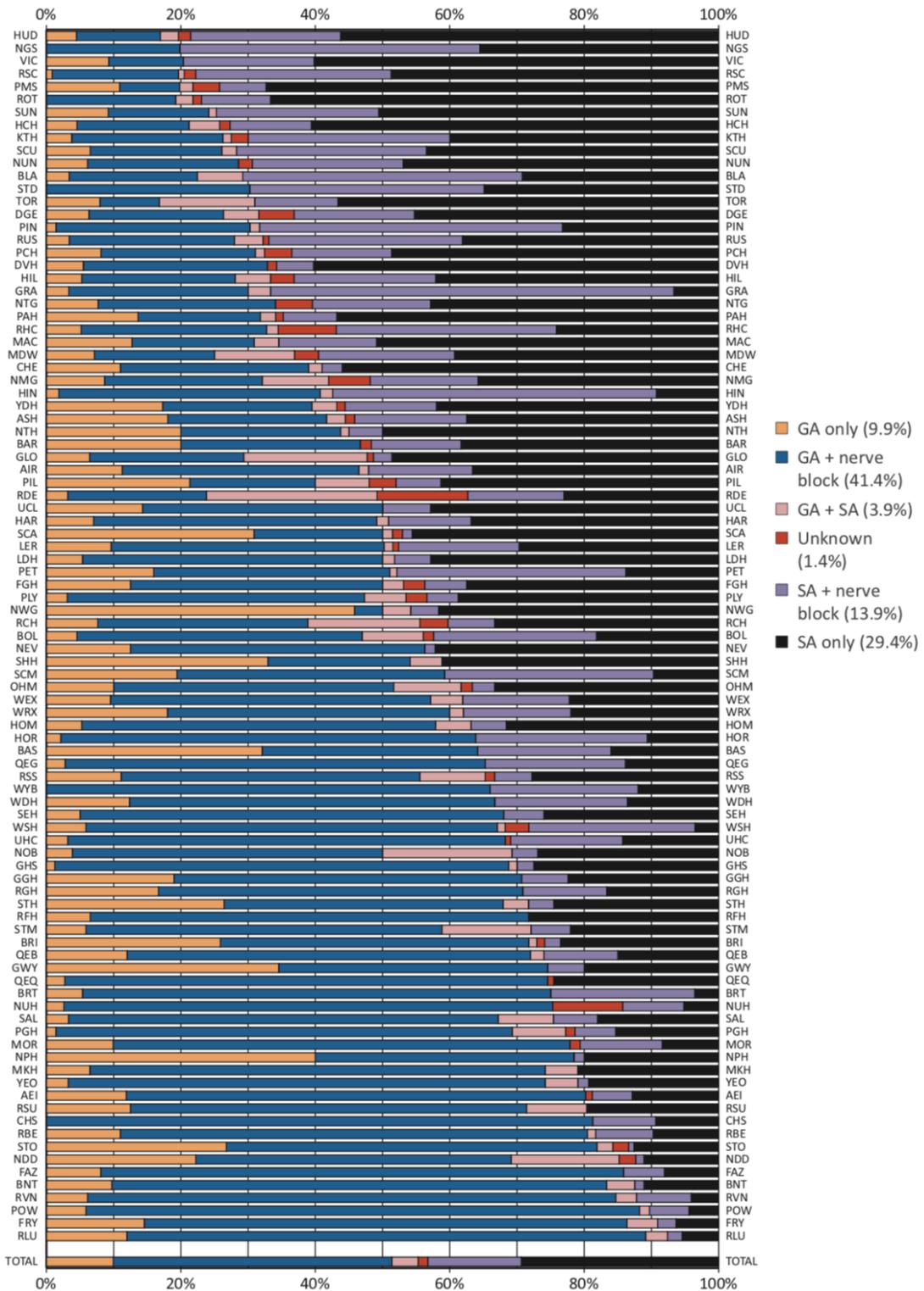


Figure 3: Mode of anaesthesia by hospital from Boulton et al 2014 (p21).

Within the medical profession therefore, the diversity of practice in hip fracture anaesthesia has been identified as a cause for concern, and work is on-going at a national level to attempt to standardise practice despite the evidence in the medical

literature becoming, if anything, more opaque.<sup>32</sup> This standardisation agenda is a feature of modern medical practice, inspired by the evidence-based medicine (EBM) movement and motivated by the medical profession's collective desire to be seen to be 'scientific', as observed by physician and philosopher Dick Willems (1998; p108):

'Often interphysician variation is taken to be a scandal. From outside medicine, the fact that treatment may seem a matter of habit or taste rather than rigorous application of well-established knowledge, is denounced as a sign of irrationality. From inside medicine, it is considered to be one of the main reasons for loss of confidence in the medical profession. The desire to counter interphysician variation is one of the driving forces behind the present proliferation of consensus statements and treatment guidelines.'

To what extent is standardisation possible? In discussing their ethnographic studies of Advanced Cardiac Life Support (ACLS)<sup>33</sup> and oncological research protocols, Timmermans and Berg (1997) point out that even when practices rely on protocolised care (e.g. ACLS), they are undertaken with 'necessary diversity' in order to be made 'workable in practice'; they rely on active support to achieve the *requirements* of the protocol and this requires some latitude. Instead of directing every possible aspect of care, the protocols serve as 'technoscientific scripts' which bring together the trajectories of other actors (e.g. healthcare providers, patients, and non-human elements) that interact with them. This, they contend, allows care to achieve universality 'at an overall level' whilst accommodating local or individual differences. This suggests that the extent to which a practice can be deemed to be standardised is not absolute but relies on the level of granularity with which it is observed. If ACLS can

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<sup>32</sup> For example, the first Cochrane review on hip fracture anaesthesia (Parker et al 2004) concluded that regional anaesthesia was beneficial, but the latest iteration (Guay et al 2016) finds no difference between general and regional anaesthesia. This is discussed in-depth in Chapter 3.

<sup>33</sup> A protocol for the treatment of cardiac arrest, including cardiopulmonary resuscitation and defibrillation.

be standardised 'overall' only through being locally 'diverse', could apparently uniform anaesthetic practice be highly variable when viewed close up?

Whereas Timmermans and Berg (1997) examine 'protocols', the ASAP standards and national guidelines are notably flexible in comparison, leaving room for almost infinite interpretation. Taking ASAP standard 5 as an example (Figure 2): 'if sedation is required this should be midazolam or propofol', the indication, timing, dose, endpoint, and route of administration (factors that are all specified for the use of medications in ACLS) are left to the anaesthetist's discretion. Perhaps anaesthesia's standards and guidelines are not scripts, but more like the audience 'call-outs' in improvisation theatre? As Annemarie Mol (2002; p32) points out, 'if there is no script, actors improvise', is it therefore any surprise that practice is diverse? It may in fact be more surprising that practice within some institutions appears, superficially, to be so consistent. Diverse practice within and between institutions, lack of definitive evidence, flexible guidelines, and an ongoing debate in 'the literature' mark out hip fracture anaesthesia as what Bruno Latour (1987) describes as an 'open box'.

According to Latour (1987), 'ready-made science' can be thought of as a 'black box'.<sup>34</sup> This analogy places the inside of the box beyond the reach of the user and suggests that attempting to understand its contents is unnecessary or even inadvisable. By contrast, Latour describes 'science in the making' as an 'open box'; the contents visible and amenable to change. Latour's first 'rule of method' (p258) states:

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<sup>34</sup> This parallel is drawn from computer sciences, where complex functions about which the user needs to know nothing other than their inputs and outputs may be graphically represented by a black box.

‘We study science *in action* and not ready made science or technology; to do so, we either arrive before the facts and machines are blackboxed or we follow the controversies that reopen them.’

To what extent is anaesthesia blackboxed? This depends on the perspective from which the question is asked; though the *Oxford Handbook* is replete with apparently blackboxed descriptions of technique, as a registrar on rotation I have observed that even the most prosaic anaesthetic interventions differ from list to list, from hospital to hospital, and from practitioner to practitioner. Individual anaesthetists, particularly those in senior positions, often vehemently defend ‘their way’ of doing something. My experience is that whilst such blackboxing occurs on an individual level; one of the perennial frustrations from a trainee anaesthetist’s perspective is that what is ‘right’ when working with one consultant may be ‘wrong’ when working with the next.

From a more distant perspective however, my contention is that all of anaesthesia remains something of an open box. One reason for this is that the elements that make up ‘an anaesthetic’ are constantly changing: new technologies are developed, old ones are abandoned (then sometimes re-adopted), patient populations become more complex, training curricula are revised, finances are restricted, surgery becomes more ambitious and fashions change. More importantly for this study however, the environment in which anaesthesia exists is not stable. Latour (1987) suggests that we ‘follow the controversies’ that challenge the integrity of blackboxed science, and the standardisation agenda in hip fracture anaesthesia is one such ongoing controversy. Like a frustrated registrar moving from one consultant’s list to the next, experienced clinicians now face the possibility that their ‘blackboxed’ technique, developed over a whole career, now falls short of ‘the standards’. Recently therefore, the boxes of hip

fracture anaesthesia have been prised open; now is an ideal time to examine their contents.

## **Chapter 2: Shaping an Anaesthetic Ethnography; Becoming an Anaesthetist-Ethnographer**

This chapter serves multiple purposes. Responding to the context that I have outlined, I explain my research questions, justify the ethnographic approach that I have adopted, and describe the methods that I use for collecting and analysing data. This requires some discussion of technical details; not only of the research process but of the legal and ethical structures that govern healthcare research. Such matters are particularly important in this study, situated in an acute environment and involving patients who are usually frail, often in pain, and in many cases have impaired cognition. The default position seems to be to exclude such patients from research, but in this chapter, I will explain why such patients' stories need to be told, and how I worked with the regulations to allow these patients into my study.

This chapter also describes the formation of links between my established professional role as an anaesthetist, and my developing identity as an ethnographer. This does not involve leaving my anaesthetist-self behind; I do not believe that this would be possible, instead the process is one of development, adding my new role to that which is already established. Being both anaesthetist and ethnographer of anaesthesia presents some practical benefits in terms of access and prior knowledge, but also methodological and ethical challenges: am I an 'insider' or an 'outsider'? Can I make anaesthesia 'strange'? To what extent am I responsible for patient safety? How will I be perceived in the hospital environment? Careful planning and a reflexive approach are required here; in illustrating this I begin to introduce some of the data from my study.

## Research Questions

Developing the research questions for this study required me to adopt an epistemological stance. Positivism remains the predominant approach within medical research and practice as indicated by Mulley's statement on 'good' and 'bad' variation (2010) and Moran's Henry Ford-inspired criticism of anaesthetic practice (2014), both of which imply that (bad) variation can be eliminated as the truth is discovered and enacted. Whilst this is the conventional point of view in evidence-based medicine (EBM), is it a reasonable perspective to adopt in this study? Am I aiming to conclude this thesis by writing down the definitive method of hip fracture anaesthesia? Or could the 'good anaesthetic' be multiple, dependant on the context in which it is provided and the interplay between the complexities of patients, staff, and the environment in which they meet? Based on my experience in practice, the frustrated efforts of EBM to produce evidence in favour of one anaesthetic mode or another, and the 'local universality' arguments of scholars such as Timmermans and Berg (1997) the former seems to be unrealistic. In this study I therefore adopt a novel perspective (though one that is well-established in social sciences): instead of aiming to find 'the method' for anaesthetising this diverse and complex group of patients, I adopt an interpretivist approach in order to address two broad research questions:

- 1) How do anaesthetists rationalise their decisions and actions in providing anaesthesia for hip fracture patients?
  - Based on the assumption that anaesthetists design their own practice to be 'good' and have access to broadly the same training and evidence from the medical literature with which to inform their choices, it follows that there

must be differences in the interpretation of evidence or local factors that interact with the evidence to create unique circumstances in particular institutions.

2) To what extent is the concept of a 'good anaesthetic' shared between and within institutions, groups of patients, anaesthetists and other healthcare professionals? What are the factors underlying any differences?

- Anaesthesia is never an end in itself; it is provided in order to make it possible for the patient to tolerate a procedure. Anaesthesia therefore cannot be fully 'untangled' from the patient, the surgery, the institution. and those who care for the patient before, during and after their operation. In researching the concept of a 'good anaesthetic', these multiple perspectives must be reconciled.

In order to address these questions, it is not enough to simply record *what* is done in any given anaesthetic, though this does form part of the picture. My emphasis is on *why* and *how* anaesthesia is provided and investigating this requires a methodology that 'gets beneath the skin' of practice. I therefore adopt an ethnographic approach.

### **The Argument for the Ethnographic Approach**

Reeves et al (2008; p512) define ethnography as 'the study of social interactions, behaviours and perceptions that occur within groups, teams, organisations and communities.' It is a methodological approach predominantly concerned with observation of practice in naturalistic environments, though interviews and documentary analysis are often used within an ethnography. The observer is typically

acknowledged as being present<sup>35</sup>, thereby affecting the environment that they are observing, and is often referred-to as a 'participant observer' (Frankham and MacRae 2011). In addition to documenting the practices that they observe; the ethnographer analyses the data they produce. To use a scientific analogy, they are the 'instrument' of both measurement and analysis. As a result of this, it is of particular importance that ethnographic researchers are reflexive, maintaining an awareness of their influence during all phases of their study (e.g. Pope and Mays 2006, Mallory et al 2001).

Ethnography has its origins in anthropology. Bronislaw Malinowski, often referred-to as the 'father' of modern ethnography, was a Polish anthropologist who studied the culture of the Trobriand Islanders by living amongst them for an extended period of time (e.g. Malinowski 1932). This was a methodological breakthrough in the early 20<sup>th</sup> century, before which time anthropology had largely been conducted remotely through the interpretation of stories brought back by travellers; so-called 'armchair anthropology' (Scott-Jones 2010). However, ethnography has evolved far from its anthropological roots; it would now be unusual to attempt to study the whole culture of a nation, but rather a particular sub-culture, often in performing a particular role. As Mayan (2009; 37) points out, 'we no longer need to travel to far-away places to study culture; nor is culture defined only along ethnic or geographical lines.' With this more-focused approach to ethnography has come an acceptance that ethnographers

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<sup>35</sup> Gold (1958) describes a continuum of roles in social fieldwork comprising: complete participant (where the researcher becomes a member of the community, without them knowing that they are being observed), participant-as-observer, observer-as-participant, and complete observer (where the researcher is removed from any 'social interaction', i.e. eavesdropping). He explains that the complete observer is 'almost never' a dominant role.

may join and leave the culture in question over time, rather than the methodology being reliant on protracted immersion (Scott-Jones 2010, Fetterman 1997). The ultimate expression of this trend is the development of so-called 'rapid ethnography', which has applications where just a few days of research targeted on a specific question may be more 'culturally palatable' than the more open-ended approach of more 'traditional' ethnographies, particularly in corporate environments where swift results are expected (e.g. Isaacs 2013). However, as ethnographer of technology Melissa Cefkin asserts (2013; p114), 'everyday life can't be speeded up: it unfolds in the time it takes to unfold.' This is particularly true in my context of non-elective surgical care, where trauma lists are constantly re-negotiated, and operations are frequently delayed, cancelled or moved to other operating theatres. The trauma list is rarely a rapid-turnover working environment and ethnographies of trauma anaesthesia, it turns out, are similarly inefficient. That is not to say that 'theatre downtime' was wasted in my study; many of my most informative encounters took place in the coffee rooms and the corridors whilst waiting for something to happen. This ethnographic tradition of 'hanging out' (e.g. Clifford 1996), potentially sacrificed in less immersive forms of ethnography, is integral to my study.

Healthcare has proved to be a fertile ground for ethnographic research, and studies using this approach have provided insights into areas of practice as diverse as nurse-doctor relationships, drug errors, the application of guidelines, and clinical expertise (e.g. Allen 1997, Taxis and Barber 2003, Gabbay and Le May 2004, Smith et al 2003, respectively). These ethnographies focus on the workplace (e.g. Knoblauch 2005) as the sub-cultures of interest form when the participants are at work. Ethnographies have also been conducted from the patient perspective in mental health, epilepsy and

Parkinson's disease, to cite only a few examples (Goffman 1968, Fadiman 2012, Hinder 2012). What unites all of these healthcare ethnographies is that they are situated amongst a particular group, and this has particular relevance for researching clinical practice, where different hospitals and professions are known to develop institutional traditions and tribalistic tendencies (Van der Geest and Finkler 2004).

Evidence for the traditions of practice that are adopted by different institutions is found not only within the ethnographic literature, but in the 'big data' of the NHFD, which has collected information on mode of anaesthesia since 2013. The diversity of practice represented here is striking (e.g. Figure 3). During the planning of my study, data from 2013 and 2014 were available (Boulton et al 2014, 2015). Examination of these two consecutive years confirms that the tendency of hospitals to adopt a particular mode of anaesthesia is consistent over time (Figure 4). The north-west of England, the location of this study, is a relatively compact geographical area of approximately 100 miles by 50 miles, yet it is the most diverse region in in the NHFD in terms of anaesthetic technique, with mean rates of neuraxial anaesthesia ranging from 7.2% to 93.3% (Figure 4).

	<b>Neuraxial<sup>36</sup> Anaesthesia (%)</b>		
	<b>2013</b>	<b>2014</b>	<b>Mean 2013-2014</b>
Royal Liverpool University Hospital	8	6.4	7.2
University Hospital Aintree	14	10.8	12.4
Leighton Hospital, Crewe	n/a	13.4	13.4
Whiston Hospital	16	18.5	17.3
Royal Lancaster Infirmary	n/a	17.4	17.4
Warrington Hospital	18	17.8	17.9
Noble's Hospital, Isle of Man	31	5.5	18.3
Royal Albert Edward Infirmary, Wigan	19	33.5	26.3
Arrowe Park Hospital, Wirral	30	29.4	29.7
Stepping Hill Hospital, Stockport	41	31.9	36.5
Wythenshawe Hospital, Manchester	49	28.3	38.7
Royal Oldham Hospital	37	47.6	42.3
Royal Bolton Hospital	42	46.1	44.1
Furness General Hospital, Barrow	44	47.1	45.6
Southport District General Hospital	n/a	46.2	46.2
Cumberland Infirmary, Carlisle	54	40.5	47.3
Manchester Royal Infirmary	48	50.3	49.2
Salford Royal Hospital	66	50.6	58.3
North Manchester General Hospital	52	69.3	60.7
Macclesfield District General Hospital	65	69.8	67.4
Countess of Chester Hospital	82	64.4	73.2
Royal Preston Hospital	69	77.5	73.3
Royal Blackburn Hospital	71	82.7	76.9
Victoria Hospital, Blackpool	80	87.2	83.6
Tameside General Hospital	94	92.5	93.3
<b>North West Average</b>	<b>40</b>	<b>43.4</b>	<b>41.7</b>

Figure 4: Data regarding mode of anaesthesia in the North West of England adapted from Boulton et al 2014 and 2015.

This consistency of practice within institutions, but diversity of practice between institutions is curious as, due to the nature of medical training, many of the region's anaesthetists will have trained together at medical school and subsequently on rotation before becoming consultants and settling at one hospital. The pattern of the NHTD data suggests that institutional culture at the level of the hospital represents a

<sup>36</sup> The 2013 NHTD data specifies 'spinal or epidural anaesthesia' and the 2014 data specifies 'spinal anaesthesia' only. Together I have termed these 'neuraxial anaesthesia.'

substantial influence on the mode of anaesthesia provided, whereas the movement of (predominantly trainee) anaesthetists from one hospital to another, and the recruitment of new consultants has comparatively little effect. Such differences in institutional practices are not unique to hip fracture anaesthesia however; in his 1983 Rovenstine Lecture on cardiac anaesthesia, professor of clinical anesthesiology Arthur Keats observed (p472-473) that in the absence of 'hard evidence':

'Each institution has its own magic of good and best, that high-dose fentanyl<sup>37</sup> may be a panacea in Toronto, but frankly noxious in San-Francisco, that Swann-Ganz catheters<sup>38</sup> may be lifesaving in Atlanta, but mostly a nuisance in Houston'.

As an approach that is interested in the relationship between culture and practice, ethnography is an ideal methodological approach with which to investigate the concept of 'good anaesthesia' for hip fracture surgery.

### **Methods and Participants**

Through the use of ethnographic methodology, I aim to understand practices which, as discussed above, appear to have been influenced by the cultures of the institutions in which they are performed. The diversity in practice which is seen in hip fracture anaesthesia has led to criticism (e.g. Moran 2014); however it cannot be said if the variation that is seen is 'good' or 'bad', as defined by Mulley (2010), 'necessary' as described by Timmermans and Berg (1997), or a combination of these. From my perspective, the variation that is seen in hip fracture anaesthesia is striking, interesting, and worthy of investigation in order that it should be better understood; not only because this will inform hip fracture anaesthetic practice, but as a lens

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<sup>37</sup> A synthetic opioid drug often used at induction of anaesthesia and for intra-operative analgesia.

<sup>38</sup> A catheter which traverses the right side of the heart to enter the pulmonary arterial circulation. It can be used to assess physiological pressures, cardiac output, and blood biochemistry.

through which to view the debates surrounding standardisation in medicine and healthcare. Variation in anaesthetic technique therefore became the basis for the locations of my ethnography (sampling strategy outlined in Figure 5): using data regarding anaesthetic technique from the ASAP and NHFD reports (Boulton et al 2014, 2015) I identified three anaesthetic departments in the north-west of England and in which I had never worked as a clinician. The hospitals are similar in terms of hospital size, location, patient population, and outcomes in terms of 30-day mortality and the proportions of patients discharged to their original domicile, but diverse in terms of anaesthetic technique. In order to preserve anonymity, I have re-named them, borrowing the names of the fells from my native county of Cumbria:

- Beckfoot Hospital undertakes approximately 80%<sup>39</sup> of hip fracture surgery under spinal anaesthesia, and 20% under GA.
- Mellbreak Hospital undertakes approximately 50% of hip fracture surgery under spinal anaesthesia, and 50% under GA.
- Longside Hospital undertakes approximately 10% of hip fracture surgery under spinal anaesthesia, and 90% under GA.

I prospectively identified two 'key informants' (individuals who are involved in the organisation, as opposed to simply the delivery of hip fracture anaesthetic care) at each hospital: the lead anaesthetist for hip fracture and the clinical lead for the anaesthetic department. In order to orient myself to the institution, I invited these key

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<sup>39</sup> These percentages are rounded to the nearest 10% to preserve anonymity without unduly affecting their meaning.

informants to participate in an introductory semi-structured interview (median duration 26 minutes, range 15-48 minutes; see appendix 1 for topic guide), during which I asked them to nominate other key informants at their hospital (defined as those who had an overview of, or strategic input into, hip fracture anaesthesia), and so-on in a process of 'snowball sampling' until no new key informants were identified.

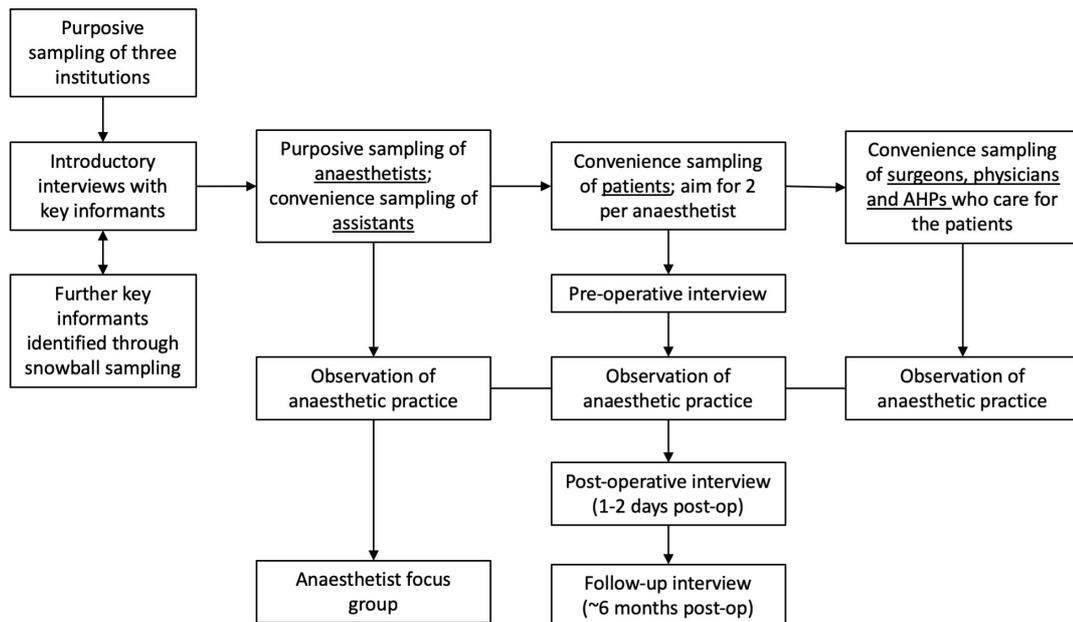


Figure 5: Schematic of sampling strategy

The introductory interviews are an important resource in providing an orientation to organisational culture and practices, however reflecting on the snowball sampling process also yields useful information. At Longside and Beckfoot hospitals I feel that I was welcomed with enthusiasm by all participants and obtaining access for interviews was limited only by the busy working schedules of the interviewees. However, at Mellbreak Hospital key informant interviews proved somewhat more challenging because of on-going organisational changes in the orthopaedic department. The principal challenge at this institution was that there appeared to be some debate over *who* the surgeon with responsibility for hip fractures actually was; the key informants

gave me different names from one another, which were also different from those given by the orthopaedic department secretaries. I therefore contacted all of the potential candidates: one (Eddie Atterberry<sup>40</sup>, who it eventually transpired is the clinical lead for trauma overall, not just hip fractures) did not respond and after several attempts to contact him I decided that his non-responsiveness probably represented a wish not to participate. Bert Pond turned out to be the orthopaedic clinical lead for hip fracture surgery, and the final potential candidate Forrest Abel, the lead for elective hip surgery. Interviews are catalogued in Appendix 1 and represented diagrammatically in figures 6-8.

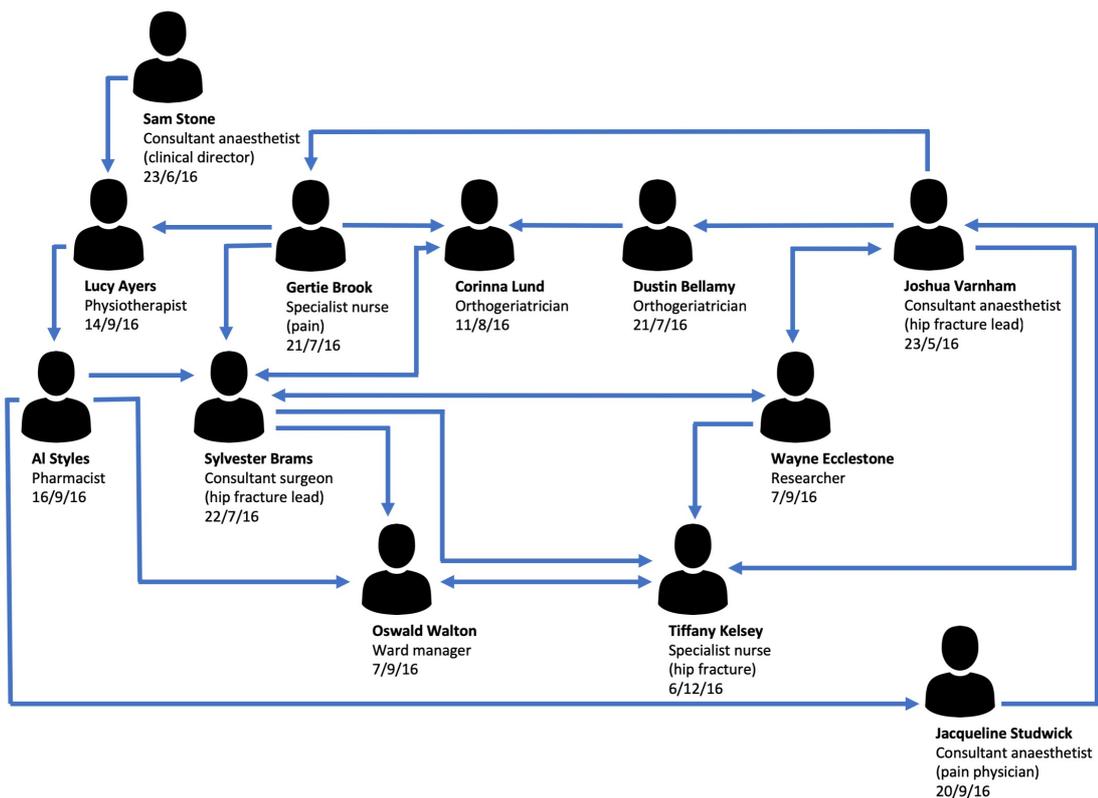


Figure 6: Snowball sampling of key informants at Longside  
(arrow direction represents a key informant 'nomination' in the direction of the arrow)

<sup>40</sup> Participants' pseudonyms are underlined throughout this thesis to distinguish them from names that appear in reference to literature.

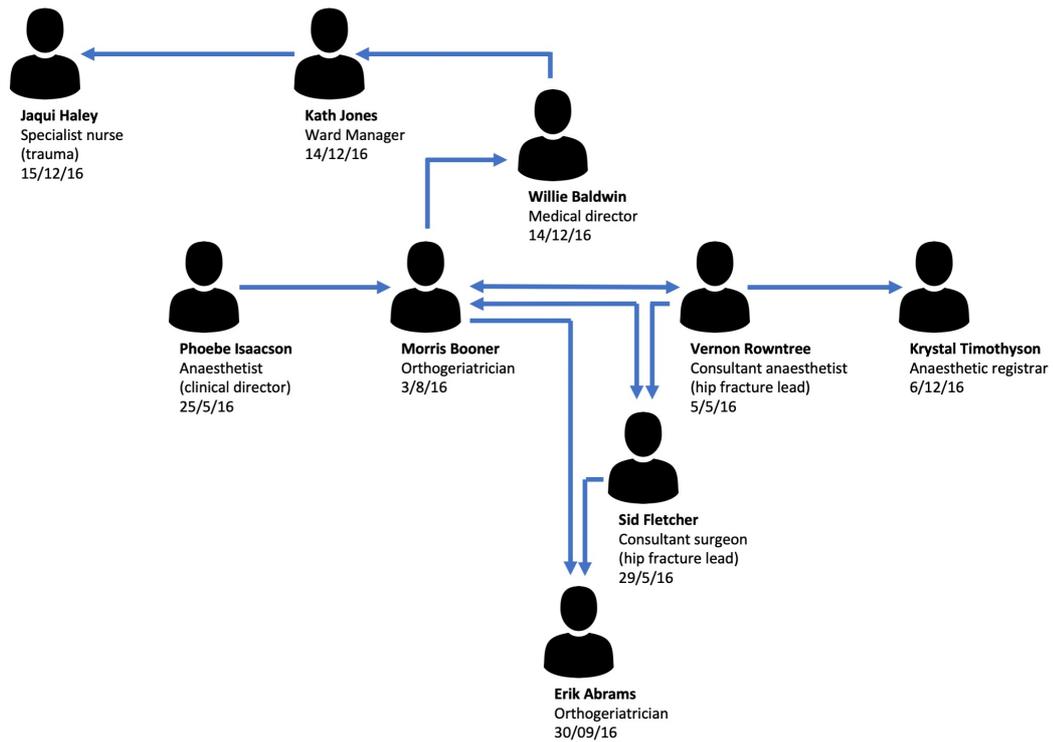


Figure 7: Snowball sampling of key informants at Beckfoot

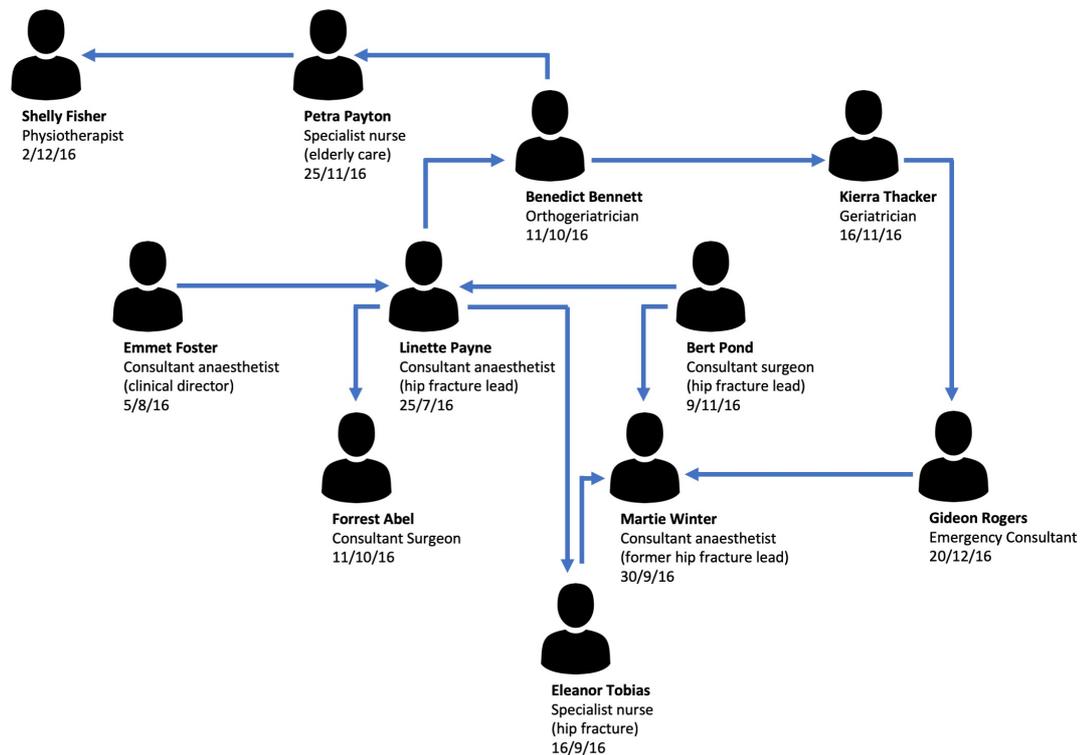


Figure 8: Snowball sampling of key informants at Mellbreak

Once the introductory interviews were completed, I commenced the observations of anaesthetic practice (catalogued in Appendix 2). My observations were ‘observer-as-

participant' in nature (Gold 1958); I engaged in discussion with participants and sometimes assisted with simple tasks such as fetching equipment or tidying the operating theatre in-between cases in order to maintain goodwill. I did not attempt to hide my clinical background; this would have been farcical given that, due to the rotational nature of training, I am known to many of the participating anaesthetists. Furthermore, early in the project it became clear that I somehow project the 'doctor' role, perhaps through my familiarity with the hospital environment: within a few minutes of commencing my first day at Longside Hospital, a nurse on the hip fracture ward (who was unknown to me) presented me with a patient prescription chart and asked me to prescribe some fluids; I explained my role to her and declined to do so. Mindful of this, I made it clear to participants that I should not be expected to provide any medical care<sup>41</sup> by explaining at the team brief before every list<sup>42</sup> that my role in the operating theatre was that of a 'researcher'.

My observations began after meeting the patient to discuss the study, answer any questions, and offer them the opportunity to participate; written evidence of informed consent was recorded.<sup>43</sup> Ideally, I tried to conduct this process after the patient had been listed for surgery but before they were seen by the anaesthetist; this gave me the opportunity to learn a little about their state of health and the

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<sup>41</sup> It was specified in the study protocol that I could intervene in medical care if required in an emergency, or to safeguard patient safety.

<sup>42</sup> A meeting that occurs before every operating list (e.g. NPSA 2009) during which the team introduce themselves to one another and run through the operating list. It is an opportunity to identify potential problems and ask questions.

<sup>43</sup> In cases where the patient did not possess the mental capacity to consent as defined by the Mental Capacity Act (Great Britain 2005), a consultee was approached, and their declaration was recorded in writing.

circumstances of their injury, and discuss their ideas, concerns and expectations about their forthcoming anaesthetic.

These encounters, which I audio-recorded for transcription (median duration 7 minutes, range 5-18 minutes), took place at a time at which patients were at their most vulnerable; they were unable to move freely, often uncomfortable, and apprehensive about the operation that they were about to undergo. I therefore had to conduct these conversations in a sensitive manner, mindful that patients were unlikely to appreciate a prolonged in-depth interview. Here, I found my experience as a clinician invaluable, having dealt with patients in similar circumstances many times before. On occasion, the encounter was curtailed if the patient began to appear too uncomfortable, and sometimes it seemed inappropriate to proceed. This degree of flexibility is a departure from the idealised study plan I have represented in my flow diagram (Figure 5) but is an example of me making my own protocol 'workable' (Timmermans and Berg 1997) to account for the challenges of researching the emergency care of complex patients. Following the pre-operative conversations with patients, I observed the clinical practice of the anaesthetist, including not only the work in the operating theatre but, where possible, the trauma meetings, pre-operative assessments, discussions with colleagues, and so-on. Following the operation, I offered patients the opportunity to reflect on their experience through further discussions which were audio-recorded and transcribed for analysis: an 'early' discussion in-person<sup>44</sup> (median duration 9 minutes, range 4-19 minutes) and a 'late'

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<sup>44</sup> This was planned to occur within two days of surgery, but in practice some discussions were up to six days post-operative in order to account for clinical circumstances and patient preferences.

discussion by telephone at approximately six months post-operative (median duration 12 minutes, range 6-21 minutes).

In a similar fashion to the introductory interviews, my discussions with patients and observations of clinical practice were aided by using topic guides (Appendix 2) which I developed on the basis of my research questions and my understanding of the key stages in anaesthetic practice. I used these as a prompt and to provide some consistency of detail, though I did not limit myself to observing only what was specified in the guide; in cases where unanticipated or interesting developments occurred, I followed these as seemed appropriate. When undertaking observations, I aimed to record as much detail as possible by undertaking contemporaneous notes, then typing these up as soon as possible following each observation. Again, I found my clinical experience to be helpful here; over the years I have developed my own shorthand for documenting technical things such as drugs, procedures and physiological observations, and this afforded me the time to record speech as verbatim quotations in many cases<sup>45</sup>. Furthermore, I was confident that making notes in 'real time' in the clinical setting would not be perceived as particularly unusual by practitioners – it is commonplace for patients in teaching hospitals such as Beckfoot, Longside and Mellbreak to be accompanied by note-taking medical students, and those caring for them are therefore unlikely to be distracted by this type of recording.

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<sup>45</sup> Typically, dialogue during clinical practice was succinct, and it was therefore possible for me to transcribe it accurately. However, sometimes I was unable to keep pace with dense conversation or long monologues, or was recording something else – in these cases I recorded a summary of what was articulated rather than quotations.

In undertaking the observations, I attempted to observe the work of all of the anaesthetists identified by the key informants as contributing regularly to providing hip fracture anaesthesia; approximately ten anaesthetists per institution. In practice this involved working with the departmental secretaries to identify the trauma lists on which those anaesthetists were due to work and approaching them in advance to invite them to participate. I planned to observe at least two anaesthetics per participating anaesthetist in order to be able to explore how their practice varies in response to patient needs or differences in context.

To a large extent this strategy was successful, however the non-elective nature of hip fracture surgery made planning observations challenging: on a number of occasions a patient who was enrolled in the study was moved to a different list at the last moment, or there were no hip fracture patients to invite to participate on a given trauma list. The result of this was that some of the identified trauma anaesthetists were not recruited, observed only once, or recruited but not observed, and a number of anaesthetists who were not identified as having trauma as part of their job plan (but covered trauma nonetheless) were recruited into the study. Though another departure from my idealised research plan (Figure 5), this provided some useful points of reference – by including anaesthetists who were not necessarily part of the intended sampling strategy, my participants were more diverse and represented a breadth of experience and a reflection of reality that otherwise may have been omitted.

I continued to conduct observations (Appendix 2) until I had observed as many of the identified trauma anaesthetists as was feasible accounting for the unpredictable

nature of trauma work, and I deemed that further observations would yield minimal analytical benefit at a given institution. This required me to conduct some analysis alongside data collection, and I therefore began to provisionally identify 'central organising concepts' (Braun and Clarke 2006) contemporaneously with data collection, a process that began with reflecting on each observation as I transcribed my rough notes shortly afterwards (see *Inductive Thematic Analysis*, below). Saunders et al (2018) note that this approach to sample size determination is known as 'inductive thematic saturation'. However, they go on to argue that 'saturation' is potentially a problematic term which implies the existence of a discrete 'point' in data collection where no new themes will be found. Citing Strauss and Corbin's argument (1998) that 'there will always be the potential for "the new to emerge"', they make the case for saturation as a *process*, whereby the researcher judges that further data collection will be counter-productive, rather than as a discrete *event*. This description is consistent with my approach to data collection in this study; though I cannot guarantee that additional data collection would not have generated any new information, I am confident that my observations *approach* saturation, and therefore authentically represent the practices of each institution.

My data collection at each institution concluded with a focus group discussion (duration 66, 68 and 80 minutes at Longside, Mellbreak and Beckfoot, respectively), with participants recruited from the anaesthetists who had participated in the earlier parts of the study at that institution (catalogued in Appendix 3)<sup>46</sup>. These were arranged

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<sup>46</sup> I had originally hoped to conduct more extensive focus groups, including with patients and other healthcare professionals, however as the study progressed it became clear that this was unfeasible, due

at a time and place that was most convenient for as many participants as possible who wished to attend. As with the other data collection methods, I made use of a topic guide (Appendix 3) in a semi-structured fashion. These focus groups provided the opportunity to record anaesthetists speaking with their departmental colleagues about hip fracture anaesthesia, which may have been difficult to capture in my observations due to the often-independent nature of routine anaesthetic practice. Focus groups were audio recorded and transcribed in the same way as the introductory interviews and patient encounters, with non-verbal information supplemented by field notes, which I integrated as I reviewed the transcripts.

My approach recognises that the concept of 'good' anaesthesia is likely to be contextual, subjective and not entirely owned by anaesthetists despite their expertise in its provision. Therefore, only considering the anaesthetist in this study would be to fail to appreciate some of the fundamentals of what an anaesthetic is for. A parallel can be drawn here with Mol's ethnography of atherosclerosis (2002; p23) in which she states:

'... without a patient [the vascular surgeon] isn't able to *make* a diagnosis. In order for "intermittent claudication" to be practiced, two people are required. A doctor and a patient.'

Though anaesthesia is different from atherosclerosis in that it is not a disease, an anaesthetist cannot practice anaesthesia by themselves any more than a surgeon can 'practice' atherosclerosis alone. Whilst atherosclerosis requires at least two people according to Mol, anaesthesia at the time of its delivery<sup>47</sup> requires at least four: the

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to the working schedules of the professionals and the ongoing healthcare problems of the patients. This is further explored in Chapter 7.

<sup>47</sup> Limiting anaesthesia to 'the time of its delivery' was a necessary simplification in order to make the project manageable. In reality there are numerous other actors: these include (but are certainly not

patient, the anaesthetist, the anaesthetic assistant and the surgeon, in addition to numerous non-human actors such as the anaesthetic equipment, drugs, monitors, operating theatres and so-on.

Based on a pragmatic assessment of the people without whom anaesthesia cannot occur, each of my observations was therefore contingent upon the consent of the patients, surgeons, anaesthetic assistants and anaesthetists (see Appendix 4 for example participant information sheets). However, the practice of the anaesthetist is often visible to healthcare professionals from other backgrounds (e.g. operating theatre, recovery or ward staff, orthogeriatricians, physiotherapists). I therefore approached these other professionals and invited them to participate in the study on a convenience-sampling basis as I followed the patient through their anaesthetic and recovery. The purposive sampling of institutions and anaesthetists, the snowball sampling of key informants, and the convenience sampling of patients and other healthcare professionals, was conducted within the constraints of inclusion and exclusion criteria (Figure 9), which I developed in accordance with the study objectives and the ethical and legal framework governing the project, including the Mental Capacity Act (Great Britain 2005).

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limited to) paramedics, the emergency department and ward staff, orthogeriatricians, porters, 'scrub' staff, circulating practitioners, recovery staff, and all the people who make and maintain the physical operating theatre environment and its contents (itself also a system of actors). Furthermore, the patient's family, carers and social network are often intimately involved in their postoperative recovery.

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**Inclusion Criteria****Staff:**

- Key informants identified through snowball sampling.
- Anaesthetists who provide anaesthesia for orthopaedic trauma.
- Other healthcare professionals involved in the operative or perioperative management of the patients involved in the study.

**Patients:**

- Adult patients (age 18 and over) with a single, isolated fractured proximal femur, planned for surgical repair on an operating list staffed by the anaesthetists as identified above.

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**Exclusion Criteria****Staff:**

- Those who do not consent to participate.

**Patients:**

- Those who do not consent to participate.
  - For patients who are unable to communicate sufficiently in English, those for whom a translator cannot be found prior to the planned time of their operation.
  - For patients without the capacity to consent, those whose consultee does not believe that they would wish to participate, or who themselves indicate that they do not wish to participate, or for whom a consultee cannot be found prior to the planned time of their operation.
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Figure 9: Inclusion and exclusion criteria

### The Ethics of Confusion

Of the many challenges in providing hip fracture anaesthesia, the high incidence of cognitive impairment amongst patients presents a particular difficulty. At least 25% of patients have moderate or severe cognitive impairment pre-operatively,<sup>48</sup> due either to chronic conditions such as dementia, or acute delirium associated with pain, analgesic medications or the disruption of daily routine due to hospital admission (Griffiths et al 2011). Larsson and Holmstrom's definition (2013, see Chapter 1) of patient-centredness, with its reliance on 'agreement on treatment, and shared decision-making', appears to rely on meaningful discussion to hold fully true. Does the prevalence of cognitive impairment mean that hip fracture anaesthesia cannot be fully

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<sup>48</sup> Defined as an abbreviated mental test (AMT) score of less than 7/10; the AMT (Hodkinson 1972) involves 10 questions and tasks which assess memory and cognition, including 'in what year did World War One begin?' and 'count backwards from 20 down to one.'

patient-centred? Or, as in Goodwin's concept of 'working with the patient' (2008) can the anaesthetic team draw on experience and professional judgement to compensate for a patient's lack of ability to understand, retain, weigh or communicate information relating to their treatment?

In my clinical experience, I have observed that many anaesthetists appear to change their practice for confused patients, often by defaulting to general anaesthesia rather than neuraxial blockade. Is this a patient-centred approach which aims to minimise pain and distress, or is this done for the convenience of the healthcare providers to avoid the challenges of interacting with a 'difficult' patient? These questions are of great importance as cognitive impairment has a significant impact on outcome: In their systematic review in the context of hip fracture, Hu et al (2012) identified 12 factors with strong evidence for predicting mortality. Of these, two factors were linked to cognitive impairment, and these were associated with a risk of death that approached double that of patients whose cognition was not impaired<sup>49</sup>.

Despite the increased risk of death associated with cognitive impairment in hip fracture, surprisingly little evidence exists in the medical literature as to how to manage such patients: for example, of the 31 studies synthesised in the most recent Cochrane review on anaesthesia for hip fracture (Guay et al 2016), six specifically excluded patients with impaired cognition or symptoms associated with it;<sup>50</sup> a further 11 studies required informed consent from the patient, thereby effectively excluding

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<sup>49</sup> According to Hu (2012), the presence of dementia and/or cognitive impairment was associated with a mortality hazard ratio of 1.89, and the presence of 'poor mental state' (an ambiguous term that was not further defined) was associated with a mortality hazard ratio of 1.78.

<sup>50</sup> Bigler et al 1985, Berggren et al 1987, Biffoli et al 1998, De Visme et al 2000, Heidari et al 2011, and Kamitani et al 2003.

patients without capacity.<sup>51</sup> Only three of the studies in the review specifically described a strategy for the inclusion of such patients;<sup>52</sup> it therefore appears that at least 17 of the 31 trials in the Cochrane Review do not represent cognitive impairment in their data. The reasons for exclusion of patients without mental capacity are rarely made explicit in biomedical research papers, however it is likely that the complex legal and ethical regulation surrounding mental capacity presents a disincentive for investigators. Although this legislation is designed to protect patients, patient advocacy groups have suggested that it results in further disempowerment of a population that is already disempowered as a consequence of their disability. For example, Alzheimer Europe states in its 2011 report 'The Ethics of Dementia Research' (p13) that:

'People with dementia are no longer considered as passive recipients of care and treatment but rather as active participants with the same rights as other members of society. Such rights include the right to be treated with respect, the right to privacy and protection and also the right to participate in research.'

Reflecting on my own experience, the paucity of current evidence, the increased risk of perioperative death, and the statements of patient advocacy groups, and encouraged by the peer-reviewers who commented on my study protocol, I committed to including patients without mental capacity in my study. In order to ensure compliance with the requirements of Section 32 of the Mental Capacity Act (Great Britain, 2005), I developed a protocol for patient participation, specifying the measures that I would take in cases where patients lacked mental capacity, and also

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<sup>51</sup> White and Chappell 1980, Svarting et al 1986, Maurette et al 1988, Biboulet et al 2012, Bredahl et al 1991, Brown et al 1994, Brichant et al 1995, Wajima et al 1995, Casati et al 2003, Hoppenstein et al 2005, and Cao et al 2008.

<sup>52</sup> Spreadbury 1980, Racle et al 1986, Valentin et al 1986.

in cases where the patient was unable to speak or read the English language (Figure 10).

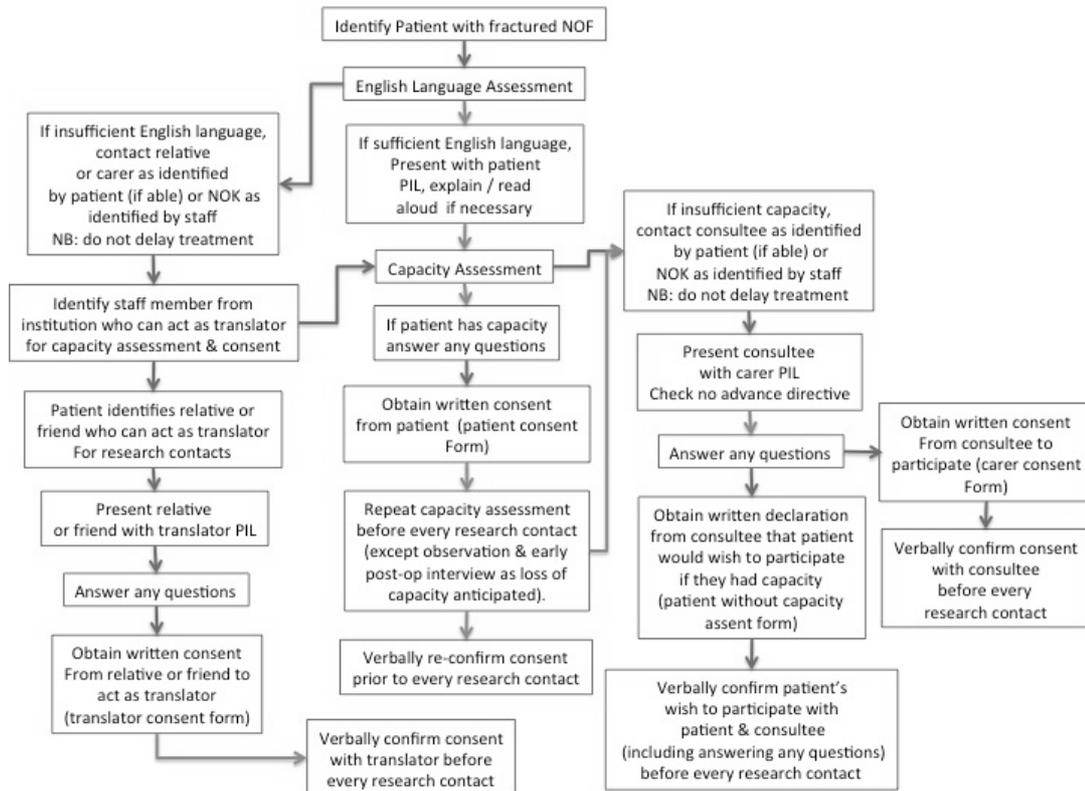


Figure 10: Patient participation protocol

The assessment of capacity is a particular medicolegal process<sup>53</sup>, which is potentially problematic for researchers and ethics committees. How does a researcher become trained in the assessment of mental capacity? Is a training course sufficient or should practical experience be gained? If so in what context and under whose supervision? At the ethics committee meeting for this study<sup>54</sup> the assessment of capacity was one of

<sup>53</sup> To have 'mental capacity', a person should be able to understand, weigh, and retain information, and communicate their decision (Great Britain 2005). Because decisions vary in complexity an individual may have capacity to decide one matter but not another, and their capacity may fluctuate, particularly in the context of acute illness or injury.

<sup>54</sup> Reference 16/WA/0105. The local Lancaster Research Ethics Committee (REC) was not able to consider my study due to the involvement of patients without mental capacity. Therefore, the application was submitted to Wales REC 7: a committee with expertise in 'research involving adults lacking capacity' (HRA 2017).

the few areas where reassurance was sought by committee members. I explained that as an anaesthetist I regularly had to assess patients' mental capacity as part of my clinical work; this was deemed to be a sufficient explanation and the discussion moved swiftly on.

This interaction demonstrates one of the benefits of my being a practicing healthcare professional: gaining access, not only to the institutions in which to undertake the study, but to the permissions to do so – the ethics committee were content to assume that I had the appropriate knowledge and skills, but I suspect that they would have treated a non-clinical researcher differently. Reports from other ethnographers of healthcare support this notion; for example, Timmermanns and Angell (2001) describe that access issues rendered an observational study of paediatric doctors' decision-making 'not feasible', settling instead for an interview-based study. My background as a doctor therefore confers advantages, but studying my own area of professional practice also presents challenges.

### **Insiders and Outsiders**

Hip fracture anaesthesia is a practice which is provided by the anaesthesia team, to allow a patient to undergo surgery. As described above, the investigation of a 'good' anaesthetic must therefore take account at least these actors. My clinical role places me closer to the anaesthetists in this study than to the other healthcare professionals such as surgeons. In turn, I am closer to surgeons than to patients; I have worked in the surgical context prior to commencing anaesthetic training, but I have never experienced what it is to be a hip fracture patient.

The positionality of the ethnographer continues to be a topic of debate; considering, for example, in Malinowski's classic ethnography *Argonauts of the Western Pacific* (1932), it is clear that he began as an 'outsider' and aimed to gain an 'insider' perspective through his immersive fieldwork. As ethnography has spread from its roots in the anthropology of 'exotic' cultures to the study of the everyday<sup>55</sup>, researchers are more commonly studying their own communities. There are benefits to being an 'insider' including gaining access, 'blending in' during observations, and, according to Merriam (2001; p411) the ability to 'project a more truthful, authentic understanding of the culture under study'. There are numerous representations of insider advantages amongst my data, perhaps most explicitly in an interaction which took place in the anaesthetic room of the trauma theatre at Longside Hospital:

**DF:** *Comes into the room from theatre. He sees me making notes: 'Are you recording everything? Or just making notes?'*

**CP:** *Leaps to my defence before I can say anything: 'He's a normal bloke, an ST6 anaesthetist. Not one of these university people.'*

**DF:** *'So we can still play music and swear?' This gets a laugh from Conor and I.*

**Consultant orthopaedic surgeon Duncan Fairclough and consultant anaesthetist Conor Paris, prior to Nancy's anaesthetic, Longside**

In the above interaction consultant anaesthetist Conor Paris draws an important boundary that I believe represents the way in which I was perceived by many of the professional participants: by presenting me as 'a normal bloke' and distinguishing me from 'university people', he gives tacit permission for the theatre team to act normally: consultant surgeon Duncan Fairclough acknowledges this humorously by confirming that they can '*still* play music and swear' (emphasis added); acts which whilst commonplace may not project the degree of professionalism that may be deemed

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<sup>55</sup> Though anaesthesia is the largest hospital-based medical specialty and therefore may be seen as 'everyday' to some extent, it is also 'exotic' in the sense that its practices are opaque to many, and membership of the 'tribe' is regulated through training and examination requirements.

suitable for an 'outsider'. There are ethical considerations that go hand-in-hand with access to this 'authentic' representation that participants were willing to expose however, based at least in-part on the trust that appeared to be afforded to me because of my professional background.

The dilemmas presented by the multiple identities of healthcare professionals researching in their own environment are discussed in an experiential account by Goodwin et al (2003). In this account, arising from her research in a department in which she had recently worked as an anaesthetic nurse, Goodwin describes how she was party to what was described as 'a confidential conversation' between two anaesthetists, conducted with apparent disregard for her presence and the fact that her 'researcher accessories' (notebook and pen) were clearly on-show. Conscious of the potential for research to be exploitative, Goodwin questions whether her status as a colleague caused her to be 'overlooked', or whether the anaesthetists had assumed that she would use her discretion and not record their dialogue.

Like Goodwin, I found myself potentially in a position to document conversations that may have been assumed to be confidential, leading me to employ similar strategies to reinforce my identity as a researcher (renegotiating consent, making it obvious that I was taking notes, reminding participants that I was in-fact present as a 'university person'), and make situational judgments about the granularity of my field notes. The similarity of our experiences is striking because though Goodwin was an 'insider', a recent staff member at the institution where data was collected, I had never worked at any of the hospitals in my study.

Is this, then, an 'insider' ethnography? Some scholars (e.g. Breen 2007) suggest that it is incorrect to dichotomise insider/outsider status, and that a continuum is a more effective concept. Though I was an outsider on an institutional level I felt strangely 'at home' in the operating theatres at all three hospitals; indicative of my membership of the 'tribe' of anaesthesia which seems to transcend institutional boundaries. This affords me the knowledge of where to stand, when to speak and how to act in the operating theatre setting, and I found it easy to 'blend in' within a short period of time. Furthermore, because of the rotational nature of anaesthetic training, a number of friends, former colleagues and acquaintances were working in the participating hospitals, either as trainees or consultants. Therefore, my positionality varied from interview to interview and observation to observation depending on the participants. My professional status as an anaesthetist resulted in a number of circumstances in which the anaesthetic participants, perhaps unthinkingly, left me 'in charge' of the anaesthetic by default. This circumstance, a result of me being a 'insider' on the basis of my profession, became my most frequently-occurring ethical concern as the fieldwork progressed:

**RA:** 'Starting Ulysses.' *Knife to skin at 12:25.*

**US:** 'Ok.' *He hangs the bag of CSL<sup>56</sup> back up – the paracetamol is through. He draws up some more drugs for the next case, then opens up a new bag of CSL and hangs it next to the one that is running – there is about 100ml still to go in. He leaves, into the anaesthetic room.*

**Me:** *I'm the only 'anaesthetic person' in theatre now. I watch the monitor and the anaesthetic machine: heart rate 64 (sinus rhythm), SpO<sub>2</sub> 98%, BP 86/57 mmHg, Temp 36.6°C, end-tidal desflurane<sup>57</sup> 2.7 kPa, end-tidal nitrous oxide<sup>58</sup> 0.44, MAC (age 80) 1.0<sup>59</sup>.*

*I think if this was my anaesthetic (which in some sense it now is) I'd turn down the volatile and try to get the BP up. I resist the temptation to adjust anything, but resolve to get one of the team back in if the next BP reading is lower...*

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<sup>56</sup> Compound sodium lactate, an intravenous fluid.

<sup>57</sup> A volatile anaesthetic agent.

<sup>58</sup> An inhalational agent with anaesthetic and analgesic properties, colloquially known as 'laughing gas.'

<sup>59</sup> Minimum alveolar concentration, a measure of anaesthetic dose. One MAC is the dose at which 50% of patients of a given age show no motor response to a standard surgical stimulus.

**Mon**<sup>60</sup>: *Cycles BP – 103/60 mmHg.*

**Me**: *I look through the window in the anaesthetic room door. Ulysses is in the anaesthetic room eating some crisps. I sit back down.*

**US**: *Returns at 12:34. He turns the desflurane up to 4% on the vapouriser dial.*

**Consultant orthopaedic surgeon Roy Arnold and consultant anaesthetist Ulysses Shine, Elaine's anaesthetic, Mellbreak.**

In the above excerpt I record my thoughts as the situation unfolds. Like Goodwin (2003) I felt a tension here between my roles as a researcher and a professional and resorted to 'bargaining with myself'. However, it is notable that my inclination to reduce the dose of anaesthetic would have interfered with the trajectory of this observation had I followed-through on it: Ulysses, the consultant anaesthetist, actually increased the dose when he returned. It is for this reason that I committed to avoid intervening unless I felt that patient safety was under immediate threat, which only occurred in one instance:

**Mon**: *Alarms: end-tidal CO<sub>2</sub> 2.6kPa<sup>61</sup>.*

**DM**: *Looks at the monitor.*

**TC**: *'Can you see?' She is stood between Duncan and the monitor.*

**DM**: *'It's alright, she's still establishing a respiratory pattern.' They go back to the cannula. Sally's veins seem difficult.*

**Mon**: *Alarms again. End-tidal CO<sub>2</sub> 0.0kPa.*

**DM**: *Looks at the monitor briefly, then goes back to trying to find a vein, without silencing the alarm.*

**Me**: *I can see that the airway pressure on the ventilator is reading 30kPa, and the reservoir bag is increasing in size. The APL valve<sup>62</sup> must be screwed down. I don't think that Duncan or Tess have picked up on this. I decide to try to wait a few moments to see if they notice, but if this continues I will need to inform them – high airway pressures can lead to complications. I look at the monitor, Sally's heart rate has fallen to 60, and the amplitude of the SpO<sub>2</sub> trace is diminishing. The high pressure in Sally's chest is affecting her cardiovascular function. I decide to intervene. 'I think the APL valve is screwed down.'*

**TC**: *Turns around and releases the valve. The bag deflates.*

**DM**: *'Thankyou. I couldn't see the bag.'*

**Consultant anaesthetist Duncan Myers and ODP Tess Clinton, Sally's anaesthetic, Longside**

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<sup>60</sup> I use the abbreviation 'Mon' here to represent the anaesthetic monitoring, a frequently-occurring and important actor in this ethnography.

<sup>61</sup> End-tidal carbon dioxide, the partial pressure of CO<sub>2</sub> that is detected at the end of expiration.

<sup>62</sup> Airway pressure limitation valve: a component of the anaesthetic breathing circuit that 'blows off' at a set pressure. It is 'screwed down' when high pressures are needed, such as when manually ventilating a patient's lungs. It is opened up when the patient is breathing spontaneously.

In the above situation my interference clearly caused a change in the anaesthetic; without my intervention Sally may have experienced cardiorespiratory collapse. Whilst this may have provided informative data on Duncan and Tess' handling of an emergency situation I felt that it was 'easy' to intervene here; there was clear justification for me to do so, not only from an ethical point of view, but in relation to the research aims – this is a study about 'good anaesthesia', and that is not to be found in allowing a patient to deteriorate into cardiorespiratory arrest.

The operating theatre environment is routine for me. This has some benefits: as MacKenzie (1990; p11) states, 'opening the "black box" of technology... requires detailed understanding of the technical field in question' and my understanding of the drugs, equipment and techniques of anaesthesia was useful in this respect. This same familiarity is however a challenge to the fieldworkers' mantra of 'making the familiar strange rather than the strange familiar' (Van Maanen 1995; p20). Having undertaken training in participant observation as part of my fellowship (detailed in Appendix 5), my approach to this was to employ some of the strategies proposed by de Jong et al (2013) in order to maintain a sense of 'surprise'. There was a certain degree of trial-and-error to this process, but as the work progressed there were two such strategies that I found to be effective; the first was to maintain the 'mystery' of practice, by 'building on... surprises experienced by the researched' (de Jong et al 2013; p174):

*I check the clock: 10:38. An anaesthetic trainee comes in – not someone I've seen before. She starts chatting to me.*

**Tr:** 'What are you up to?'

**Me:** 'They're doing cannulated hip screws.' *I presume that she thinks I am the anaesthetist as I'm stood at the head of the bed next to Vaughn.*

**Tr:** 'It looks like an alien autopsy – all that plastic.' *She is referring to the semi-transparent vertical plastic drapes that make a 'wall' to isolate the operative field by looping over a rod suspended between two drip stands placed at the top and bottom of Olga's bed. Now the trainee mentions it, I realise that this arrangement does make the theatre look unusual; most surgical draping is with green or blue toweling.*

**Discussion with an anaesthetic trainee during Olga's anaesthetic, Longside**

Though the study focuses on the work of expert anaesthetists, encounters such as the above proved to be valuable; by exploring the perspectives and following the dilemmas of the senior house officers, medical students and junior paramedical staff, and by discussing experiences with patients, I could tap into the accounts of those for whom the 'strangeness' was spontaneous rather than intentional. The second strategy that I found to be effective is explained by de Jong et al (2013; p179) as 'distancing by immersion', the basis of this is to immerse oneself in a culture in order to get past 'smooth, front stage stories' and 'see and hear more than non-intimates [are] supposed to know.' In this respect I found that my insider status was an advantage – many healthcare ethnographies (e.g. Hirschauer 1991) focus on what is most obviously 'strange' about anaesthesia – the drugs, the equipment, the operation. Without the need to explain such things to me, as might be done to accommodate an 'outsider', participants had the space to express themselves frankly:

*We go through to theatre at 16:19. As we enter theatre Andre makes an announcement:*

**AU:** 'Corpse-watch two: the medical profession's valiant fight against the forces of nature!' *He puts on a gravelly voice for this; like a voiceover from a Hollywood film trailer...*

*Looks at the monitor: 'So, we've got blood pressure, which is good. We've got oxygen, which is good. We've got squiggly lines, which is good... they're not nice squiggly lines, but ok.' The ECG, which is on lead II, shows ST depression<sup>63</sup>.*

**KW:** *Connects 1L of plasma-lyte to the cannula. She looks at Andre as he makes his comment about the ECG – I think she's implying he should intervene.*

**AU:** *Quietly, to Kodey: 'Why? It's not like he's going to run a bloody marathon.'*

**Consultant anaesthetist Andre Underhill and ODP Kodey Warren, Seymour's anaesthetic, Beckfoot**

As in the above case, this resulted in dialogue that was in many cases very bluntly-phrased and certainly not the 'publicly acceptable face of anaesthesia' (Goodwin et al

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<sup>63</sup> An ECG feature which suggests myocardial ischaemia.

2003; p574) but which I feel was well aligned with the aims of my study – to ‘get beneath the skin’ of anaesthetic practice.

Though my insider position amongst the professional participants is dynamic, my position amongst the patients is much more certain. On numerous grounds including age, role within the hospital setting and social and health status I am an outsider. However, patients are at the centre of this study (in the same way that they are at the centre of my anaesthetic practice). I therefore wanted to be sure that this study would meet the needs of the people that it aims to help, and confirm that the methods and materials would be acceptable to the patients who I would recruit as participants. In order to do this, I sought a patient perspective, or as close to it as I could practically achieve. Initially, this involved addressing the ‘top ten research priorities for anaesthesia and perioperative medicine’<sup>64</sup> outlined by the *James Lind Alliance (JLA)*<sup>65</sup> (Boney et al 2015; p7). Of these, four are addressed in this study:

- ‘How can patient care around the time of emergency surgery be improved?’
- ‘What outcomes should be used to measure the ‘success’ of anaesthesia and perioperative care?’
- ‘How can we improve recovery from surgery for elderly patients?’

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<sup>64</sup> At the time of development there was no JLA ‘top ten’ for hip fracture. This has now been undertaken and I was fortunate to participate in the process as a representative of the anaesthetic profession (Fernandez et al 2018)

<sup>65</sup> JLA: a not-for-profit organisation established in 2004, funded by the National Institute for Health Research (NIHR) and the Medical Research Council. Its principal activity is the undertaking of research priority-setting exercises.

- ‘For which patients does regional (local) anaesthesia give better outcomes than general anaesthesia?’

The JLA priorities may not however offer a fully valid ‘insider’ perspective however: there were no inputs from organisations representing the interests of patients with hip fractures or older people more generally (Boney et al 2015), and the demographic distribution of the individual respondents to the priority-setting exercise indicates a bias towards working-age people; only 4.5% of respondents were aged over 65. Addressing the JLA priorities therefore indicates that my study is relevant to the public in general but provides limited information about what matters to hip fracture patients.

Once I had developed an early draft of the study protocol, I approached the Age-UK centre in Crossacres, Manchester<sup>66</sup> to ask if I could discuss my ideas with an advisory group of older people. I chose to approach Age-UK for this purpose because there is no specific group which represents people who have sustained hip fractures, but Age-UK’s clients represent a demographic approximation of hip fracture patients.

My contact with the advisory group was initiated with the help of the centre manager, who identified that the members of the craft group which meets on Friday afternoons might be interested in assisting with the study. I presented my early ideas to the group and sought their opinions regarding the topic and justification for the research; these were incorporated into the research design:

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<sup>66</sup> Crossacres is local to Wythenshawe Hospital where I practice clinically.

- Group members expressed surprise and concern at the mortality rate following hip fracture and felt that it was imperative to increase our understanding of the influence that anaesthesia may have on this; their pre-existing conceptions of different anaesthetic techniques were that GA was 'dangerous', but regional was safer.
- The group were very concerned about the notion of patient choice, and the way that choices are presented by healthcare professionals; their expectation was to be offered choices and to have their opinions respected, but their experience was that often this did not occur.
- There was agreement that it was very important to be treated by an expert anaesthetist. It was recognised however that there was a tension between accepting the suggestions of an expert and making choices for oneself. Members were interested in how this could be reconciled. Some suspected that the mode of anaesthesia was selected for the convenience of the medical team rather than in the patients' best interests.

Group members were universally enthusiastic about the study. They were emphatic about the importance of recruiting patients as study participants and felt that patients would be prepared to participate. The group also felt that it was both novel and important that this study was concerned with anaesthesia as opposed to surgery, which they deemed to be a more 'obvious' focus.

We agreed that the group should continue to be involved with the study as it progressed. In this capacity, the group helped to develop the topic guides for interviews, patient encounters, observations and focus groups (reproduced in

appendices 1 to 3), reviewed and approved the study protocol prior to its submission to the ethics committee, co-designed the patient consent forms and information sheets, and participated in the production of a short film which explains the study and their involvement in helping to design it.<sup>67</sup> I have met with the group periodically to update them on the progress of the project, and members have expressed a particular interest in helping to disseminate the results of the study to patients.

### **Inductive Thematic Analysis**

When I conceived this study, it was in response to a call from anaesthetic colleagues to redirect research ‘towards finding “best” methods of [general] and spinal anaesthesia’ for hip fracture surgery (White et al 2014a; p228), as opposed to previous research which had attempted to ascertain whether spinal or general anaesthesia are superior. Consistent with this change in direction, I adopted a flexible inductive approach to analysis that could account for the variety of real-world practices. Perhaps most prominent inductive approach is Grounded Theory (Glaser and Strauss 1967). However, in the context of this study, Grounded Theory’s dictum of ‘no preconceptions’ (e.g. Glaser 2014) did not seem feasible to me due to my ongoing professional involvement with the care of hip fracture patients. Even prior to conceiving the study I had read, synthesised and formed opinions on the medical literature relevant to hip fracture anaesthesia, and throughout the study I continued my practice as a trauma anaesthetist. This pre-existing knowledge and experience brought with it advantages as already described; adopting the mental discipline of Grounded Theory would therefore potentially sacrifice some of the unique advantages

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<sup>67</sup> The video (<http://youtu.be/-a04hvNV7Gs>) was entered into the NIHR New Media Competition.

of my study. Thematic analysis, as described by Braun and Clarke (2006), though perhaps a simpler approach, offers sufficient flexibility to be conducted by a relative 'insider' such as myself. When used inductively, this method employs a 'bottom up' approach to data, instead of analysing data using existing theory. Educational researchers Frankham and MacRae (2011; p35) state:

'It is best not to use, apply, or develop theory prematurely, although "thinking with" existing theories is inevitable in the sense-making process... After all, one of the central reasons for doing ethnography is to work in ways which open up new ways of thinking about things.'

Braun and Clarke's description of thematic analysis (2013) adopts a stepwise approach comprising transcription, reading, coding, searching for themes, reviewing themes and defining themes, which I have applied in analysing my data:

Interviews and focus groups were recorded and transcribed verbatim by an external company<sup>68</sup>; I then edited them to comply with a simplified version of the Jefferson notation system (2004) developed for this study. I recorded non-verbal data as fieldnotes, and integrated these into the transcriptions. In order to anonymise the data, I replaced individual and institutional names with pseudonyms<sup>69</sup> or descriptors in cases where the person, place or institution was mentioned in passing (e.g. 'ward manager', 'major teaching hospital'). I did not alter locations that were sufficiently broad (e.g. 'England', 'Europe'). I recorded the observations of clinical practice as

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<sup>68</sup> Fingertips Typing Ltd.

<sup>69</sup> Pseudonyms for staff participants were generated randomly by software (Which Name? v1.0.3 for iOS, Rafael Dinis, location unknown). Though I had initially planned to generate pseudonyms for patient participants using the same method, the names that were generated seemed too 'young'. The mean age of a hip fracture patient is 82, so the 'mean' year of birth is 1935. I therefore decided instead to choose pseudonyms sequentially (at each institution the first participant's pseudonym begins with 'A', then 'B', and so-on) from a list of common first names in the UK from the 1930's, apparently found in the National Archives by family-tree website findmypast.co.uk (2015). Though the pseudonyms represent the gender of the participant accurately, both staff and patient pseudonyms sound Western in origin. They do not, therefore, fully represent diversity of the study participants.

shorthand fieldnotes and diagrams, which I expanded into rich descriptions using the same notation system. I documented dialogue either as quotations (if I had recorded it as such) or a description of the topic of discussion and conversation structure. In addition, I recorded my own impressions and thought processes throughout each observation.

Undertaking the transcription and editing of fieldnotes and transcripts required me to familiarise myself with the data. I achieved this by printing out and reading each transcript in detail, and highlighting data of interest. In addition to printing the transcripts, I loaded them into a qualitative data analysis software programme (NVivo for Mac version 10, QSR International, Doncaster), providing a method by which I could organise data and assign codes to fragments of the transcripts. I employed a 'complete' coding strategy, whereby the whole of each transcript was eligible for coding (Braun and Clarke 2013). Once coded, I identified 'central organising concepts' that tied together different codes in ways that related to the research questions. These central organising concepts were designated as 'provisional themes' for further review. Once I had reviewed and refined the themes, I developed names for each theme and a brief description of the central organising concept. The main themes form the chapter titles of the empirical chapters of this thesis (Chapters 4-7), and sub-themes are discussed within.

Two 'quality measures' were incorporated into the analysis phase of the study (e.g. Horsburgh 2003). Firstly, I presented samples of the transcripts and provisional themes to my supervisors for discussion and development as the study progressed. Secondly, I noted themes that could be triangulated from multiple data types (i.e.

interviews, observations and focus groups), as these different sources of data added different views, making the theme more multidimensional and aiding a richer understanding. I did not dismiss data that only occurred in one type of source however, but used this as a means by which to question why it was represented from only one perspective.

Though I have taken a systematic approach to the production of themes, I do not wish to try to conceal or underplay the influence that I have had in my role as researcher – another ethnographer observing the same situations may have produced alternative themes. There are numerous choices to be made as the analysis progresses that are often not made explicit in textbooks of method, but which have become clear to me through undertaking the research. Most importantly this includes having to decide what to leave out: I have found that ethnographic research generates a vast body of data, and ‘filtering’ is therefore a necessity. However, much filtering has already been done prior to analysis; as Law (1994) points out, the ethnographer cannot perceive everything during fieldwork and must therefore choose the focus of their attention.

In this ethnography of anaesthetic practice, I reconceptualise the ‘good anaesthetic’ for hip fracture repair. I draw on uncertainties that I have experienced in my professional role to guide my exploration of the ways that anaesthetists understand and rationalise what they do, and how the needs of others play into their decision-making. In this age of healthcare targets, protocols and guidelines it is fundamental to consider how we know if we are doing ‘a good job’, yet this is a challenging concept for a hip fracture anaesthetist who may receive little feedback on their work due to the complexities of patient movements and the cognitive and communication

difficulties experienced by their patients. The tools by which we currently assess 'good practice' are derived at a great distance from the patient and the practice of the individual anaesthetist, through randomised controlled trials, meta-analyses and observational cohort studies. In her classic ethnography *The Body Multiple* (2002), Mol writes of the importance of the microscope in atherosclerosis, of how a thickened arterial intima doesn't exist by itself but only through the microscope in the lab. I contend that distant viewpoint adopted by 'big data' makes it difficult to see what a 'good anaesthetic' looks like. In undertaking this study, I bring hip fracture anaesthesia 'under the microscope' of ethnographic observation. However, before I enter the hospital, I first examine one of the worlds of knowledge that anaesthesia looks to for direction – the 'evidence base' of the medical literature.

### **A Note on the Chapter That Follows**

The following chapter began life as a 'literature review' of the medical evidence pertaining to hip fracture anaesthesia. However, as my study has progressed and I have become more attuned to the cultural aspects of anaesthesia, I have come to realise that the medical literature is more than a collection of knowledge; it is a cultural artefact which has an important role in refereeing the debates and defining the orthodoxies of the anaesthetic 'tribe'. This chapter therefore feels suited to its current place in the story of my study; bridging the gap between methodology and the wards, clinics and operating theatres. By analysing and critiquing the UK anaesthesia literature I illustrate one of the bases upon which anaesthetists make their decisions. My approach to presenting this is to respond to the voices of those healthcare professionals, recorded during their participation in my study; who better than them to explain the challenges that the 'evidence base' presents to practitioners?

## Chapter 3: The 'Evidence Base' for Hip Fracture Anaesthesia: Orthodoxy and Controversy

**WB:** 'I have to trust that the teams are doing evidence-based practice. And I guess whether it's the anaesthetists, whether it's the cardiologists stenting people, putting implantable devices in, or the medics out there with non-invasive ventilation, I have to trust that they're doing evidence-based practice.'

**Medical director Willie Baldwin, introductory interview, Beckfoot**

As a medical student, and subsequently as a doctor and anaesthetist, my starting-point for conceptualising knowledge lies in traditions of evidence-based medicine (EBM), as symbolised by the famous 'hierarchy of evidence' (e.g. Phillips et al 2009). Through the application of this approach in my clinical practice, and through observing colleagues applying EBM in theirs, I have developed a respect for its principles and aims. However, I have also developed a wariness of the way that its preoccupation with 'bias' can deflect practice away from the patient in question in favour of a homogenised 'average' who may never exist in practice. In the context of anaesthesia for hip fracture repair EBM offers little to direct the anaesthetist who wishes to know how best to provide an anaesthetic; an intervention which must be provided if surgical repair is to be undertaken, yet can be done in many different ways. But the lack of direction in the literature does not mean there is lack of material or a lack of debate – the journals are replete with 'controversies' to follow (Latour 1987). As described in the *Prologue* this lack of direction provided the stimulus for my research.

In this chapter I describe and critique the current and historical 'evidence base' regarding anaesthesia for surgical repair of hip fracture. I outline the debate around the role of EBM in healthcare, demonstrate some of the deficiencies in what is known about hip fracture anaesthesia, and explain the key ongoing controversies. This provides background information which further justifies my methodological approach

and provides an insight into the knowledge system that is most familiar to the healthcare professionals who participated in this study; whose medical directors 'trust that they're doing evidence-based practice', but who are unable to find 'the right way' within the literature:

**DM:** 'If someone produced a paper tomorrow that showed beyond a shadow of a doubt the right way to do it, I would adopt the right way. I mean, there have been so many attempts in the past to investigate. I mean the GALA trial<sup>70</sup> in vascular, where everyone that organised that study *just knew* that it was going to show that local was better for your carotids - nope.'

**Consultant anaesthetist Duncan Myers, Focus Group, Longside**

In a similar fashion to Catherine Will's focus on the *BMJ* and the *Lancet* (2005) in her exploration of the debates between specialists, researchers and general practitioners around cardiovascular risk assessment, I concentrate on the literature of most relevance to the anaesthetists who participated in my study. This includes national and regional guidelines, and papers published in *British Journal of Anaesthesia (BJA)*, and *Anaesthesia*. These two journals are considered to have high academic impact within their category<sup>71</sup>, but perhaps more importantly they are received monthly by post by members of the RCoA and AAGBI,<sup>72</sup> respectively. These journals therefore have a central role in shaping the orthodoxy of anaesthesia in the UK and represent the knowledge system to which participants are most frequently exposed. They are also a site of professional debate and analysing this provides insights into how

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<sup>70</sup> The GALA trial (GALA Trial Collaborative Group 2008) is a well-known study which compared complications in patients who received either general or local anaesthesia for carotid endarterectomy – a procedure in which atheromatous plaques are removed from the carotid artery to reduce the risk of stroke. Despite several plausible reasons why local anaesthesia may reduce complications (principally the ability to monitor the patient's brain function intra-operatively), no difference was found.

<sup>71</sup> In 2017, the *BJA* had an impact factor of 6.499 and *Anaesthesia* had an impact factor of 5.431. According to this system of assessment, they are the second and fourth highest-impact anaesthesia journals worldwide (Clarivate Analytics 2018)

<sup>72</sup> Membership of the RCoA is mandatory for trainees and consultants in anaesthesia in the UK. There are approximately 14,000 practicing members (RCoA 2016). The membership of the AAGBI numbers approximately 11,000 (AAGBI 2018).

anaesthesia handles the limitations of EBM; there is an ongoing controversy generated by the tensions between the equivocal results of 'high quality' evidence and the opinions of experts, whose expertise is in-fact legitimised through participation in the structures that EBM endorses. In the empirical chapters that follow, participants make reference to components of this 'evidence base' in order to justify or explain the anaesthesia that they provide.

The canon of knowledge regarding hip fracture anaesthesia in the UK is currently led by a small group of prominent clinician-researchers: Dr Stuart White (Royal Sussex County Hospital), and Professors Richard Griffiths (Peterborough and Stamford Hospitals) and Iain Moppett (Nottingham University Hospitals).<sup>73</sup> Though these colleagues have a history of independent hip fracture-related research, evidence of their collaborative work is found recurrently in the literature from the last decade, beginning with a multi-centre validation study of the Nottingham Hip Fracture Score (Moppett et al 2012), a risk-stratification tool which was developed at Nottingham University Hospitals (Maxwell et al 2008). Their subsequent works have continued to define the agenda for hip fracture management in the UK anaesthetic literature, and their studies, editorials and responses are seen numerous times throughout this thesis.

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<sup>73</sup> They have also contributed to this study by kindly reviewing and commenting on my study protocol. Based on my personal interactions with them, I would assert that in addition to being high-profile and well published, they all share a genuine (and infectious) enthusiasm for improving the quality of hip fracture care and I thank them for their support and encouragement.

## Evidence-Based Medicine

The term 'evidence-based medicine' was coined by US physician Gordon Guyatt in 1991. This was his second name for the concept; he had initially proposed 'scientific medicine' but colleagues resented the implication that their existing practice was unscientific, thus inspiring a re-branding (Sur and Dahm 2011). Guyatt was a Physician Residency Coordinator, responsible for the training of junior doctors. He proposed that trainees should address clinical problems not only by consulting senior colleagues, but by searching for published evidence, via online resources such as MEDLINE, which had become more widely-accessible due to the growing use of the internet (Guyatt 1991, Evidence-Based Medicine Working Group 1992). This shift away from the time-honoured apprenticeship model (e.g. Halstead 1904) and into the realms of self-directed critical appraisal facilitated by new technology, was described by Guyatt as 'the way of the future' (1991). Though Guyatt's 'future' now appears rather old-fashioned in some ways,<sup>74</sup> the intervening decades have seen a shift towards Guyatt's vision; the credibility of 'systematic' evidence produced by organisations such as the Cochrane Collaboration has increased relative to what is termed 'expert opinion'.

The Oxford Centre for Evidence-Based Medicine's *Levels of Evidence* presents a hierarchy ranging from systematic reviews (with homogeneity) of RCTs (level 1a) to expert opinion (level 5) (Phillips et al 2009).<sup>75</sup> This formalised relegation of expert opinion to the lowliest level of evidence represented a paradigm shift in medicine, however how this paradigm is applied remains contentious, with many studies

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<sup>74</sup> Guyatt's proposals placed great emphasis on the use of now-superseded technologies such as desktop microcomputers and fax machines.

<sup>75</sup> Qualitative research is not acknowledged in the *Hierarchy*.

(summarised in the systematic review by Swennen et al 2013) finding that expert opinion and clinical experience are still the basis for much clinical practice.

The hierarchy of evidence espoused by the EBM movement is positivist in its epistemology. As the levels of evidence are ascended, the more measures are introduced to remove the influence of the individual from the knowledge generation process. Thus, an RCT is deemed to be 'better' than a cohort study, which in turn is superior to a case-control study, and so-on. This structure relies on the notion that there is a universal and discoverable set of 'truths' that exist independently of the researcher, whose involvement is perceived as a potential threat to the purity of these truths through the introduction of biases. This paradigm is a logical companion to the ideas that underpin the genesis of EBM; Guyatt illustrated his concept with clinically-situated vignettes which describe, for example, a junior doctor struggling to make a decision about which test to order for the investigation of anaemia (1991), and another pondering how to quantify the risk of seizure recurrence to a patient following their first fit (Evidence-Based Medicine Working Group 1992). These questions are relatively simple to answer<sup>76</sup>, and may be adequately addressed by studies that fit into the positivist approach by generating numerical data that can be analysed statistically and generalised to the population.

Though EBM has been adopted by the medical profession to some extent, there are many areas in which it struggles to provide satisfactory answers, and within the medical literature authors such as US respiratory physician Martin Tobin (2008) have

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<sup>76</sup> 'Serum ferritin' in the case of the former paper, and '43-51%' in the latter.

criticised the legitimacy of a grading system which holds the methodological avoidance of bias as the sole indicator of quality, without considering fundamental concepts such as the scientific validity of the questions that are being asked. Tobin also points out that the exclusion of all evidence except RCTs in the pursuit of 'quality' has the potential to lead to harm by ignoring data generated in circumstances where RCTs would be inappropriate. Further criticism of EBM is offered by professor of primary care Trisha Greenhalgh, who in 2014 asserted that the movement was in crisis. In this paper, she articulates concerns about the misappropriation of the EBM 'brand' by vested interests, who find opportunities in defining hitherto unknown medical disorders in order to suit technologies that can be legitimised, and hence marketed, through trial evidence. Furthermore, the over-powering of trials, bankrolled by commercial interests, can generate apparently convincing statistical differences despite a lack of relevant clinical effect, which are elevated in their importance by the 'rules' of EBM.

Of particular relevance to this study, Greenhalgh (2014) discusses the problem of multimorbidity in the context of EBM, contending that 'as the population ages and the prevalence of chronic disease increases, the patient with a single condition that maps to a single evidence-based guideline is becoming a rarity' (pg3725). This is, in part, due to the tendency of RCTs to exclude certain groups, which notably include women, elderly people and those with medical comorbidities (Van Spall et al 2007); demographic probabilities in the case of hip fracture (e.g. Baker et al 2014). The features of EBM, Greenhalgh argues (2015), may lead to discrimination against patients, as despite patient experience (physical and psychological) being the

fundamental reason for the provision of healthcare, these are devalued as a consequence of EBM's focus on quantifiable outcomes.

Another important critique of the RCT is related to the complexity of interventions. Whilst the methodology of the RCT originates in the comparison of individual drugs, anaesthesia is never a single intervention. Instead, the anaesthetist enacts numerous individual practices (induction, airway management, ventilation, analgesia etc) to 'make' an anaesthetic. This raises the question of whether RCTs of anaesthetic technique are appropriate, or if the inherent complexity creates by default what social psychologist Trudy Dehue (2010; p107) describes as 'incomparable cases' where it may be 'impossible to isolate a single factor from all the other ones that may constitute an effect.' This is seen by some as making the argument for further standardisation; that if anaesthetic technique was identical within a given mode that they would be easier to compare. Logically this is an appealing notion but is it possible? Sociologists of science and technology such as Timmermans and Berg (1997) have persuasively argued that total standardisation is not possible in clinical or research practice; building on this, Will and Moreira (2010) identify that though trials present techniques as standardised, there is in-fact 'local, individual diversity' which becomes lost in the reporting. As I will show in Part II, this is of profound relevance in hip fracture anaesthesia, where the options are so many, yet the description of technique is often so minimal that it would be impossible to for the reader to reproduce.

Though there are a number of compelling criticisms of the EBM model, is it important to note that since its introduction this model of knowledge has become an accepted convention amongst medical practitioners (e.g. McColl 1998, Lewis 1998, Davies

2011). As such, I make use of the 'levels of evidence' structure to organise my analysis of the medical literature on anaesthesia for hip fracture repair, starting with 'level-one' evidence:

### **Meta-Analysis of RCTs: the Forced Conformity of Evidence Synthesis?**

**TF:** '... my understanding is that there isn't any mortality difference between GAs and spinals across the board as with almost everything we do...'

**VR:** '... there's the Cochrane Review and various other meta analyses. But they've all questioned the quality of data in them as well.'

**TF:** 'Exactly, the trial designs are so heterogenous....'

**Consultant anaesthetists Tyrell Fishman and Vernon Rowntree, focus group, Beckfoot**

The Cochrane Collaboration was founded in 1993 as a product of the EBM movement. Named after Scottish physician Archie Cochrane, a proponent of RCTs, its aim was to produce systematic, up-to-date reviews of healthcare evidence (Chalmers 1993). Cochrane reviews are conducted in a highly-structured manner, and conventionally include only RCTs (Higgins and Green 2011).<sup>77</sup> Therefore, they are typically classified as level-one evidence, and are viewed by many practitioners as the 'gold standard' of EBM (Smith 2013).

The Cochrane review of greatest relevance to this study aims to compare the outcomes of regional and general anaesthesia for hip fracture repair<sup>78</sup>. It is now in its third edition having been updated in 2016 (Guay et al) and was initially published in

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<sup>77</sup> According to the *Cochrane Handbook* (Higgins 2011), non-randomised studies may be included in specific circumstances: to examine the case for undertaking an RCT by evaluating the weaknesses of non-randomised studies, to provide evidence of the effects of interventions that cannot be randomised, and to provide evidence of effects that cannot be studied in randomised trials.

<sup>78</sup> There are two other Cochrane reviews which are of direct relevance to anaesthetic practice: Guay et al (2017) compares the effectiveness of systemic analgesic medications to peripheral nerve blocks. It indicates that peripheral nerve blocks are an effective form of pain relief and suggests that there are further benefits in terms of early mobilisation, financial cost, and the avoidance of pneumonia. Lewis et al (2016) assesses the role of goal-directed fluid therapy and concludes that there is no benefit compared to 'usual care.' Both of these reviews are subject to similar critiques to the main subject of this section but are comparatively peripheral to the topic of this chapter, so I do not discuss them in detail.

abridged form in the *BJA* in 2000 (Urwin et al) then added to the *Cochrane Library* in 2001 (Parker et al). Though this was not the first meta-analysis of hip fracture anaesthesia (e.g. Sorenson and Pace 1992), it was the first to be published in the UK literature and was the most comprehensive study of its type at the time of publication, incorporating 15 RCTs. This review was the first hip fracture-related publication by Peterborough anaesthetist Richard Griffiths, who was the third author of this review in 2000, but by 2011 would be the chairperson of the AAGBI guideline on hip fracture, and in 2017 the recipient of the AAGBI's Featherstone Professorship, in-part due to his contribution to hip fracture care (Harrop-Griffiths 2017).

The latest version of the Cochrane review (Guay et al 2016) includes thirty-one RCTs with a total of 3231 participants, published between 1977 and 2013. It has six primary outcome measures comprising mortality at various timepoints, pneumonia, and myocardial infarction, and 14 secondary outcome measures which are indicators of recovery and complications.<sup>79</sup> Despite the broad-ranging outcomes, the review found that there was no evidence of difference between the two modes of anaesthesia, with the exception that regional anaesthesia is associated with a reduced risk of deep vein thrombosis, if 'potent' thromboprophylaxis<sup>80</sup> is not given, a finding of historical

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<sup>79</sup> Primary outcome measures comprise mortality at 30 days, three months, six months and one year, pneumonia, and myocardial infarction. Secondary outcome measures comprise cerebrovascular accident, acute confusional state, deep vein thrombosis, return of patient to their own home, congestive cardiac failure, acute kidney injury, pulmonary embolism, unsatisfactory surgical results, number of patients who received a blood transfusion, length of hospital stay, duration of surgical procedure, intraoperative hypotension, urinary retention, and incomplete or unsatisfactory analgesia.

<sup>80</sup> Thromboprophylaxis describes a group of interventions devices which reduce the risk of developing of venous thrombosis, which can lead to life-threatening consequences such as pulmonary embolism.

interest only in UK practice as pharmacological thromboprophylaxis is administered as a matter of course to patients undergoing hip surgery (e.g. NICE 2015)

The Cochrane reviews of hip fracture anaesthesia have a number of weaknesses which derive principally from the methodology that underpins all such studies. Central to this is the methodological assumption that 'general anaesthesia' and 'regional anaesthesia' are single, distinctive and uniform interventions which can be legitimately compared to one another. The authors of the most recent version of the review (Guay et al 2016) acknowledge this problem to some degree, conceding that GAs administered in older studies may not reflect current clinical practice due to the introduction of short-acting anaesthetic agents; indeed much of the practice in the studies from the 1970s and 1980s would not even be possible today due to changes in drug licensing.<sup>81</sup> Due to this, a regression analysis of early (0-30 day) mortality versus year of publication was undertaken as part of the review, suggesting a reduction in mortality with regional anaesthesia if only older studies were considered. This is corroborated by the initial version of the Cochrane review (Urwin et al 2000, Parker et al 2001), which concluded that regional anaesthesia is advantageous in terms of early mortality. Though the date of publication was understood by the authors to be a source of heterogeneity, there was little acknowledgement that markedly different versions of regional or general anaesthesia may be used within the same era. This issue formed the basis of a letter to the *BJA* by Eger, an American anesthesiologist (2000;

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<sup>81</sup> For example, althesin, used in three studies (McKenzie et al 1984, McLaren et al 1978, White and Chappell 1980), had its licence revoked due to a high incidence of anaphylaxis and is now restricted to veterinary practice only.

p492) in response to the publication of the first iteration of the review (Urwin et al 2000):

'The article... appears to be based on the unstated assumption that all general anaesthetics are alike and all regional anaesthetics are alike. That is, 'regional' and 'general' define two homogeneous categories whose effects may be compared. Given the diverse actions of different general and different regional anaesthetics, is this a reasonable assumption?'

The authors' response to this letter is telling – my reading of Eger's question is that it relates to diversity of anaesthetic *technique*, however in their response, Urwin and Griffiths (2000; p492) interpret 'anaesthetics' as meaning *anaesthetic drugs*:

'Although different local anaesthetics were used, all are known to have similar actions at the sodium channel, and therefore can be expected to have equivalent peripheral effects.... General anaesthetics were included in a single group, as there is still no consensus of opinion as to their mode of action. There is no evidence by which data relating to each type of general anaesthetic could be separated according to mode of action.'

When seen in historical context, this response illustrates the change in the perceived importance of mode and technique. Griffiths, a co-author of the above letter which I believe misses Eger's point, was also a co-author of the paper which 13 years later emphasised its importance by calling for research to find 'the "best" methods' of hip fracture anaesthesia (White et al 2014a; p228).

Evidence of differences of technique *within* the modes of anaesthesia can be seen with a detailed examination of the studies included in the Cochrane review (Guay et al 2016). For example, two of the more recent studies, Haedari et al (2011) and Messina et al (2013), use an entirely different combination of drugs to induce and maintain general anaesthesia.<sup>82</sup> Likewise, contemporary studies including spinal anaesthesia

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<sup>82</sup> Haedari et al (2011) used thiopental, isoflurane, nitrous oxide, fentanyl and pancuronium whilst Messina et al (2013) used propofol, sevoflurane, remifentanyl and cisatracurium.

use a near four-fold difference in the dose of bupivacaine.<sup>83</sup> Perhaps more strikingly, the Cochrane methodology combines interventions that the original study authors had deemed to be so different that they were the subject of their original comparison. Examples of this are seen in the combination of total intravenous anaesthesia (TIVA) and inhalational anaesthesia,<sup>84</sup> which originally constituted different groups in Biboulet et al's (2012) study, and the combination of single-shot and incremental spinal anaesthesia from Julsgaard et al's study (1998).<sup>85</sup> All of these factors are apparent from a detailed reading of the review but may be missed by the non-critical reader. What is not acknowledged however is that the methodology of RCTs (and hence the systematic reviews produced from them) is only able to capture *what* was done during the anaesthetic, not *how* it was done. Anaesthetic technique is not only about drugs and doses, but these elements of anaesthesia become over-emphasised by RCTs, just as aspects of practice that are difficult to quantify become obscured.

Not surprisingly, the authors of the 2016 Cochrane review were unable to make any recommendations for practice on the basis of their analysis. As a result, they conclude that the existing research is insufficient and state that larger, high-quality RCTs are a priority for future research. It is also notable that they suggest that future studies should include a measure of quality of life in addition to the biomedical outcomes that

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<sup>83</sup> Hoppenstein et al (2005) used 4mg, of bupivacaine plus 25mcg of fentanyl, whereas Kamitani et al (2003) used 15mg of bupivacaine.

<sup>84</sup> TIVA involves inducing and maintaining anaesthesia using an intravenous agent, usually propofol, whereas inhalational anaesthesia involves the maintenance of anaesthesia with volatile anaesthetic agents.

<sup>85</sup> A single-shot spinal involves the administration of a predetermined dose of local anaesthetic. An incremental spinal involves inserting a spinal catheter and giving small doses of local anaesthetic, titrated to effect. The proposed benefit of incremental spinals is that overdose of local anaesthetic is avoided.

are assessed in the current literature. Echoing Greenhalgh's call for 'real' EBM (2015); the prioritisation of the patient's perspective above more easily measurable outcomes.

The National Institute of Health and Care Excellence (NICE) issued guidelines on *The Management of Hip Fracture in Adults* in 2011 in which the section on anaesthesia is based predominantly on evidence from the 2004 version of the *Cochrane Review*<sup>86</sup> (Parker et al). As described in Timmermans and Berg's (2003) discussion of guidelines, NICE provides a 'distillation' of the findings of the Cochrane review, which in this case are interpreted as being equivocal. The guideline therefore provides little direction, effectively opening up options to clinicians rather than closing them down. Its recommendations regarding anaesthesia (p36) are sparse, comprising only two points, both incorporating an element of choice:

- 'Offer patients a choice of spinal or general anaesthesia after discussing the risks and benefits.'
- 'Consider intraoperative nerve blocks for all patients undergoing surgery.'

The recommendation that patient choice should be the deciding factor in the absence of other evidence is compelling. However, basing decisions on patient choice may compel an anaesthetist to deviate from their usual practice towards what they consider to be inferior care. A degree of discomfort with this compromise is evident the reflections of the anaesthetists at Longside, where GA is the predominant technique:

**Me:** '... are there any other particular reoccurring challenges amongst [patients] with hip fractures?'  
**LT:** 'I had a couple of patients that said specifically that they wouldn't want a GA, they wanted a spinal, they had been told a spinal was the best thing to have.'

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<sup>86</sup> The other evidence that was considered by NICE (Chakladar and White 2010) related to the cost of spinal and GA and did not comment on outcomes.

*[the conversation diverts briefly to a discussion of chest disease as an indication for spinal anaesthesia]*

**Me:** '... how do you deal with that when patients volunteer that they'd like something that isn't the aforementioned recipe that you tend to stick to.'

**VB:** 'I mean as I said, there's no, there's no problem with that, there's no evidence that one is better than the other as long as there's not a specific reason why a spinal can't be done, then if they want that, fine. They've obviously not got dementia if they're asking for that, they've probably got, they've probably been able to weigh things up and they probably have capacity so that's fine. That's fine, do a spinal, no problem.'

**Consultant anaesthetists Vaughn Bates and Louis Tyrell, focus group, Longside**

In a similar fashion to the Cochrane review (Guay et al 2016), NICE suggests that more research should be conducted in order that the effect of anaesthetic technique be better understood. It proposes a three-armed RCT, with groups comprising spinal anaesthesia, spinal anaesthesia with sedation and GA.<sup>87</sup> However White, a contributor to the NICE guideline, identified four problems with the notion of further RCTs in a subsequent editorial in *Anaesthesia* (2012) which he co-authored with Griffiths and Moppett:

- That although there may be 'scientific equipoise', institutions often demonstrate a preference for one mode of anaesthesia or another. Clinicians may therefore feel it to be unethical to participate in a trial which compels them to offer a mode of anaesthesia that would not be their preference.
- That many patients with hip fracture have comorbidities that may exclude them from randomisation (e.g. aortic stenosis), or informed consent (e.g. dementia or delirium).
- That there are significant challenges in identifying outcome measures which matter to patients and are appropriately specific to anaesthesia.

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<sup>87</sup> The NICE guideline (2011; p88) also suggests that:

'A qualitative research component would also be helpful to study patient preference for type of anaesthesia.' This is explored in Chapter 7.

- That mode of anaesthesia represents 'a vast array of techniques that are known to be used by individual anaesthetists and are consequent to the lack of evidence for any 'best' general or regional anaesthetic' (p576).

The RCT model, then, poses significant practical and ethical challenges in the context of hip fracture anaesthesia. This led White, Griffiths and Moppett (2012) to conclude that this methodology had run its course in the hip fracture context and that large-scale observational cohort studies would be preferable, in order to 'overcome the problems inherent in any trial of such a complex, multifactorial intervention' (p576).

The Cochrane meta-analysis of hip fracture anaesthesia indicates no difference in outcomes of practical relevance to current practice between regional and general anaesthesia and this has translated into national NICE guidance (2011). This may of course be because there is no difference, but a close reading demonstrates a 'forced conformity', where techniques that should legitimately be perceived as markedly different from one another when viewed in context are classified as the same for the purpose of data synthesis. This homogenisation of technique is problematic because it treats anaesthesia as if it were a simple intervention, potentially obscuring important findings. Moreira and Will (2010; p160) suggest that an 'absence of evidence might be a good indicator of forms of exclusion...', a suggestion corroborated by clinical researchers such as White, Griffiths and Moppett (2012) who point out that patients who are excluded from such trials in hip fracture often have the highest perioperative risk, including those with cognitive and cardiac comorbidities. For White and colleagues this justifies the use of observational methods, not in the form of case studies as suggested by Moreira and Will (2010), but in the form of 'big data'.

### Cohort Studies: the Loss of Detail in the Big Picture?

**BD:** '... it's based on fairly piss-poor evidence, like GA's versus spinals, it's all retrospective data. If everyone thinks spinals are better but GA's are given to the sick people who can't have spinals that's going to make spinals look better...'

**Consultant anaesthetist Brent Dabney, Heather's anaesthetic, Beckfoot**

Observational cohort studies compare outcomes with exposures; the basis on which study groups are defined. As random allocation cannot occur, according to the *hierarchy* this is 'level-two' evidence. However, this methodology has a number of advantages: data are obtained from real clinical practice, perhaps going some way towards addressing concerns about the artificial nature of RCTs, and datasets from national registries can be very large; the NHFD collects data from England, Wales and Northern Ireland and is thought to capture data on over 95% of hip fracture patients aged 60 and over (White et al 2016a, NHFD 2016). Three large cohort studies of anaesthesia practice have used NHFD data.

The most relevant study to this thesis (not least because it inspired my research question) reports the outcomes of over 65,535 patients who underwent hip fracture surgery in the UK in 2012 and was published by White et al in *Anaesthesia* in 2014. Data were obtained from the NHFD; the primary outcomes were 5- and 30-day mortality. This study is contemporary with several similar studies derived from large North American datasets (Neuman et al 2012 & 2014, Paterno et al 2014, Fields et al 2015, Basques et al 2015), some of which identified marginal benefits to one mode of anaesthesia or the other, but none of which were able to definitively conclude that any mode was superior. In White et al's study (2014a), mode (defined on the basis of

general, spinal, and/or epidural anaesthesia, as well as peripheral nerve blocks<sup>88</sup>) was recorded for 59,191 patients, of whom 30,130 received general anaesthesia, 22,999 received spinal anaesthesia, and 4,214 patients received GA combined with spinal anaesthesia. No difference was found when spinal was compared with GA in either 5-day (2.8% vs 2.8%,  $p=0.958$ ) or 30-day (7.5% vs 7.0%,  $p=0.053$ ) mortality. Adjustment for baseline characteristics was conducted on the basis of ASA grade, a relatively simple measure<sup>89</sup> which is often criticised for being inconsistently applied (e.g. Haynes and Lawler 1995), but this did not affect the outcomes. On the basis of their analysis, White and colleagues offered three possible interpretations:

- That there is no difference in outcome between GA and spinal anaesthesia.
- That there is a difference in outcome between GA and spinal anaesthesia, but not in terms of mortality.
- That national data recording is not accurate enough to detect a difference in outcome between GA and spinal anaesthesia.

White's study (2014a) had several methodological strengths in that it captured nearly all eligible hip fractures in the countries of interest, and the recording of anaesthetic technique was more representative of the options available in practice than the North

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<sup>88</sup> Epidurals and peripheral nerve blocks were interpreted as analgesic techniques when used in combination with other modes of anaesthesia (i.e. general, spinal or combined general and spinal)

<sup>89</sup> The American Society of Anesthesiologists' *ASA Physical Status Classification System* is a grading system that classifies patients according to the presence and severity of systemic disease. It is commonly-used in UK as well as American practice. The grades are defined below:

ASA I	A normal healthy patient
ASA II	A patient with mild systemic disease
ASA III	A patient with severe systemic disease
ASA IV	A patient with severe systemic disease that is a constant threat to life
ASA V	A moribund patient who is not expected to survive without the operation
ASA VI	A declared brain dead patient whose organs are being removed for donor purposes

Adapted from ASA House of Delegates 2014

American studies (Neuman et al 2012 & 2014, Paterno et al 2014, Fields et al 2015, Basques et al 2015). However, the use of sedation during regional anaesthesia was not addressed; this is potentially important as processed electroencephalogram (EEG)<sup>90</sup> readings consistent with GA are frequently achieved during intended 'conscious sedation'<sup>91</sup> in hip fracture patients (Sieber et al 2010), and as Scarborough anaesthetist Fleming (2014; p643) points out in a response to White's paper, sedation can be done in numerous different ways:

'Fentanyl, propofol (bolus or target controlled infusion), midazolam, ketamine and combinations thereof are all in use as sedation for this purpose, with differing levels of sedation (minimal, moderate, deep) favoured by different anaesthetists.'

Because sedative agents are the same drugs as those used in general anaesthesia, given at lower doses but sometimes (erroneously) generating a similar depression of consciousness, it is possible that many of the anaesthetics classified as 'spinal' by White et al (2014a) may have been more akin to combined general and spinal anaesthesia. Though Fleming (2014) focuses on sedation, White et al are clearly cognisant that the definitions of anaesthesia used in their study are imperfect and unlikely to represent the complexity of anaesthetic practice, as evidenced by their suggestion that 'general' and 'regional' are too broad as definitions.

A close examination of White et al's data (2014a) reveals two subgroups that are not included in the overall analysis but have the capacity to influence the overall interpretation of the data. The first is the 6.5% of patients who received both spinal

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<sup>90</sup> A technique which measures the electrical activity of the brain in order to monitor the 'depth' of anaesthesia.

<sup>91</sup> *Conscious sedation* is described by the Academy of Medical Royal Colleges (2001) as 'a technique in which the use of a drug or drugs produces a state of depression of the central nervous system enabling treatment to be carried out, but during which verbal contact with the patient is maintained...'

and GA. These patients had a 30-day mortality of 6.7%, the lowest in the study, and as pointed out by the authors, if these are 'counted' as GA the difference in 30-day mortality between GA and spinal becomes statistically significant in favour of GA. The authors do not report the corresponding calculation for if this group was added to the spinal cohort, but my own calculations indicate that the 30-day mortality for spinal would fall from 7.5% to 7.0%: the same as for GA. There is another group that is not discussed in the paper at all: 9.7% of patients did not have their mode of anaesthesia recorded, but had a 30-day mortality of 20.3%, the highest in the study. That the group with the highest mortality has the lowest-quality data recording raises important questions: is this phenomenon reflective of the difficulties of making accurate records whilst resuscitating an unwell patient? Do anaesthetists who don't make adequate records treat their patients with a similar lack of attention-to-detail? Are the records for these cases more complex, leaving the staff responsible for completing the NHFD reports unable to decipher what was done and therefore abandoning the data entry? The accuracy of NHFD data was discussed by Jamani and McLelland (2014) in a response to White et al (2014a). Citing their own experiences as an example, they present concerns about the interpretation of anaesthetic mode and explain that at their institution NHFD data is entered by a non-clinician colleague. They imply that this may have contributed to a 4% error rate that they identified in their own data.

A particular subgroup of patients within White's (2014a) paper, classified as ASA-grade IV ('severe systemic disease that is a constant threat to life'), attracted comment from anaesthetists Chesser and Timperley (2014) and Yurtlu and Hanci (2014). These authors noted that amongst this subgroup, the 30-day mortality rate is significantly reduced in cases where GA was used (22.2% vs 26.5%,  $p=0.008$ ), and whilst this is

displayed in a data table, it is not further discussed. Both Chesser and Yurtlu's responses suggest that on this basis, GA may be safer than spinal. In their response White et al (2014b; p1058) reflect on a methodological weakness of observational studies of anaesthesia – that because anaesthesia is never an isolated intervention, it may be difficult to untangle anaesthesia-related complications from those of other causes, and that such causes may have associations with mode of anaesthesia which are unseen in big data:

'... we suggest that mortality rates associated with comorbidities that are relative contraindications to general anaesthesia, such as severe chronic obstructive pulmonary disease and heart failure (that have two-year survival rates of ~30% and ~50%, respectively) are higher than for comorbidities that have traditionally been relative contraindications - despite a relative lack of evidence - to spinal anaesthesia (e.g. valvular heart disease of any severity, and coadministration of warfarin or antiplatelet drugs...)'

These 'confounding variables' form the basis of the outspoken critique by Xue et al (2014; p1058), who advocates for the RCT model, and its reliance on 'standardisation' of practice:

'... the results of [observational] studies are sensitive to confounding variables that cannot be standardised. As such, the results... are easily achievable but barely meaningful.'

The above criticisms, which constitute a much larger number of responses to a journal article in the UK anaesthetic literature than may usually be expected, illustrate both the perceived importance and the controversial nature of White's paper; it was at the same time a challenge to the RCT model lauded by EBM, and a threat to anaesthetists' favoured mode of anaesthesia; its finding that mode did not affect mortality effectively undermining everyone's assumption that their own preferred anaesthetic was superior.

The same researchers who undertook White et al's 2014 study subsequently published another cohort study in *Anaesthesia* (2016a). This involved the integration of

prospectively-collected data about anaesthetic technique from the Anaesthesia Sprint Audit of Practice (ASAP) (Boulton et al 2014) with outcome data from the NHFD. In ASAP, hospitals participating in the NHFD were invited to collect additional data on anaesthetic practice between May and July 2013, which were compared to 'standards' (Figure 2) derived from the AAGBI guideline (Figure 1, Chapter 1). Of the eligible NHS Trusts, 67.5% participated in ASAP, yielding data on 11,085 patients with hip fractures. White's 2016 integration of ASAP and NHFD, dubbed 'ASAP-2' provided perhaps the most detailed insight offered by 'quantitative' research into the effect of anaesthetic *technique* on patient outcomes. Outcome measures were mortality at 5- and 30-days, length of stay, and deterioration in cognition, independence or residential status. No association between anaesthetic mode and any outcome measure was found; however lower intraoperative blood pressure was associated with higher mortality. Intraoperative hypotension was, in turn, associated with higher-dose spinal anaesthesia<sup>92</sup>. Aside from the usual criticisms of observational studies as outlined above, this study has a key methodological issue: the return rate for ASAP represented just over two-thirds of the Trusts involved in NHFD overall. Because the 30-day mortality rate in ASAP-2 was 5.1%, but 8.0% in the NHFD overall in the same year, it appears that hospitals with lower mortality rates were more inclined to contribute data to ASAP. The ASAP-2 study may therefore be more representative of the practices of what may be deemed 'better' hospitals.

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<sup>92</sup> 'The relative fall in systolic blood pressure was weakly correlated with more sub-arachnoid bupivacaine:  $r^2$  -0.10 and -0.16 for hyperbaric and isobaric bupivacaine, respectively' (White et al 2016a).

An important strength of ASAP-2 (White et al 2016a) lies in its more nuanced assessment of how anaesthesia was done: the presence or absence of sedation was considered for the first time in the context of spinal anaesthesia (no differences in outcome were found), the dose of bupivacaine used in spinal anaesthesia was recorded, and the potential causes and impacts of intraoperative hypotension were considered. This paper generated less controversy than White's 2014 study, the discussion being focussed on the concept of low-dose spinal anaesthesia.

In his response to White et al's ASAP-2 (2016a), published in *Anaesthesia*, anaesthetist Sean Tighe (2016; p1242) advocated for the use of the 'lowest possible' dose in spinal anaesthesia, explaining that in his own practice he used 5mg of bupivacaine, half of the 10mg maximum dose suggested in the ASAP standards (Boulton et al 2014; Figure 2). He conceded however that he increased the dose 'when a slower surgeon is operating, or for larger or younger patients.' On the basis of this experience, he suggested that the majority of spinals reported in ASAP-2 were 'almost certainly with an excessive dose' and that if faster more experienced surgeons operated, the anaesthetic dose could be minimised with a potential reduction in mortality. According to Tighe, he had used his 'ultra-low dose' technique for three years 'without incident.' Tighe's reflection on his own practice was deemed to be inadequate evidence of the effectiveness of low dose spinal anaesthesia by Japanese anaesthetist Godai (2016), who argued against his rationale, and suggested that in the event of a spinal starting to wear off during prolonged surgery, the patient may suffer pain which, in turn, may lead to other complications such as delirium. In his subsequent response to Godai's critique of Tighe, White (2016e; p127) concedes that duration of effect is 'the commonest concern held by anaesthetists about using low-dose spinal

anaesthesia.' Presenting evidence from his own Brighton Hip Fracture Database and the work of Lemonie et al (2016) in support of Tighe's technique, he asserts that 7.5mg of bupivacaine (used in this context to represent 'ultra-low dose', though notably 50% higher than the dose used by Tighe) provides around 4 hours of anaesthesia, whilst only 8.1% of hip fracture procedures last for longer than 2 hours.

The most recent study derived from the NHFD (Johansen et al 2017), published in *Anaesthesia* during the course of my observations, does not focus on anaesthetic technique. Instead, it is about whether to proceed with anaesthesia in high-risk cases. Johansen et al analysed the rates of in-hospital mortality according to ASA grade using 2015 data from the NHFD. This analysis identified that 48.6% of patients who did not undergo surgical repair died in-hospital, compared with 6.6% of patients who underwent surgery. Though the authors acknowledge that the excess mortality amongst non-operative cases may be due to the illnesses that prevented them from being deemed 'fit' for anaesthesia and/or surgery in the first place, they point out that mortality amongst even 'moribund' ASA-V patients was only 24.8% when surgical repair was undertaken, thereby representing a near 50% relative reduction in mortality if non-operated patients are all assumed to be ASA-V or equivalent. They suggest an explanation for this apparent benefit to proceeding with surgery for even the sickest of patients (p964):

'...the provision of nursing care for patients with unrepaired hip fracture [is] hugely challenging. Such patients find it painful to move about in bed or to use a bed pan. Surgical repair of the fracture hip offers pain relief and the opportunity for mobility, which can reduce the rate of chest infections and pressure sores.'

The discussion of the data from this study takes the form of a re-framing of the meaning of risk pertaining to operative hip fracture repair. The authors acknowledge

that as ASA grade increases, the relative risk of mortality increases steeply (Figure 11). However, they suspect that considering risk in this way this may constitute 'therapeutic nihilism' in 'high-risk' cases. They argue that when absolute risks and different time-frames are considered, risk may appear quite different. For example, whilst ASA IV patients (those with 'severe systemic disease that is a constant threat to life') have a 16.5% risk of dying before they can be discharged from hospital, their risk of death within the first two postoperative days, which the authors imply is enough time to benefit from the pain-relieving effects of surgery, is under 2%.

ASA Physical Status	Number	Operated	Postoperative death in-hospital
I	1,286 (2.1%)	1,223 (95.1%)	16 (1.3%)
II	16,446 (26.5%)	15,832 (96.3%)	295 (1.9%)
III	35,309 (56.8%)	33,918 (96.1%)	2,204 (6.5%)
IV	8,786 (14.1%)	8,231 (93.7%)	1,358 (16.5%)
V	286 (0.5%)	165 (57.7%)	41 (24.8%)
<b>Total</b>	<b>62,113</b>	<b>59,369</b>	<b>3914 (6.6%)</b>

Figure 11: Operations and deaths, NHFD 2015

Adapted from Johansen et al 2017

In contrast to White's papers (2014a and 2016a), Johansen's NHFD study (2017) generated no written responses. This alludes to the degree to which the conclusions drawn by these studies cause controversy: Johansen's suggestion that patients should, in general, undergo surgery went unchallenged, whereas White's papers about anaesthetic mode and technique (2014 and 2016) attracted comment from those whose practices were either supported or impugned. For example, Chesser and Timperley (2014), whose reply criticised White (2014a) for not discussing the lower mortality with general anaesthesia in ASA-IV patients are anaesthetists from Bristol Royal Infirmary, where according to ASAP (Boulton et al 2014) 74% of anaesthetics are general. Likewise, Tighe (2014) who advocated low-dose spinal anaesthesia works at

the Countess of Chester Hospital, where 82% of anaesthetics are spinal (Boulton et al 2014).

These debates in the literature provide insights into the current controversies in hip fracture anaesthesia: the anaesthetic community appears to accept that anaesthesia must be done, but divides in to opposing 'tribes' regarding how. This tribalism extends to those who are involved in generating data; White, Griffiths and Moppett are not neutral in this debate. They are practicing anaesthetists who, like the rest of us, must form opinions about what constitutes a good anaesthetic for their patients. However, elevated to expert status through their research practice, they are able to translate their opinions into authoritative documents, producing guidelines and standards against which the rest of the anaesthetic profession may be measured.

### **Expert Opinion: the Lowest Level of Evidence, the Greatest Controversy?**

**TF:** '... all our consensus guidelines do is to provide us some medicolegal cover. They're all consensus and opinion, because there will never be evidence about any of this stuff. The actual complications are one in tens of hundreds of thousands, trials are never gonna exist. It's just knowledge based... the pharmacology of the drug and some opinions.'

**Tyrell Fishman, consultant anaesthetist, focus group, Beckfoot**

To summarise the current state of the biomedical literature regarding hip fracture anaesthesia, the studies of the highest methodological quality according to the hierarchy of evidence do not provide clinically useful direction regarding anaesthetic technique. The Cochrane review (Guay et al 2016) is beset with methodological problems regarding the quality of studies and the heterogeneity of interventions. The authors of the review acknowledge that differing practice according to the date of each study is problematic, but do not account for the fact that even contemporary practices vary widely. This is seen in their own summary tables and is further corroborated by national audit data (e.g. Boulton et al 2014). The NHFD studies which

go the furthest in terms of recording the anaesthetic technique (White et al 2014a & 2016a) are unable to fully describe *what* anaesthetic was done in each group due to the limited nature of survey-based data collection, and no study describes *how* anaesthetics are done. However, the ASAP-2 study has brought the issue of *technique* to the forefront of the current literature, and in a recent blog post the editor-in-chief of *Anaesthesia* Andrew Klein borrowed the words sung by Ella Fitzgerald, summarising the evidence regarding hip fracture anaesthesia as 'it's not what you do it's the way that you do it' (2016).

Expert opinion is deemed to be the lowest level of evidence according to the *hierarchy*, but it is the predominant influence on the guidelines regarding the anaesthetic management of the hip fracture patient; guideline authors are careful to make the reader aware that this is the case. The AAGBI guideline on *Management of Proximal Femoral Fractures* (Griffiths et al 2011; p2) carries a warning:

'In common with other guidelines, this guideline reviews current evidence regarding best practice anaesthesia. Crucially, however, this guideline also recommends best practice in the numerous circumstances where evidence is controversial or incomplete, based on expert consensus opinion'.

The guideline's section on 'anaesthetic considerations' is largely based on opinion, and begins with an explanation of evidence (p16), and the implications of this for clinical practice and the guideline process:

'There is a minimal evidence base for determining the optimal anaesthetic technique for patients undergoing hip fracture surgery. Consequently, anaesthetists tend to adhere to a technique with which they are familiar, roughly half administering neuraxial anaesthesia and the remainder general anaesthesia. Furthermore, the wide range of drugs and dosages used obscures determination of the best technique using audit data.'

In making this statement, the authors of the guideline legitimise its 'expert opinion' basis by outlining the problematic nature of the evidence available from higher levels

of the *hierarchy*: it is the 'best' remaining option in the absence of 'better' evidence. This does not mean however that the AAGBI guideline does not use evidence at all; it uses inconclusive trial findings to support the expert opinions of the authors. For example, regarding mode of anaesthesia it aligns its recommendation with that of the SIGN guideline on *Management of Hip Fracture in Older People* (2009), which favours regional over general anaesthesia on the basis of the consensus of the guideline committee and the 2004 version of the Cochrane review (Parker et al).<sup>93</sup> The AAGBI guideline also cites a more recent systematic review by Luger et al (2010), published in the specialist osteoporosis literature. Luger and colleagues are cognisant of the challenges of synthesising data on mode of anaesthesia, outlining the problem that this presents within the confines of EBM in the introduction to their paper (pS556) in what, to me, appears to be more of an expression of frustration than of scholarship:

'... when the literature speaks of "regional anaesthesia" versus "general anaesthesia", a vast amount of methods is subsumed beneath these generic terms. Reviewing this topic is more like comparing apples with oranges than finding an answer that bears up the prerequisites of evidence-based medicine.'

Luger's study (2010) adopts a broader approach than that of *Cochrane*, including both observational studies and RCTs. Finding benefits to regional anaesthesia in terms of 'early' mortality, venous thromboembolism, pneumonia, hypoxia, myocardial infarctions and confusion, but to general anaesthesia in terms of blood pressure and stroke, Luger (pS555) concluded:

'These data suggest that regional anaesthesia is the preferred technique, but the limited evidence available does not permit a definitive conclusion to be drawn for mortality or other outcomes.'<sup>94</sup>

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<sup>93</sup> Parker et al (2004) concluded that regional anaesthesia was associated with less postoperative confusion.

<sup>94</sup> In 2018 (after my data collection had finished) O'Donnell et al published a systematic review adopting a similar methodological approach to Luger (2010). They found no significant differences in outcome,

The AAGBI recommendation (2011) for regional anaesthesia is therefore not entirely opinion-based but it makes use of non-definitive evidence and the consensus built by other guidelines in a way that bolsters the opinion of the guideline committee. The preference of the authors for regional anaesthesia is evidenced by the threshold that they set for the evidence that would be required in order to change it – they state that they will continue to endorse the SIGN (2009) preference for regional anaesthesia unless there is 'conclusive evidence' to refute it. Whilst the evidence hangs in the balance therefore, regional remains the preferred mode.

Other recommendations regarding anaesthetic technique in the AAGBI Guideline (Griffiths et al 2011) which are unreferenced and therefore likely to have been made on the basis of opinion, include the drugs that are recommended for sedation and the use of supplemental oxygen during spinal anaesthesia, the advice to exercise caution with doses of sedatives and general anaesthetic agents, the administration of spinal in the lateral position, the avoidance of opiates as the sole analgesic strategy, and the recommendation for the use of peripheral nerve blockade for analgesia (though a 2017 Cochrane review on peripheral nerve blockade by Guay et al has since provided evidence to support the last two of these recommendations). Whilst no empirical evidence is presented for the technique of GA, several studies are cited in the description of technique for spinal: a narrative review by Hindle (2008) is cited as the basis for favouring intrathecal fentanyl over diamorphine, though Hindle draws this

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with the exception of a reduced length-of-stay when regional anaesthesia was used. Though statistically significant, the magnitude of the advantage, 0.03 days (43 minutes), is unlikely to represent any meaningful benefit.

conclusion on the basis of pharmacological principles rather than empirical evidence, and studies by Wood and White (2011) and Ben-David et al (2000) are cited in support of limiting the dose to under 10mg of bupivacaine in order to ameliorate hypotension.

As with the studies discussed above, the AAGBI guideline, which was published in *Anaesthesia* as well as being made available directly from the AAGBI, attracted comments from anaesthetists. Many of these took the form of 'tips' that the authors felt had been omitted from the guideline, including the importance of continuing certain medications in the perioperative period (Mahadevan and Paranthaman 2012, Trotter and Boothroyd 2012), and advocating for the early use of peripheral nerve blockade (Funnell and Ford 2012, Pawa et al 2012).

Two responses were however critical of the opinion-based suggestions for technique in the AAGBI Guideline (2011): Plumb (2012) expressed concerns about the statement that 'supplemental oxygen should always be provided during spinal anaesthesia' (p17), contending that amongst this frail and diverse group of patients the indiscriminate use of oxygen could cause complications such as atelectasis<sup>95</sup>, as well as being uncomfortable and discouraging early mobilisation. Further criticism was offered by Harding (2012; p672), who disputed the preference for regional anaesthesia, stating 'when I ask my patients whether they would like to be awake or asleep, the vast majority express a desire to have a general anaesthetic.' Furthermore, he reflected on the difficulty of positioning patients with hip fracture:

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<sup>95</sup> Atelectasis refers to the collapse of alveoli in the lung which can lead to hypoxia; it can be caused by the excessive administration of oxygen which is readily absorbed into the blood, unlike nitrogen which is relatively insoluble and therefore 'splints' the alveoli open.

'Patients with this condition are usually elderly, often scared, in pain, disorientated, thirsty and sometimes confused. If I was one of them, the last thing I would want would be to be turned on my side and have my broken hip flexed; I would prefer to receive a general anaesthetic and wake up free of pain.'

Both Plumb and Harding (2012) challenge the guideline on the basis of patient-centredness; Plumb emphasises what is unique about hip fracture patients and questions the validity of universal measures, whereas Harding prioritises patient experience and preferences. Griffiths' response (2012; p675) to Harding provides some insight into the controversies experienced during the guideline development process, and his own preferences as a clinician:

'... the question of which anaesthetic technique to choose... was discussed at length... The literature is scant, and we all agreed that the evidence was not robust enough to recommend one technique over another. We also appreciate that with randomised controlled studies in this patient population, many are excluded because they are cognitively impaired or deemed too unwell for inclusion... On a personal level, I do favour neuroaxial anaesthesia for these patients. All must be positioned carefully but once the block is established, I find that almost every patient goes to sleep without any sedation.'

The AAGBI Guideline (Griffiths et al 2011) formed part of a literature-based study by Kearns et al (2103), published in *Anaesthesia* and entitled *A Comparison of Clinical Practice Guidelines for Proximal Femoral Fracture*. The AAGBI guideline was compared to others available in the UK at the time of publication, including the guidelines by SIGN (2009), NICE (2011), and the British Orthopaedic Association (2007 and 2012). Kearns and colleagues identify numerous inconsistencies between the five guidelines which mostly related to pre-operative considerations such as the timing of surgery, the provision of analgesia and the role of investigations. But it was noted in terms of anaesthetic mode that whilst SIGN (2009) and AAGBI (2011) indicated a preference for regional anaesthesia, NICE (2011) suggested only that it be offered to patients as a choice. Considering the reasons for these differences, Kearns et al suggest that chronology plays a significant role – additional evidence was considered by NICE and

AAGBI in 2011 that was not available to SIGN in 2009. However, they also proposed that the motivations behind guidelines were important; the AAGBI document is described (p161) as 'clinician-driven and patient focussed,' whereas the NICE guideline (p163) 'must balance an over-arching responsibility for the fair and optimal use of resources' with clinical considerations. For Kearns, the principal concern about these inconsistencies is a medicolegal one; considering guidelines' 'quasi-legal' status, what are the implications for a practitioner who does not follow their advice? And how does one reconcile the situations where the guidelines disagree? In responding to these concerns, Green and Griffiths (2013) suggested that, consistent with the Bolam test (1957)<sup>96</sup>, the guidelines with the greatest legal weight in such circumstances would be the AAGBI guidelines, those generated by the profession itself.

Similar 'expert opinion' methodology was used to create two sets of standards which attract financial incentives for the organisation providing hip fracture care: the 'Best Practice Tariff' (BPT) is a national scheme that attracts a basic payment for all participating trusts, and an additional payment of £1335 every time an eligible patient meets the tariff criteria (DoH 2013). In the 2016 NHFD report, current at the time of my data collection, 60.3% of patients in the North West of England were found to have met the criteria for the BPT. The criteria in operation at the time of the study are outlined in Figure 12.

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<sup>96</sup> The Bolam test is derived from the case of *Bolam vs Friern Health Management Committee* (1957); it is based on the principle that 'a doctor does not breach the legal standard of care, and is therefore not negligent, if the practice is supported by a responsible body of similar professionals' (Samanta and Samanta 2003).

1. Time to surgery within 36 hours from arrival in an emergency department, or time of diagnosis if an inpatient, to start of anaesthesia.
2. Assessed by a geriatrician in the perioperative period: within 72 hours of admission.
3. Fracture prevention assessments (falls and bone health).
4. An abbreviated mental test performed before surgery and the score recorded in the NHFD.
5. A nutritional assessment during the admission.
6. A delirium assessment using the 4AT screening tool during the admission
7. Assessed by a physiotherapist on the day of or following surgery.

Figure 12: Criteria for the Best Practice Tariff for Hip Fracture  
(NHS Improvement, 2016)

The second set of standards which attracts a financial incentive is the 'Advancing Quality' (AQ) scheme which operates locally in the North West of England. Eight criteria are specified in the AQ standard for hip fracture care (Figure 13). A payment is made to the healthcare trust if a certain percentage of patients meet all eight criteria. This 'all or nothing' method of payment makes the AQ payment challenging to achieve; at the time of data collection no hospital had achieved compliance in more than 20% of patients (Advancing Quality Team, 2017).

1. Pain score assessment and painkillers given within 60 minutes of hospital admission.
2. Admission to appropriate specialist ward within four hours of hospital arrival.
3. Jointly agreed protocol started within six hours of hospital arrival.
4. Pressure ulcer assessment within six hours of arrival.
5. Surgery supervised by consultant or senior clinician.
6. Post-operative notes should state that the patient should full weight bear.
7. Physiotherapy assessment within 24 hours of surgery.
8. Nutritional Screening within 24 hours of arrival.

Figure 13: Advancing Quality criteria for hip fracture  
(Advancing Quality Team, 2015)

It is notable that, in common with the NICE guideline on hip fracture (2011), anaesthesia appears peripheral to the management of hip fractures in these financial tools: there is no aspect of the AQ criteria which would be within the influence of the anaesthetist in their usual practice, and the only element of the BPT to which the anaesthetist may be expected to contribute is the time to surgery (Figure 12). There is therefore little financial incentive for trusts to promote a particular way of doing anaesthesia, provided it is done in a timely manner.

The guidelines on hip fracture available at the time of the study predate much of the most recent research regarding anaesthetic mode and technique.<sup>97</sup> However, the anaesthetic management of the hip fracture patient remains a prominent concern in the literature and at specialist meetings. White is an advocate of what he describes as 'minimally invasive standardised anaesthesia' (White 2016d). This comprises 10 standards, which are informed by RCTs and observational studies, but largely based on expert opinion (Figure 14). At the present time these standards have been presented at professional conferences and uploaded to White's hipfractureanaesthesia.com website but have not been published in peer reviewed journals. The notion of standardised anaesthesia, which is not explicitly mentioned in any of the above national or regional guidelines, has gained traction in recent years, despite there being little evidence in its favour in terms of patient outcomes; what evidence there is (e.g. Laiwalla et al 2016) does not come from hip fracture anaesthesia and only demonstrates improvement in physiological, not clinical, outcomes.<sup>98</sup> However, there appears not to be any evidence that standardised anaesthesia makes outcomes worse.

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<sup>97</sup> Further guidelines have been published since my data collection concluded; the Delphi-based *International Fragility Fracture Network Consensus Guidelines* (White *et al*), for which I (along with Griffiths, Moppett, and 23 others) was a collaborator were published in *Anaesthesia* in March 2018. It is notable that *mode* does not feature in these guidelines, only 61% of participants having agreed that 'regional anaesthesia is preferable to general anaesthesia.'

<sup>98</sup> In Laiwalla's study, patients undergoing an innovative neurosurgical procedure received either protocolised or standard anaesthetic management. Those in the protocolised group had less variation in their intraoperative blood pressure and expired carbon dioxide levels, however the success of their recovery from surgery was not measured. It is therefore not known if such interventions have any effect that is meaningful to the patient.

1. Spinal preferred to general anaesthesia
Spinal Anaesthesia
2. Supplementary nerve block
3. Low dose
4. Minimal or no opioid
5. Minimal or no sedation
General Anaesthesia
6. Depth of anaesthesia monitored
7. Supplementary nerve block
Both Spinal and General Anaesthesia
8. Tighter blood pressure control
9. Bone cement protocol
10. Post-operative care bundle

Figure 14: Components of minimally invasive standardised anaesthesia for hip fracture

adapted from White 2016d

Whatever the evidence may (or may not) say, standardised anaesthesia remains a controversial concept; with proponents arguing that it drives up quality of care, and sceptics concerned that it undermines professional autonomy. In December 2016 White, Griffiths and Moppett published an editorial in *Anaesthesia*, entitled *Standardising Anaesthesia for Hip Fracture Surgery*. They outline the problem as they see it from the perspective of researchers concerned with large-scale observational studies, their efforts frustrated by a 'cycle of uncertainty' (p1391) whereby practice varies widely due to a lack of evidence, which in turn makes it difficult to produce evidence using large-scale observational data; thus the cycle continues. From a clinical perspective they go on to argue that, assuming that anaesthesia makes a difference to outcomes, variation in practice necessarily means that some people are getting worse care than others (although without data to base the decision on, they don't know who). This, they state is 'anathema to our profession, which is built on the foundations of patient safety and delivering a positive patient experience.' They go on to provide examples of standardised care that anaesthetists provide without apparent controversy including Advanced Life Support; a noteworthy choice of example

considering that it was the focus of Timmermans' study which contributed to the concept of 'local universality' (Timmermans and Berg 1997). White and colleagues do not explicitly state what standards they propose in this editorial. Instead, they describe that they intend to develop a 'pragmatic first draft' of such standards and publish it via the *Hip Fracture Perioperative Network*<sup>99</sup> for comment.<sup>100</sup> However, standardisation is controversial, particularly in the absence of evidence on which to set standards:

**JV:** 'You can see the national interest in trying to get people to follow protocols, but that's just difficult in individual departments really anyway, unless you've highlighted a problem and say, "we've got to tackle this."'

**Me:** 'And why do you feel that is?'

...

**JV:** 'Because there isn't- because people want to hear the evidence, don't they?'

**Consultant anaesthetist Joshua Varnham, focus group, Longside**

On 23<sup>rd</sup> November 2016, the date that 'Standardising anaesthesia for hip fracture surgery' was published online ahead of print, *Anaesthesia* (@Anaes\_Journal) posted two messages on the social networking website Twitter. In addition, co-author Iain Moppett (@Iain\_Moppett) posted a message referring to the paper. There followed a lively debate amongst the anaesthetic Twitter community which I have mapped in full in Figure 15. This discussion, which unlike the other debates discussed in this chapter was comprised of short instant messages with no editorial oversight, was largely critical in tone: users such as Sussex anaesthetist and prehospital emergency physician Ali Maddock (@ali1m) and Bolton anaesthetist and intensivist JP Lomas (@jplomas) expressed concerns about professionalism, with Lomas suggesting that

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<sup>99</sup> An 'NHS Network', an online resource for sharing information about a particular condition <https://www.networks.nhs.uk/nhs-networks/hip-fracture-anaesthesia>

<sup>100</sup> At the time of writing (February 2019) these standards have not yet appeared on the HipPeN website.

standardisation represented 'a slippery deprofessionalising slope', and Maddock proposing that standardisation would 'Remove professional judgment. Make us mere technicians' and compel anaesthetists to 'Deliver the protocol or face sanction!' However, others such as Oxford intensivist Segun Olusanya (@iceman\_ex) and London anaesthetist and intensivist Manohasandra Majuran (@icugasdoc) defended the use of 'SOPs' (standard operating procedures), contending that knowing *when* to deviate from them was a matter that required both professionalism and expertise. Further criticism was advanced from the patient-centredness perspective, with Lomas contending that the circumstances in which SOPs had demonstrated success had 'nowhere near as much variability as a fractured NOF<sup>101</sup>' and London anaesthetist Kate Prior (@doctorwibble) joking that anaesthesia should be standardised 'only if you standardise the patients.' White's concerns about the ethical barriers of compelling anaesthetists to use techniques that were not their preference were also reflected; Worcestershire anaesthetist Hannah Whibley (@giraffehk) quipped that hip fracture anaesthesia should be standardised 'only if my way is the standard'.

Some users adopted a more measured response however, picking out key messages from White et al's editorial (2016e). Australia-based British anaesthetist Gavin Sullivan summarised his main learning point as relating to the avoidance of low blood pressure, stating '[I read that as] use a metaraminol infusion'<sup>102</sup> and brought critical attention to some of the 'unusual' practices illustrated by White, which he implied may be

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<sup>101</sup> Fractured neck of femur; used here to mean 'hip fracture'.

<sup>102</sup> Metaraminol is a vasopressor, used in anaesthesia to increase or maintain the patient's blood pressure.

mitigated through standardisation, asking 'who the hell puts 3.5ml into a NOF pt!!!'<sup>103</sup> To Sullivan, and his Australian anaesthetist colleague Janette Wright (@jcwright99) it appears to me that standardisation is not akin to 'McDonaldization' (Ritzer 2000), as implied by Prior, Lomas, Maddock and others, but to the aspirational *standards* as described by Timmermans and Epstein (2010).

Despite its controversy on social media, the editorial on standardisation attracted less correspondence in *Anaesthesia* than the other studies discussed above. However, what characterises the responses is strength of feeling that they convey. Sivasubramaniam (2017) reports the positive experiences of Sandwell and Birmingham hospitals in implementing a 'pragmatic' approach to standardisation, involving measures to improve the continuity of perioperative care, the adoption of 'standard operating procedures' for anaesthetic technique, and 'continual feedback'. This, he reports, has resulted in 'significant improvement in structure, process and outcome measures', and he commends this approach to others. In contrast, Skinner (2017; p406) is vehement in his opposition, stating that although standardisation has a logical appeal, 'the authors have gone beyond what is reasonable' considering the context. In order to standardise, he contends, there must be 'high levels of certainty about the safest course of action,' certainty which requires more 'well-resourced and robust research.' Skinner presents a sarcasm-laden challenge to White and colleagues' neutrality on the issue of anaesthetic mode, and questions their authority to make the

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<sup>103</sup> This refers to spinal anaesthesia; 3.5ml of 0.5% bupivacaine is 17.5mg, nearly double the maximum dose suggested in the AAGBI guidelines (2011).

claim that regional should be the preferred mode, a claim that is not actually made in their editorial:

'I am of the (irrelevant, of course) personal view that general anaesthesia is the preferred technique for the bulk of these patients. From hearing one of the authors speak and reviewing the literature [*sic*], one would be forgiven for thinking that collectively they are equally clear that regional anaesthesia is preferable, a view only as relevant as mine.'

Moppett, White and Griffiths' response (2017) is diplomatic; they acknowledge the uncertainties about mode of anaesthesia to which Skinner refers and point out that no recommendation was in-fact made in their editorial. They accept that there is 'little, if any' evidence in favour of either mode and suggest that 'doing either as best we can' is the 'key issue', on the basis that all anaesthetists must be able to provide both modes to a high standard regardless of their preference for one or the other. They do not describe their personal preferences for anaesthetic mode, though these are documented in other sources as outlined above<sup>104</sup>, and it is therefore not surprising that Skinner's reading of the editorial was one of the implied superiority of regional anaesthesia. Regarding the need for future research, Moppett and colleagues (2017) cite several ongoing trials, as well as referring to my own study's role in investigating 'the good anaesthetic.'

### **The 'Evidence Base' and the Good Anaesthetic**

This chapter has been part literature review, part ethnographic analysis of the literature. In it, I have summarised and critiqued the current and historical medical literature pertaining to hip fracture anaesthesia. Despite the state of equipoise

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<sup>104</sup> The narrative seems to be changing here. At recent conferences that I have attended (Age Anaesthesia Association Scientific Meeting, Grantham, 2019; AAGBI Regional Seminar on Hip Fracture Care, Manchester, 2019) both White and Griffiths have clearly downplayed the importance of mode of anaesthesia.

presented by the *Cochrane* review (Guay *et al* 2016), expert opinion as reported in the literature available at the time appears to advocate spinal anaesthesia. Is this due to the influence of a small group of experts who happen to favour one particular mode of anaesthesia? Or has the clinical experience of these experts told them something that the evidence in the medical literature has not? Analysing the anaesthetic literature, though a valuable starting point, suggests to me that the 'good anaesthetic' for hip fracture repair is not likely to be found in the 'wide angle' approach familiar to readers of medical journals. In the next chapter I begin to discuss the data that I have obtained by 'zooming in' and visiting a familiar environment in an unfamiliar role – as an ethnographer investigating the hospitals, wards and operating theatres, the real-world settings where anaesthesia is performed.

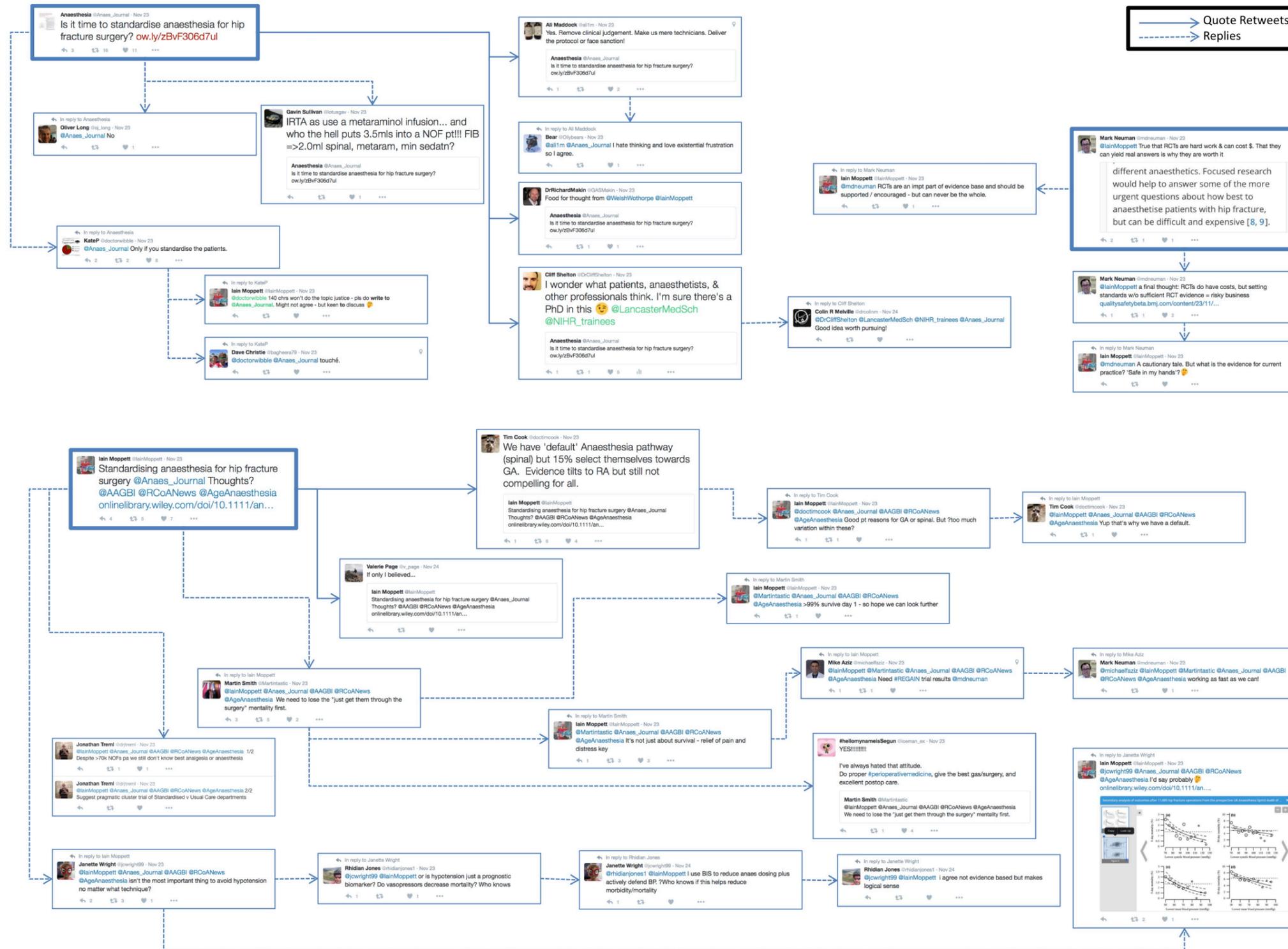


Figure 15(a): Twitter discussion of *Standardising Anaesthesia for Hip Fracture Surgery* (White et al 2016d)



## Part II: Emergence

## Chapter 4: A Good Anaesthetic... Gets Done Today

'Surgery is the best analgesic for hip fractures.'

**AAGBI Guideline on the Management of Proximal Femoral Fracture (Griffiths et al 2011)**

This chapter is about time, about how anaesthetists and their colleagues expedite surgery. This is not a simple process, there are numerous compromises to be made. These compromises begin at the start of the day; before the patient comes to theatre the decision must be made to assign them to the operating list, this happens at the 'trauma meeting', where junior orthopaedic doctors 'present' the newly-admitted patients for discussion. Once 'listed', patients are assessed by the anaesthetist who must decide if they are 'fit' for an anaesthetic, or if the operation should be deferred to another day. There are no absolute rules that govern this assessment; one anaesthetist's approach to risk will be different from another's. I start my exploration of the 'good anaesthetic' at this moment, not in the anaesthetic room or the operating theatre, but in the seminar rooms, wards and corridors where listing and assessing takes place. I describe how the anaesthetists view pre-operative difficulties and develop strategies by which to deal with them. In practice such strategies involve a degree of boldness and an acceptance that frail, unwell, injured patients can seldom be made truly 'fit' before proceeding. Hip fracture anaesthesia requires a tacit understanding of the need to press ahead despite these problems and compromises. This is described by those who work in the operating theatre as 'cracking on':

*Chester, the surgical consultant enters. I introduce myself and explain that I hope to be observing Briar Bonner today. Chester nods and smiles – he seems to think Briar is a good anaesthetist to observe:*

**CS:** 'He has a "can-do, lets crack on with it" attitude!'

**Consultant orthopaedic surgeon Chester Steed, prior to Arthur's anaesthetic, Mellbreak**

## Cracking On

Collins Dictionary (2017) defines the phrase 'crack on' and provides two example sentences:

'If you crack on with something, you continue doing it, especially with more effort than before, or as quickly as possible.

*[Informal]*

*You've just got to crack on, whatever the problems are.*

*Just tell him what to do and he'll crack on with the work.'*

In the context of anaesthesia, the phrase is a sort of shorthand, it means to proceed with the anaesthetic in a timely fashion, and deal (or cope) with problems as they arise. As the definition suggests, this requires no small measure of effort. It may be seen as the antithesis of 'prehabilitation', a model that aims to minimise risk in (elective) surgery through extensive pre-operative intervention (e.g. Wynter-Blyth and Moorthy 2017). Evidence of the extent to which 'cracking on' has become embedded in the anaesthetic lexicon is found not only in the dialogue that I have recorded during my study, but in the 2016 publication in *Anaesthesia* of a fictional 'Christmas special' article written by Australian anaesthetist Nicholas Chrimes.

According to Chrimes, his 'CRAC-ON' study (2016; p1409) is named for the 'complete relinquishing of anaesthetic conscientiousness, optimisation, and nuance'; the concept that he playfully considers in his paper. He explains that in his 'trial', several hundred patients in the 'CRAC-ON' group received a universal and arbitrary anaesthetic technique without prior assessment, which resulted in a number of unintended consequences including 'some deaths' and the accidental anaesthetising of 'several innocent bystanders'. However, in the 'assessment' group (which involved patients being assessed by 'the most fastidious anaesthetists in the country') they were 'unable to present any patients for surgery within the study period'. Chrimes

drily concludes that 'there is probably a happy medium between these two approaches.'

Though not 'high impact' in the traditional sense, the social media influence of CRAC-ON was remarkable. Within six months of publication it had an Altmetric score<sup>105</sup> of 158, making it the 6<sup>th</sup> highest scoring paper ever published by *Anaesthesia* at the time (Altmetric 2017a); persuasive evidence of its comedic success. As with all observational comedy, CRAC-ON makes use of an element of truth. Chrimes therefore presents a challenge to the anaesthetic community by illuminating truths that may otherwise be unsayable: most notably that a 'fastidious' attitude to the assessment and optimisation of patients (a key tenet of the perioperative medicine<sup>106</sup> agenda, for example) may result in excessive procrastination.

The role that Chrimes plays is what management scholar Kets de Vries (1990) describes as that of the 'court jester': he is speaking truth to power and in doing so, acting as a 'guardian of reality'. This non-confrontational regulatory function of humour also exists between colleagues and friends, as described by sociologists Fine and De Soucey (2005). Drawing on ethnographic data (p6), they describe that 'successful joking is a response to shared concerns' which 'creates norms of action'. In Chrimes' case, the norm that he attempts to create is a middle ground between over- and under-assessment. Though his mockery is most notably directed at the cautious end of the continuum; his concession that his fictional intervention group was afflicted by a

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<sup>105</sup> The Altmetric attention score is derived from the volume and nature of online citations of a scholarly output. This includes Twitter, Wikipedia, and the mainstream media (Altmetric, date unknown).

<sup>106</sup> Perioperative medicine is a current priority of the RCoA and is described as 'deliver[ing] the best possible care for patients before, during and after major surgery' (RCoA 2015). It involves anaesthetists taking greater responsibility for pre- and postoperative management.

number of unintended adverse events suggests that whilst under-assessment may be efficient, it may also be high-risk.

The fine line between under- and over-assessment is crucial in this study: patients with hip fractures are frail, medically complex, and have recently sustained a major traumatic injury – a challenging starting point for any anaesthetic. There is therefore a temptation to wait, to try to improve patients' medical problems and make them as fit as possible before committing to surgery. However, the very fact that these patients have a hip fracture challenges the success of any attempted optimisation: pain and immobility mean that as time passes the risk of pressure sores, respiratory complications, and muscle deconditioning becomes ever more likely, and to treat pain and immobility effectively requires surgery (Griffiths et al 2011).

A recent analysis of NHFD data by Sayers et al (2017) supports the case for early fracture fixation, indicating that patients who receive surgery more than 24 hours after admission have a higher mortality rate.<sup>107</sup> This was one of the few hip fracture-related publications that attracted interest from outside the medical literature, having been reported by the BBC (2017) under the headline 'Early hip fracture surgery will save hundreds of lives.' Despite this optimistic appraisal however, is impossible to tell whether the 'delayed' cases in Sayers' study were operated-on after 24 hours because they were too ill for early surgery and required some treatment, or if administrative reasons such as operating theatre capacity were at fault. Whatever the reason for the delays in Sayers' data, many anaesthetists in my study subscribed to the general

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<sup>107</sup> Odds-ratio for 30-day mortality 1.094.

principle that there is almost no clinical justification for delaying a hip fracture operation, as described to me by experienced trauma anaesthetist Duncan Myers as he walked to the ward to assess Sally:

**DM:** 'When I was a junior doctor, someone I respected very much said to me: "there are three reasons to cancel an acute hip: evolving infarct, thyroid storm, and..." I forget the third, but it was something similarly catastrophic. Everything else is an inconvenience to be managed. You gain nothing from them lying there while you "treat" something.' *He mimes quotation marks around "treat" with the index and middle fingers of each hand.*

**Duncan Myers, consultant anaesthetist, prior to Sally's anaesthetic, Longside.**

What Duncan is explaining above is his interpretation of the contextual nature of risk and benefit: there are many medical conditions of relevance to anaesthesia and surgery that can be treated or optimised, and to await the effect of such intervention would usually be justification for postponing surgery. However, the trajectory of hip fracture patients before fracture fixation is such that, except in the most pressing of emergencies ('evolving infarct, thyroid storm...') any benefit from treatment may well be offset by the deterioration in the patient's condition resulting from complications of their unfixed fracture. Duncan's use of the phrase 'acute hip' is also notable here: by using this term (unique to him in my data) he is placing hip fracture on an equal footing with other emergency conditions, a perspective that has gained traction in recent years. Indeed, the somewhat clumsy phrase 'hip attack' has been proposed to describe hip fracture in an attempt to draw an association with the urgency of heart attacks (e.g. Berg 2016). This slogan has even been adopted as the title of a study which assesses hip fracture surgery within six hours of hospital admission, with encouraging pilot results (HIP ATTACK Investigators, 2014).

Whilst Duncan's discussion focuses on the approach to known diagnoses, there is also the matter of pre-operative investigations<sup>108</sup> which may lead to the making of new diagnoses. In the below observation, Mellbreak anaesthetist Elroy Ashworth discusses the role of echocardiography,<sup>109</sup> an informative but time-consuming investigation that may be undertaken to diagnose the cause of a cardiac murmur, as was heard when his colleague examined Gloria, a patient with complex communication needs who had waited two days for surgery:

**EA:** '... She also may have a murmur, so somebody has said she needs an echo. The box is ticked to say it's been ordered, but I can't see it. I'm just going to get on and do her. You could cancel fifty patients for a murmur, but how often do you find anything on the echo that changes your practice? Hardly ever.'

**Consultant anaesthetist Elroy Ashworth, prior to Gloria's anaesthetic, Mellbreak**

In the above observation, Elroy explains that whilst 'somebody' felt that Gloria required additional investigation, to him the result was unlikely to lead to a significant alteration in his anaesthetic technique. Proceeding without an 'echo' is therefore his preferred option. This lack of consensus between colleagues about risk and benefit was commonplace in my study and was sometimes a cause of animosity. When Gloria is brought to the anaesthetic room, Elroy undertakes a quick physical examination:

**EA:** *Listens with a stethoscope. 'Take a deep breath. In... and out [he listens to the left of her chest]. And again [right side]. Just easy breaths now [precordium].'*

**TR:** *Finishes attaching the monitoring.*

**Mon:** *HR 97, SpO2 91%, BP 174/78.*

**Elroy:** *[to me] 'This is it you see, you sit around... She's got bibasal crackles now.' He's implying that she has developed atelectasis<sup>110</sup> or a chest infection as a result of lying in bed for two extra days.*

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<sup>108</sup> The purpose of pre-operative investigations is to assess the severity of a known diagnosis or investigate a symptom or sign that may be relevant to anaesthesia. According to NICE for example (2016), the 'routine' pre-operative tests for an ASA-III patient undergoing elective major surgery would include a full blood count, renal function tests and an electrocardiogram (ECG). Other tests may be prompted by examination findings or history.

<sup>109</sup> Ultrasound-based cardiac imaging; it provides measurements of anatomical structures and an assessment of cardiac function. It is a specialist skill typically undertaken by cardiologists or cardiographers and is therefore often not immediately available.

<sup>110</sup> Atelectasis is the collapse of areas of the lung.

**SN:** *Pops her head into the anaesthetic room: 'Can we do a WHO?' The World Health Organisation ('WHO') checklist is conducted prior to starting the list, to check details such as the list order, equipment requirements and anticipated problems.*

*We go through into theatre; the team are waiting. Gloria's details aren't filled-in on the board; they waited until she had been seen by Elroy. He hurries through the checklist:*

**EA:** 'I've seen her, no echo, she's got bibasal creps, sats are ninety-one. We'll crack on and do her.'

**Consultant anaesthetist Elroy Ashworth, ODP Todd Randall, and the Scrub Nurse, prior to Gloria's anaesthetic, Mellbreak**

In the above observation Elroy stops short of explicitly criticising his colleague but illustrates to me what he believes is the consequence of a failure to 'crack on' whilst awaiting an (unnecessary) investigation: Gloria has developed respiratory complications as a result of her prolonged immobility which will make her anaesthetic more high-risk than if it had been expedited.

When pre-operative investigations have no capacity to change anaesthetic practice, it is clearly illogical to undertake them, especially if this results in a delay which is itself not risk-free. Does this logic extend to all investigations, or only to some? And what of other aspects of pre-anaesthetic assessment such as history-taking and examination? Of all of the anaesthetists in my study, Hiram Niles, an experienced trauma anaesthetist at Longside Hospital who was acknowledged as an expert by his colleagues, enacted the most extreme expression of 'cracking-on'. His practice differs from that of his colleagues in that he doesn't see the patients on the ward pre-operatively, instead assessing them briefly in theatre reception:

**SB:** ... 'Hiram Niles is a very experienced anaesthetist, does the weekends, nothing fazes him. You know for instance the anaesthetic review beforehand? His anaesthetic review involves him asking me if the patient needs the operation, and if they need an operation, he will be prepared to do the anaesthetic... He says he looks at the patient and goes "right, you're having a GA and we'll do it very carefully."'

**Lead hip fracture surgeon Sylvester Brams, introductory interview, Longside**

**LP:** 'Hiram Niles doesn't even see them. He says, "they need an anaesthetic, just get them done." I've done four, six hips in a day with Hiram... Some [anaesthetists] are great, they take ages though. Some go "let's crack on" and give a GA.'

**Consultant surgeon Lamar Porter, during Renee's anaesthetic, Longside.**

My subsequent observation of Hiram's anaesthetic practice verified these accounts: having been to visit Percy, a patient with dementia who had fallen that morning whilst on a ward as an inpatient, I met the orthopaedic registrar who mentioned that Percy was first on the list. I realised that this could be a problem: whilst waiting to speak to the nurse I had overheard that Percy had been given some tea and toast following his fall at 4:30am. This meant that he would not be 'fasted' if anaesthetised first.<sup>111</sup>

I wondered aloud if Hiram knew about Percy's early breakfast and was informed by the surgeon that Percy has already been sent-for and Hiram would not be seeing him prior to his arrival in theatre. I considered letting this matter lie, but as it was potentially important to safety, I felt that I should make Hiram aware. I made my way quickly to theatre and explained the situation: Hiram seemed unperturbed. He subsequently explained to me that he 'does the same' for every hip fracture patient: GA, endotracheal intubation and positive pressure ventilation, FICB, and multimodal non-opioid analgesia.

Hiram's presented his technique to me as if it obviated the need for pre-operative assessment. There is some degree of truth to this: GA can potentially be given in more circumstances than spinal anaesthesia (e.g. deranged clotting, severe aortic stenosis), and intubating the trachea provides protection against the aspiration of gastric contents in situations such as when the patient is unfasted or has gastro-oesophageal

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<sup>111</sup> According to guidelines on perioperative fasting endorsed by the AAGBI, (Westby et al 2005), in order to be 'fasted' a patient should not have eaten solid food for at least six hours.

reflux. Hynam's 'universal' anaesthetic is perhaps therefore more flexible than some alternatives, but does that justify his approach? Putting aside clinical reasons for altering his technique that may arise, what of the implications for informed consent? And for his colleagues? If one anaesthetist elects to forgo the usual conventions does that create pressure for others to do the same in the name of efficiency? The account of Jaqueline Studwick, one of his consultant colleagues, suggests that it may:

**JS:** ... 'I had on one occasion said to me: "why do you need to see the patients? Doctor so-and-so doesn't, he just lets us send for the patients directly to reception." And I said: "well, that is not the way that I do things, and not our department policy." We don't see patients in the theatre area because it's not appropriate. It's not good for them and it's not good for us and the only occasion where it may possibly be appropriate is where somebody's having a life-threatening haemorrhage where you need to get in there straight away. It's not acceptable in these cases. These are complicated cases. So, no, they just have to wait until we are ready. And that is a problem because you lose time to get these patients done and they need to be done as soon as possible.'

**Consultant anaesthetist Jaqueline Studwick, introductory interview, Longside**

Jaqueline does not name Hynam here, instead she refers to 'doctor so-and-so', presumably in an attempt to avoid identifying him on record: an interesting choice of pseudonym as it has dual meanings, it is both anonymising and pejorative. Despite Jaqueline's vigorous objections to Hynam's lack of assessment however, she recognises that her own approach is not perfect either: waiting 'until we are ready' creates a delay in getting hip fracture patients to theatre when delay is not what they need. There is therefore a compromise between assessment and 'cracking on', which Jaqueline makes explicit: dealing with complexity, she believes, requires thought and planning, not improvisation. And thought and planning takes time.

### **Legitimate Delays**

The dominant approach to hip fracture patients is to 'crack on', to tolerate and mitigate the challenges of comorbidity and frailty. But there are times when anaesthetists hold back, potentially delaying a patient's progress to theatre. In what

circumstances can such delays be deemed 'legitimate'? During an observation, consultant anaesthetist Arlo Holme, described a previous situation in which he felt that a medically-complex patient required spinal anaesthesia because of severe lung disease. However, she had been given a high dose of an anticoagulant 'treatment dose Clexane' and, according to AAGBI guidelines (Harrop-Griffiths et al 2013) it would not be safe to perform neuraxial anaesthesia until 24 hours had elapsed:

**AH:** 'She was on home oxygen, pO<sub>2</sub> of 5.6 on a genuine ABG.<sup>112</sup> She fell and fractured her hip. She had distended neck veins so they thought she might have had a PE [pulmonary embolism], so she'd had treatment dose Clexane. To me, this lady needed a spinal, I discussed this with a colleague and he agreed. It needed to be timed and done. I explained to her... and her nephew is an anaesthetist... and she agreed. She preferred something not involving her chest. Then, I bump into someone from theatres and they were going to send for her, they were just going to crack on and do a GA!'

**Me:** 'Did you stop them?'

**AH:** 'I fed her. They did her the next day with a spinal.'

**Consultant Anaesthetist Arlo Holme, Quentin's anaesthetic, Longside**

This episode differs from Jaqueline's account in that rather than simply disagreeing about points of practice, an intervention was made: Arlo, undermined by his colleague's disregard for his plan which had been negotiated with the patient and her relative (whom Arlo pointed out was also a colleague), arranged for the patient to be fed, thus preventing them from going to theatre (though perhaps not if Hynam had been the anaesthetist!) In this episode, the unnamed colleague who was sending for the patient was prepared to do something that Arlo considered 'second best' (a general anaesthetic) in order to operate early. That spinal anaesthesia was considered the best choice here (by consensus of Arlo, his colleague from whom he sought a second opinion, and the anaesthetist who eventually did the case) is unusual for

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<sup>112</sup> Arterial blood gas; a blood test which measures the pressure of gases (e.g. oxygen) dissolved in a patient's arterial blood. It is a measure of respiratory and metabolic function. 'Genuine' is used here because 5.6KPa approximates the usual partial pressure of oxygen in venous blood.

Longside, which only undertakes approximately 10% of hip fracture repairs under neuraxial anaesthesia.

This scenario of the patient on home oxygen was also described by consultant anaesthetist Pamela Lynton:

**PL:** 'Have you seen any spinals [at Longside]?'

**Me:** 'No.'

**PL:** 'You need a strategy to insert them reliably.' *We discuss sitting the patient up – they would need a very effective nerve block.* 'Every now and then you get someone on home oxygen, and even the most committed GA person would think "I should try a spinal." That would be the FRCA<sup>113</sup> answer.'

**Consultant Anaesthetist Pamela Lynton, Harriet's anaesthetic, Longside**

Here Pamela, herself a 'GA person', illustrates that she may define limits to the application of her preferred technique. This is counter to the 'one size fits all' approach adopted by Hynam and makes the case for pre-operative assessment. It is notable however that her language is non-committal: 'I *should* try a spinal' is different to Arlo's 'This lady *needed* a spinal' (emphasis added in both). Here, I wasn't sure how much Pamela would persist with an attempt to perform spinal anaesthesia in such circumstances – perhaps she felt that in order for her practice to be medicolegally defensible she needed to be seen to try, but would in fact revert to the usual institutional practice with anything other than immediate success.

### **Motivations For (and Against) Expeditiousness**

The expedited nature of hip fracture surgery is integral to the NICE guideline (2011) and the Best Practice Tariff (BPT) (NHS Improvement 2016, see figure 12), both of which stipulate a 36-hour deadline for surgery. That anaesthetists have a limited influence in the BPT was acknowledged, time to surgery being the only factor within

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<sup>113</sup> The Fellowship of the Royal College of Anaesthetists examination, see *Prologue*.

their remit. This single opportunity to participate in gaining (or losing) income for the hospital (and the associated approval of their colleagues) appeared to be an additional motivation to ensure that the patient's operation was not delayed. Lead hip fracture anaesthetist at Longside hospital Joshua Varnham reflected on how this influences the impression that anaesthetists make as part of the multidisciplinary team:

**JV:** 'The only anaesthetic influence [on achieving tariff payments] is in terms of time to theatre, so most anaesthetists now are looking for ways of getting patients to theatre rather than looking like you're making excuses to delay them a few days.'

**Lead Hip Fracture Anaesthetist Joshua Varnham, introductory interview, Longside**

At Longside Hospital the orthopaedic department employs a researcher, Wayne Ecclestone, who is responsible for collecting and analysing data for the BPT and clinical trials related to orthopaedics. He expanded on Joshua's statement:

**Me:** 'What do anaesthetists need to do to tick the right boxes [for the BPT]?'

**WE:** 'Well the only thing they're concerned with is getting them to theatre within the 36 hours.'

**Me:** 'And is that a binary outcome? They're either there in 36 hours they're not? Or are there shades of...'

**WE:** *Cuts me off* 'No, no. If you make it in 36 hours and one minute, you've failed. You don't get your money.'

**Researcher Wayne Ecclestone, introductory interview, Longside**

The expression of 'best practice' in such stark terms seems too binary to be valid from a clinical or experiential perspective, where the success or failure of any episode of treatment is rarely absolute and outcomes that appear catastrophic from one perspective can seem like successes in others.<sup>114</sup> In the below observation, consultant anaesthetist Joshua Varnham and consultant surgeon Lamar Porter reflect on their 'missed' targets, and console themselves that whilst a dead-loss from a financial

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<sup>114</sup> Considering death for example, which could be viewed as the ultimate binary outcome, this is perceived very differently in palliative care to the elective surgical setting.

perspective, the small margin by which the targets were missed indicates that patient care was not badly compromised.

*JV: Sits the back of the bed up, and chats to Lamar as Tess brings the monitor to the bed: 'Did you see we missed the best practice tariff for twelve hips in December? They were over thirty-six hours, but were all done between 38 and 45 hours.'*

*LP: 'We just need to get them done.'*

**Consultant anaesthetist Joshua Varnham and consultant surgeon Lamar Porter, Renee's anaesthetic, Longside**

As Lamar's world-weary reply implies, the form of target-setting in the BPT is familiar to NHS workers. The 36-hour timeframe explained by Wayne is similar to the notorious 'four-hour target' for emergency departments which has been repeatedly criticised for presenting a perverse incentive to treat patients *less well* (e.g. Gubb 2008, Mayhew 2008).

Despite the clinical and financial incentives that were espoused at the hospitals in my study, the clinical case for early surgery is not without controversy in the broader anaesthetic literature. One of the best-performing hospitals in the UK in terms of 30-day mortality is the Royal Victoria Hospital in Belfast. Here, the 30-day mortality in 2012 was 5.4%<sup>115</sup>, compared with the NHFD average of 8.3% in the same year (Johansen et al 2013). In a letter to *Anaesthesia* in response to White et al's NHFD study (2014a), Belfast anaesthetists Michael McBrien and Martin Shields, and orthogeriatrician Gary Heyburn (2014; p641) defended their institution's record on early surgery (only 26% within 36 hours at the time of his letter, the 'second from the bottom of the table'), explaining that 'medical optimisation and aftercare' constitute the 'cornerstone of perioperative management at the Royal Victoria Hospital' and

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<sup>115</sup> As quoted in McBrien's letter (2014).

suggesting that the BPT (which does not apply in Northern Ireland) provides a perverse incentive for English hospitals to 'expose certain patients to surgery and anaesthesia before it is in [their] best interests to do so' (p640). Again, this commentary suggests that it is not *if* patients are delayed, but *why* they are delayed and *what happens* during the intervening period that may be important. This was the viewpoint recurrently expressed by Dustin Bellamy, consultant orthogeriatrician at Longside, who felt that the 'rush' to get patients to theatre sometimes resulted in 'skipping' in their clinical management:

**DB:** 'I think it always tends to be a bit of a rush because you have to get them to theatre, so everyone's rushing around and probably skipping a little bit...'

'... when you actually look into it, if you delay for good reasons you get good outcomes, if you delay for bad reasons you get bad outcomes.'

'... I think, of the things that I think might help would be a bit more optimisation before surgery, and not just rushing in for the sake of hitting targets.'

**Consultant orthogeriatrician Dustin Bellamy, introductory interview, Longside**

Dustin however felt that it was not his role to insist on delaying theatre for reasons of medical optimisation. He felt that the 'rush' was as much a representation of the culture of his orthopaedic colleagues as it was to do with targets or the perceived clinical benefits of early surgery:

**Me:** 'What do you think stimulates the rushing?'

**DB:** 'It's the orthopods<sup>116</sup>, isn't it? Some sort of, "got to get to theatre straight away, get them to theatre." So, it's all rush, rush, rush. There isn't really a rush, I think it's a cultural behavioural thing.'

**Consultant orthogeriatrician Dustin Bellamy, introductory interview, Longside**

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<sup>116</sup> 'Orthopod' is commonly-used slang for orthopaedic surgeon. The etymology of 'orthopaedics' is thought by most to relate to the correction of childhood deformities (Greek *orthos* 'right or straight' and *paideia* 'rearing of children'). It is however a possibility that the correction of lower limb problems (*podos* 'foot') is the origin of the term (Diab 1999), so 'orthopod' may in-fact be etymologically authentic.

Reproachful as he was however of surgeons' tendency to rush, on reflection he seemed equally critical of his own tendency to do the opposite, ascribing this to his background as a physician, stating: 'I'm not a surgeon, I'm a medic<sup>117</sup>, not very efficient, sort of troll along.'

So, if surgeons 'rush', and physicians 'troll along', what do anaesthetists do? This seems to be a question on which the perception of the 'good anaesthetic', as defined by the surgeons in this study, seems to rest:

**SB:** 'You get an anaesthetist turn up, and it still happens occasionally, who [doesn't do] regular trauma... they seem to flap for want of a better word. Everything takes longer and they're more concerned. They're thinking about "oh, I might have to cancel this patient." You don't hear that from the good trauma anaesthetists who go "we've got to do this." The good trauma anaesthetists go "what's the point in getting an echo? They need an operation. I will just tailor my anaesthetic around the clinical picture of the patient." And that's a good thing...'

**Lead hip fracture surgeon Sylvester Brams, introductory interview, Longside**

**BP:** 'My interest is really to try to get these patients to theatre as quickly as possible. So, I would prefer that, unless there was anything that was actually optimisable, that patients go up to theatre as quickly as possible by hook or by crook. Obviously, some people are more cautious than others with lots of requests for echos, and the next day another anaesthetist may approach the same patient and cancel the echo! It makes it very confusing for us as surgeons as to what the appropriate course of action should be for managing these patients.'

**Lead hip fracture surgeon Bert Pond, introductory interview, Mellbreak**

**SF:** '... How brave [the anaesthetists] are too. Some of these patients are elderly with loads of co-morbidities and not all of them are brave enough, "Sorry I'm going to kill this patient, I am not happy to do that." I had a patient you know, she had a multiple metastases and a pathological fracture and [the anaesthetist] said, "I am sorry, I can't [anaesthetise] this lady, she's going to die." [proceeding with surgery] is something we should always push for.'

**Lead hip fracture surgeon Sid Fletcher, introductory interview, Beckfoot**

Comparing the above statements from the lead trauma surgeons of all three institutions in my study, agreement is evident: to all three, an expedited anaesthetic is a priority. Notably, the qualities that all three identify as responsible for an anaesthetist's ability to proceed are not related to technical skill or knowledge, but

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<sup>117</sup> 'Medic' is hospital slang for physician; those who have followed a 'medical' career path regulated by the Royal Collages of Physicians.

personality and attitude. Inappropriate caution and a lack of 'bravery', they contend, lead to worry, indecision and procrastination, for example through requesting additional investigations; this may lead to unacceptable delay.

### **Cracking On: Boundaries, Brokers and Hybrids**

Amongst the anaesthetists in my study there was a strong consensus that, excepting extreme circumstances, patients should receive their operation as promptly as possible. This view is largely in agreement with national guidelines and the opinions of their surgical colleagues. Though this sentiment transcended individual hospitals, there were important institutional differences in the processes that supported (or hampered) expedited fracture repair. This was most clearly seen at the boundaries between surgery and anaesthesia. For example, before patients are brought to theatre, they remain under the care of the surgical team who are responsible for making them ready for their operation, with anaesthetists and orthogeriatricians involved by consultation. Likewise, in the early postoperative period after a short time in the recovery area, the patient is discharged back to the surgical ward, where surgeons may find themselves dealing with 'anaesthetic' complications. Surgeons, therefore, facilitate anaesthesia in much the same way as anaesthetists facilitate surgery – but the extent to which one profession understands the other and collaborates constructively appears to be a matter of institutional culture.

The concept of *communities of practice*, proposed by learning theorist Etienne Wenger and social anthropologist Jean Lave (1991), and subsequently further developed by Wenger (1998) has resonance here. According to Wenger (1998) a community of practice (CoP) has three requirements: mutual engagement, a joint enterprise, and a

shared repertoire. It is appealing to consider the healthcare team involved in the care of a hip fracture patient (orthopaedic surgeon, anaesthetist, orthogeriatrician, nurses, ODPs, etc) as a coherent CoP: indeed, Wenger (1998, p76) specifically cites the complementary contributions of the 'medical operating team' as an example of mutual engagement. However, my analysis indicates that this complementary interaction does not happen by default. Instead, CoPs exist in a stable fashion within professions (anaesthesia, surgery, orthogeriatrics, nursing, etc), and the challenges and requirements of hip fracture management act as what Wegner describes as a 'nexus of perspectives.' At the intersection of multiple CoPs at times and places such as the trauma meeting or the operating theatre, individuals may extend beyond the boundaries of their 'professional' community, and lend themselves to the operating theatre team. Such 'multimembership' occurs with varying degrees of success, which is dependent, as Wenger (1998) suggests, on two factors: 'brokering', in which individuals introduce elements of one community of practice into another, and by converging around 'boundary objects' (Star and Griesemer 1989).

I observed a clear demarcation between different institutions of the degree to which brokering occurred. At Longside I recorded recurrent evidence of the sharing of practices between anaesthetists and surgeons, at Beckfoot I observed the strict maintenance of boundaries which on occasion led to hostility, and Mellbreak lay between these two extremes. The collaborative nature of practice at Longside was highlighted by lead trauma surgeon Sylvester Brams:

**SB:** 'So they [expert trauma anaesthetists] seem to be... they almost seem to be more akin to surgeons than anaesthetists, the trauma anaesthetists that we're starting to see come through, almost morphing. You know, surgeons, some of our major trauma surgeons are morphing a bit into understanding a bit about physiology and clotting and temperature and all this. And so, some of them, they seem to pay an interest in what we're doing rather than just

turning up to collect their money and then bugging off. So, it's hard to put into words but that's what I see happening, and I find that quite exciting, and I find that beneficial.'

**Lead hip fracture surgeon Sylvester Brams, introductory interview, Longside**

The 'morphing' of anaesthetists into surgeons and *vice-versa* as described by Sylvester is consistent with Wenger's concept of brokering. By incorporating concepts that are traditionally the domain of anaesthetists ('physiology and clotting and temperature...') into their work, trauma surgeons are able to help the anaesthetists by optimising the patient pre-operatively, and through understanding the purpose and process of surgery, anaesthetists help the surgeons; both parties transcending the traditional boundaries of their communities and in doing so bolstering their 'shared repertoire'. In this collaborative version of the operating team community of practice, the 'joint enterprise' is less about professional territories (the anaesthetic, the surgery) and more about a cooperative approach to patient care.

The location in which collaboration was most obvious at Longside was at the morning trauma meeting, which was attended by anaesthetists in all but one case that I observed. Here, the operating list for the day is negotiated amongst the multidisciplinary team and anaesthetists demonstrated a particular role as enablers in cases when the surgeons considered that the patient might not be suitable for operation. An example of this is the case of Nancy: a complex patient with respiratory and cardiovascular comorbidities<sup>118</sup> who took warfarin and had a high international normalised ratio (INR)<sup>119</sup> when admitted. The surgical junior doctors suggested that

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<sup>118</sup> COPD, bronchiectasis, atrial fibrillation, heart failure and metallic mitral and aortic heart valves.

<sup>119</sup> A measure of blood clotting time; it is increased in patients taking warfarin and in certain illnesses. A high INR indicates delayed clotting, which has implications for bleeding during surgery, and the safety of regional anaesthetic procedures (particularly neuraxial techniques).

she was not suitable for theatre, a suggestion disputed by consultant anaesthetist

Conor Paris:

**CP:** 'For her it's a palliative operation, but I'd gas her<sup>120</sup>. I can't speak for Granville [the other trauma anaesthetist], But I'd gas her once her INR is safe.'

**Consultant anaesthetist Conor Paris, trauma meeting, Longside**

By speaking out here, Conor negotiates Nancy's place on the trauma list: a practical enactment of his expertise. Though a patient with Nancy's complexity and comorbidity could very reasonably have been postponed, Conor was able to redefine what should be considered 'reasonable' in this situation. By acknowledging that the operation was 'palliative' he was able to step outside the conventional approach to perioperative risk, though he made it clear that this was his personal view – he couldn't 'speak for Granville' (the only anaesthetist who did not attend the meeting). Conor subsequently coordinated efforts to bring Nancy's INR in to an acceptable range, liaising with the haematology team and advising the surgeons regarding drugs and investigations.

In a similar fashion, again in relation to coagulation, collaboration was central to the case of Renee, a 94-year-old who had been diagnosed with a haematological abnormality on admission to hospital which manifested as a low platelet count.<sup>121</sup> It was agreed by the teams looking after Renee that until this abnormality had begun to resolve it would not be safe to operate. She had been reviewed by consultant anaesthetist Sidney Riley, who had liaised with his colleagues in haematology and

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<sup>120</sup> Anaesthetists are often referred-to by the slang term 'gasman' ('-woman', '-person'), presumably due to the prominent role of gases and vapours in the provision of anaesthesia. This has led to the adoption 'gas' as a slang term for 'anaesthetise'. Despite this being a 'palliative operation' there is no suggestion in this professional context that Conor is using 'gas' in its more conventional sense (i.e. to kill with poisonous gas).

<sup>121</sup> This was referred-to as 'idiopathic thrombocytopenic purpura' by the clinical team, but according to the haematologists Renee's platelets were 'clumping' when viewed under the microscope. This suggests pseudothrombocytopenia, though this was not mentioned at the time of the observation.

arranged urgent treatment with intravenous immunoglobulin. After 24 hours of treatment Renee's platelet count had begun to increase, and although it was still lower than normal<sup>122</sup> the teams elected to proceed; still 'cracking on', but arguably more safely than if they had done so the day before. Renee was subsequently anaesthetised by Arlo Holme and Joshua Varnham. At the end of the operation, collaboration between teams remained central to her management:

**JV:** 'So we don't need to do anything else haematological?'

**AH:** 'No. If there's no haematoma they're going to start the daltaparin.'

**JV:** 'And the surgeons know about it?'

**AH:** 'Yes. They've been really good from an SHO point of view, and it's good to have an orthogeriatrician.'

...

*Jamie has finished operating, the drapes are being taken down. A student ODP reads through the 'Sign out'. Joshua makes a comment regarding post-operative care:*

**JV:** 'You know about the daltaparin at six hours?'

**LP:** *Discusses with his junior colleagues – they decide to review Renee and give the daltaparin at 22:00 if all is well.*

**Consultant anaesthetists Joshua Varnham and Arlo Holme, and consultant surgeon Lamar Porter, Renee's anaesthetic, Longside**

At Longside then, a culture of collaboration was evident: it was the norm for surgeons to pay specific attention to facilitating anaesthesia, and for anaesthetists to adopt a flexible approach in order to facilitate surgery. This required both professions to 'broker', to bring practices from their own communities and introduce them to others, enabled by a culture in which clinicians were able to openly engage with the problems at hand and cross professional boundaries without fear of attracting criticism for straying into someone else's territory. This was described by Sylvester Brams as 'morphing', a word derived from *metamorphosis*, when 'a person or thing develops and changes into something completely different' (Collins Dictionary, 2019).

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<sup>122</sup> Renee's platelet count was  $60 \times 10^9 \text{L}^{-1}$ ; The normal range for platelet count is usually stated to be around  $150\text{-}400 \times 10^9 \text{L}^{-1}$

From outside medicine, the notion that a professional should have knowledge of and input into the practices of those with whom they work most closely may not seem surprising, yet Sylvester's excitement at the morphing that he sees at Longside suggests that this is in-fact something radical: a continuing trend of sub-specialisation within hospital-based practice (including anaesthesia – see Handy and Morris 2013, and orthopaedic surgery – see Wilson et al 2017) may have increased practitioners' expertise, but potentially at the expense of the breadth of practice. And yet, as surgical treatment becomes more ambitious and anaesthesia becomes more complex (exemplified by the hip fracture context), it is more important than ever that these two professions act cooperatively. This simultaneous requirement for specialisation and collaboration is analogous to the argument of Bruno Latour in his anthropology of science *We Have Never Been Modern* (1991), in which he contends that the 'modern' tendency for the 'purification' of humans and non-humans into discrete 'ontological zones', is only made possible through the workings of 'hybrids' which are themselves ontologically ambiguous. At Longside, the collaborative 'morphing' of anaesthetists and surgeons creates hybrid practitioners, potentially allowing more ambitious surgery and more complex anaesthesia to occur.

At Mellbreak the organisational aspects of collaboration were similar to those at Longside (anaesthetists routinely attended trauma meetings, for example), but boundaries between the professions were carefully maintained:

**BP:** 'I'm very careful to compartmentalise my role because I'm not an anaesthetist and I couldn't really see myself as an expert on anything medical. I'm happy to delegate, or rather to accept, whatever decisions the anaesthetist makes because it's not my role to contradict them. However, from an observational point of view, there is a lot of heterogeneous approach to anaesthesia for neck of femur fractures. There is so much variety within one Trust. It does raise questions in my mind about whether we're providing individual patients with bespoke

care or whether the anaesthetists have set ways of working in that they would prefer to continue with, almost in spite of rather than because of the patient's medical history.'

**Lead hip fracture surgeon Bert Pond, introductory interview, Mellbreak**

In the above passage, Mellbreak's lead hip fracture surgeon Bert Pond considers that it is a matter of professional respect for both him and his anaesthetic colleagues to 'compartmentalise' without challenge from one-another; there is no suggestion of 'morphing' here. However, it is clear that anaesthetic practice is both visible to Bert and of interest to him; like me in my role as ethnographer, he is a front-line observer of anaesthetic practice who feels that it is not his place to interfere.

A challenge to Bert's compartmentalisation of practice formed the focus of an episode during which Nicola, a 47 year-old woman with osteoporosis who had fractured her left hip following a trip and fall, was discussed during the team brief by Thad Pearson, a consultant anaesthetist whose expertise was in cardiothoracic anaesthesia and who was covering the trauma list due to the unexpected absence of a colleague:

**TP:** 'Bert, can you do the femoral block? I don't usually do these; she'll have a GA.'

**BP:** 'Well, if you do a fascia iliaca, I'll put lots of local around.'

**TP:** 'I don't do these, I heard you are an expert?'

**BP:** 'Surely Cliff is an expert at fascia iliaca blocks? He could do it?'

**Me:** 'I'm not working clinically here. I think my access would be rescinded if I did anything with the patients!'

**BP:** 'Ok.' *He accepts this - he'll do the procedure.*

**Conversation between consultant anaesthetist Thad Pierson and consultant surgeon Bert Pond, prior to Nicola's anaesthetic, Mellbreak**

The team brief is the nexus of perspectives here; Thad and Bert, each representing their well-demarcated CoP, both accept the usefulness of 'blocking' the nerve supply to the hip<sup>123</sup> but neither consider it to be their role. For Thad, this is because femoral nerve blocks are outside the usual scope of cardiothoracic anaesthesia, and for Bert it

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<sup>123</sup> A femoral nerve block involves the injection of local anaesthetic around the the femoral nerve. The fascia iliaca [compartment] block (FICB) targets the femoral and obturator nerves and lateral cutaneous nerve of the thigh. It is considered by many to be a simpler and lower-risk procedure.

is because although orthopaedic trauma surgeons are familiar with femoral nerve blocks (used when splinting mid-shaft femoral fractures, for example), in this context it is an 'anaesthetic' procedure. It is only when I decline Bert's suggestion that I perform the block that he agrees to proceed, which he did with an opportunistic display of skill:

**BP:** *Scans Nicola's left groin with the ultrasound.*

**LW:** *Picks up the consent form – 'Left side.' She's doing a 'stop before you block' check.*

**BP:** *'At least somebody's on it!'*

**HH:** *Inserts a temperature probe into Nicola's mouth.*

**U/S:** *Shows two pulsatile structures – I think they are profunda femoris and the superficial femoral artery*

**BP:** *'I'm too distal.' He moves the probe proximally.*

**U/S:** *The structures on the screen unify into what looks like the femoral artery. The Nerve, a brighter triangular area, comes into view, but on the screen it appears to be medial, and the vein looks lateral – I realise that the probe is the wrong way round; the left of the patient is on the right of the screen.*

**BP:** *Inserts the needle from the lateral side.*

**U/S:** *The needle appears on the right of the screen – a white line.*

**BP:** *Injects 2ml and I can see the local deposited above fascia iliaca. He advances the needle and places 8ml above the nerve, then repositions the needle and injects the remaining 10ml underneath the nerve. The inversion of the probe doesn't seem to be causing him any problems. 'Ironically, Cliff is the person who's probably done the most of these, but he won't help us.' He's teasing me.*

**Me:** *'Can't, not won't!' to be honest I wouldn't have done any better than Bert – that was as good a femoral nerve block as I've ever seen.*

**Bert:** *'I know, your hands are tied... I'll put loads into the muscle. So, she's had twenty of point-two-five.'*

**Consultant surgeon Bert Pond, anaesthetic SHO Lennie Winchester, OPD Hall Heath, and the ultrasound machine, Nicola's anaesthetic, Mellbreak**

In the above example, the team at Mellbreak were faced with more problems than those presented by the patient and the procedure: there was an additional challenge related to Thad's lack of trauma expertise. 'Cracking on' was however made possible by brokering, but unlike the enactment of this approach at Longside, there was a reluctance to cross what were perceived as stable professional boundaries. At Mellbreak, an integrated approach was an exception rather than the norm; boundaries were crossed only by invitation, but by positioning themselves as observers of one another's practice, anaesthetists and were able to cross boundaries when required.

At Beckfoot, practice was not only compartmentalised, but barely visible between the professions:

Me: ‘... what does this institution do to make hip fracture anaesthesia safer?’

SF: ‘Umm, I’ve no idea. Whatever the anaesthetists do. Anaesthetists, it is really “leave it to the anaesthetist” to make the anaesthetic safe! At our hospital I don’t want to know how to make the anaesthetic safe because it’s not my territory. I would expect the anaesthetist to take care of that section. So, I contribute to make safe surgery itself.’

**Lead hip fracture surgeon Sid Fletcher, introductory interview, Beckfoot**

In the above extract, Sid Fletcher is frank about his relationship with his anaesthetic colleagues: whereas it was commonplace for surgeons to ‘morph’ at Longside and ‘observe’ at Mellbreak, at Beckfoot it was rare for any level of engagement to occur. This was most obviously manifest in the fact that only the surgeons attended the trauma meeting, and others were excluded. This was most notably explored in a conversation between consultant orthogeriatrician Morris Booner and lead hip fracture anaesthetist Vernon Rowntree which I was party-to whilst accompanying Vernon to see a patient. Morris and Vernon extolled the benefits of a collaborative approach but felt unable to engage with their surgical colleagues in order to promote collaboration at their institution; Morris confided that he had once attended the trauma meeting but had been made to feel so unwelcome that he had not attempted to return since.

Unlike at Longside and Mellbreak, where anaesthetists participated in constructing the trauma list, at Beckfoot anaesthetists were presented with the list as a result of a process to which they were not invited. This disconnect between anaesthetists and orthopaedic surgeons was reflective of what I suspected to be a longstanding animosity between the two departments. This, I believe, was at the root of the only instance of a surgeon declining to participate in the study. This episode was notable

because, rather than simply not signing the consent form, the consultant surgeon opted to admonish me loudly in front of the operating theatre staff, accusing me of attempting to discredit the orthopaedic surgeons with the aim of securing myself a consultant post at the Trust<sup>124</sup>. That discrediting the orthopaedic surgeons could be perceived as a way to curry favour with anaesthetists at Beckfoot provides evidence of a somewhat dysfunctional relationship between the two departments.

The exclusion of anaesthetists from the decision-making process often resulted in unrealistic expectations of how much work could be accomplished; a frequent source of friction between anaesthetists and surgeons, which I most memorably experienced in a case of mistaken identity:

*I see Tobias on the corridor outside the trauma office at 8am – I recognise him as one of the anaesthetists who was most eager to participate in the study when I introduced it at the departmental meeting. I'm glad to see him:*

**Me:** 'Just the man I've been looking for!'

**Tobias:** *Doesn't look pleased:* 'Who put this list together?!' *Accusatory – I think he thinks that I am the orthopaedic surgeon.*

**Me:** 'I have no idea.'

**TN:** *One of the orthopaedic trauma nurses is passing by – she comes to my defence:* 'He's not one of ours. He's a visitor.'

**SHO:** *Comes out of the office.*

**TC:** *Raised voice, to the SHO:* 'This list is bollocks. I'm not seeing eight patients then cancelling half of them. You need to make a new list. I'm not seeing anyone until you do!'

**SHO:** *Nods, leaves – I think to talk to his seniors.*

**Me:** *I start again with Tobias as we walk into the office – he remembers who I am and launches into an enthusiastic discussion of hip fracture anaesthesia as he looks on the computer for the blood results...*

**Associate specialist in anaesthesia Tobias Clifford, a trauma specialist nurse and an orthopaedic SHO, Beckfoot Hospital**

In the above excerpt, Tobias feels slighted; by making a list that cannot feasibly be completed the surgeons are wasting his time and, he feels, treating him as a technician rather than a fellow professional. Exasperating as this is for Tobias, there is little

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<sup>124</sup> My consultant appointment is not at Beckfoot.

suggestion here that it would have had any impact on patient care, beyond the potential for delaying the start of the list.

In other circumstances however, barring anaesthetists from decision-making had significant consequences. Most notably in the case of Tess, a patient with atrial fibrillation who had tripped and broken her left hip whilst letting her cat out of the house. Tess usually took an anticoagulant, rivaroxaban, and had been waiting for her operation at Beckfoot for two days when Nick Raines, an expert trauma anaesthetist whom I was keen to observe, was covering the list:

*I catch up with Nick in the office on the trauma ward at 8am: he is going through Tess' notes. He identifies that she has cardiac valve disease, heart failure, atrial fibrillation, and takes an anticoagulant, rivaroxaban. He vocalises his thoughts and reads certain passages aloud, I assume for my benefit, as he goes...*

**NR:** '... When did she last have her rivaroxaban? That's the question. So where does she live?' *He picks out the ambulance notes: 'You get the most sense out of these.'* *He reads aloud again: "Got up to let the cat out" - that suggests a certain amount of - lives alone, carers, that doesn't sound like a form four - digoxin, ramipril - oh-eight.'* *The time of her fall on Friday: 08:00.* 'Will she have had her meds yesterday? Probably not. So that would be forty-eight hours, so I would suggest a risk-benefit...

*The junior surgeons – a registrar and an SHO – enter the office, they have just been to the trauma meeting.*

**SR:** 'The hip is off. You know that?'

**NR:** 'The hip is off? Aaah!' *an expression of frustration.*

**SHO:** 'She had rivaroxaban Friday, INR's two-point-five, it's forty-eight hours.'

**NR:** 'The thing is, rivaroxaban and INR don't correlate...'

**Consultant anaesthetist Nick Raines and the orthopaedic specialty registrar and SHO,  
Beckfoot**

In the situation above, Nick gathers information from Tess' notes, which he interprets as indicating that proceeding with surgery today would be beneficial on a 'risk-benefit' basis. However, unknown to Nick, the orthopaedic team have already discussed Tess in his absence and decided against surgery because of her raised INR. The registrar delivers this news as an ultimatum: 'the hip is off.' However, as Nick points out, INR is not suitable for the assessment of anticoagulation induced by rivaroxaban (e.g.

Heidbuchel et al 2013); by making the trauma meeting exclusive, a nexus of perspectives has not been achieved and brokering has been impeded. Nick uses national guidelines from the AAGBI (2013) and the BBC report on Sayers' study (both 2017) in an attempt to renegotiate the list:

**NR:** 'I've got an app on here...' *He holds up his mobile phone, taps the screen. 'Regional anaesthesia and... It's AAGBI.'* *He puts the phone down and opens up Internet Explorer on the desktop PC. He searches for the document... 'You know there's been a BBC report about this recently?' It was published on 20<sup>th</sup> April – four days previously, entitled "Early hip fracture surgery will save hundreds of lives."* *He finds the guideline: 'Right.'* *He scrolls to the appropriate page: 'She's on rivaroxaban, prophylaxis.'* *He's reading across the table in the guideline. "'Acceptable time from drug to block... eighteen hours.'"*

**SHO:** 'And it's been forty-eight hours.'

**Consultant anaesthetist Nick Raines and the orthopaedic SHO, Beckfoot**

Hoping that he had done enough to reclaim her place on the list, Nick subsequently went to assess Tess, but on returning to the office, found that he had been outmanoeuvred:

*We get back to the office. The trauma coordinator (TC) follows us in:*

**TC:** 'Right, I've spoke [*sic*] to [the surgical consultant]. There's no space on the list now, he's brought the wrist in.'

**NR:** 'That's inappropriate, I'm not seeing the wrist. She [Tess] can be done... Let him know if she's not done today, I'll put an [incident report] in - unnecessary delay. You can phrase it as a threat if you like.'

**TC:** 'I've told him, he won't put her on the list.'

**NR:** 'You'll have to document why unnecessary delay... What's the reason for the delay?' *His voice is getting louder, he's obviously upset.*

**TC:** 'It was the INR, then the wrist...'

**NR:** 'Tell him...'

**TC:** *Cuts Nick off: 'I'm not playing cat and mouse! I don't blame her; I wouldn't want to be caught in the middle of this either.'*

**NR:** *Pulls open the office door and stalks out – I presume to talk to the consultant surgeon. I decide to remain in the office.*

**Consultant anaesthetist Nick Raines and the trauma coordinator, Beckfoot**

Here, in a similar fashion to Arlo's 'feeding' intervention to delay the operation for his patient with lung disease at Longside, the surgical consultant has intervened assertively here by arranging for an alternative patient, 'the wrist', to come into hospital. Unable to send 'the wrist' back home, Nick feels unable to continue to argue. However, he feels compelled to check when Tess's INR was taken; though he knows it

is not a valid test, he suspects that rather than being misinterpreted in good faith, the result was misappropriated to provide a reason to avoid operating on a high-risk patient. As he suspected, the test has not been repeated today. That no attempt was made to see if the clotting had improved, he alleges, is indicative of 'laziness' rather than misplaced concern:

**NR:** *Clicks onto the pathology system:* 'This [the INR] was [processed at] eleven-fourteen [yesterday]. Nothing today, as I suspected. Oh, God!' *He turns back to me:* 'Feel free to document this: delay, laziness of surgeon.'

**Me:** *I decide that if I am going to be recruited into this row, I maybe should make myself scarce. I've managed to get the project back on track since being thrown out of theatre – I don't want to be seen to further inflame relations between the anaesthetists and the orthopaedic surgeons. 'I'm going to push off then, if that's the lie of the land.'*

**NR:** 'It just drives me round the twist! I'm just trying to do some work. We've had our rather protracted discussion about what's in her best interest. If she was my mother or grandmother I'd go absolutely mental, and I think that's what - When the new CEO started, I don't think he's great, he's doing a fine job - but when he started, he said I want to get the mentality: "I want you to think what would I want for my relative?" I think that's totally fair...'

**Consultant anaesthetist Nick Raines, Beckfoot**

The problems faced in this case were similar to the those of Nancy at Longside (above), also a medically-complex patient whose coagulation was abnormal on admission. The contrast between these two cases makes clear the value of brokering in order to enable 'cracking on'. In Nancy's case, the trauma meeting, where all parties felt able to contribute, facilitated a cooperative approach between the teams and a professional consensus about the justification for proceeding with surgery was reached. Reflecting on this, Longside anaesthetist Conor Paris suggested that the formation of a community was critical to enabling early surgery:

**CP:** 'It's consultant-delivered. They're all my mates, if I won't gas them, we talk about it, work it out.'

**Consultant anaesthetist Conor Paris, Nancy's anaesthetic Longside**

By contrast, Tess' case is the antithesis of 'mates' working it out, an illustration of how an anaesthetic cannot be made if the surgeon is not willing to operate. In Tess' case

there is another actor, 'the wrist', an alternative patient who was available to be brought-in from home.

The descriptions of the two patients in the negotiations between Nick, the trauma coordinator and the surgeons are notable. Rather than being identified by name, they are described in terms of their injured anatomy; they are 'the hip' and 'the wrist'. This tendency to refer to patients as body parts (or surgical implants - see below) was commonplace in my observations when there were discussions between different professionals, with references to names being comparatively rare. This observation is consistent with Hirschauer's observation (1991) that patients are 'turned into objects' during surgery. However, unlike the physical transformation that he describes in the operating theatre, at this pre-operative stage the transformation is linguistic: 'Tess' becomes 'the hip'.

This linguistic transformation allows patients to function as 'boundary objects' (Star and Griesemer 1989), which Wenger (1998, p105) describes as 'artefacts, documents, terms, concepts and other forms of reification around which communities of practice can organise their interconnections.' Making a person into a joint, bone or implant through *reification* is distinct from *depersonalisation* here because although the patient is more of a 'thing' they are not necessarily less of a person. For example, it is notable that 'human' personal pronouns are still used ('the hip' is still 'she'), and Nick's frustration is at least in-part borne of empathy ('if she was my mother or grandmother...'): Tess is therefore simultaneously a person and a broken bone. The extent to which a person can function as a boundary object was considered by Star and Griesemer (1989) who identified that although 'marginal people' share many

qualities with boundary objects, their ability to participate actively prevents them from acting in this way. However, organisational ethnographer Kasia Zdunczyk (2006) observed that she was able to act as a 'human boundary object' in the context of cross-community negotiations by allowing herself to be treated as such. In my observations however, the patient is not afforded the option to decide if they wish to function in this way: the negotiations at the trauma meeting are distant from the ward, and in this sense, patients are both 'marginal' and passive. Through the processes of reification and distancing, hip fracture patients lack the ability to 'change themselves reflexively' as ascribed to marginal people by Star and Griesemer. At the trauma meeting therefore, although patients may not be represented only as objects, they are able to function in this way.

Wenger (1998) defines four qualities of boundary objects: they are *modular* (each perspective can attend to a specific portion), *abstract* (extraneous information is deleted), *accommodating* (able to conform to different activities) and *standardised* (information is 'contained' within them in a prespecified form). When viewed through this lens, patients, reified as anatomical locations, operations or implants, act as Wenger describes: anaesthetists and surgeons have their own *modules* of interest, the use of structured assessments and shorthand descriptions is a form of *abstraction*, the patient must *accommodate* both anaesthesia and surgery if their fracture is to be fixed, and the acquisition of *standardised* information is at the centre of hip fracture practice<sup>125</sup>.

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<sup>125</sup> For example, surgeons will classify fractures and determine their treatment based on a standard series of x-rays, and anaesthetists use 'standard monitoring' during anaesthesia and recovery (AAGBI 2015).

In the case of Tess (above), a hip fracture patient was exchanged for another to settle a dispute between colleagues. More-frequently however, I noted the exchange of hip fracture patients for others when orthopaedic surgeons who sub-specialised in upper-limb surgery were assigned to the trauma list. In this circumstance, there was a tendency in all three hospitals to prioritise upper-limb cases. A number of possible reasons for this were advanced by anaesthetists: surgeons' preference for working within their area of core competency is an accusation that was recurrently made, but it was also recognised that there was a need to get upper-limb cases done so that lower-limb colleagues who were scheduled for the next day wouldn't have to deal with cases that lay outside their area of expertise. This situation was acknowledged by anaesthetists as undesirable but was often grudgingly accepted. In the below observation of a listing negotiation, patients again function as boundary objects between the CoPs of orthopaedics and anaesthesia:

**DM:** 'Which is the sickest of the two?' *the two hip fracture patients.*

**BF:** 'The DHS [Sally] is about ninety isn't she?' *In reality, she is 62.*

**OJ:** *Puts Sally's x-ray up on the screen.*

**BF:** 'Well?'

**OJ:** *Doesn't commit.*

**DM:** 'Who will be in the best shape tomorrow morning?'

**BF:** 'That's what it's all about.'

**LP:** 'Just make a decision.'

**OJ:** 'The DHS.'

**BF:** 'Good. We're more likely to get that done.'

**LP:** 'And I like nails [Tabitha is listed for an IM nail<sup>126</sup>]. I'll get that done in half an hour.'

**DM:** *leans over to me and shows me the operating list. He whispers: 'So, from your perspective, the shoulder surgeon [Bev] is on today so they want to do these first.' He indicates the two upper-limb cases. 'So, they'll be fucking around with that for an hour.' He points to the first case – a minor upper limb trauma. 'Then fucking around with this revision for three, four hours.' He points to the second, more complex case. 'Personally, I think it's outrageous to cancel an acute hip for a revision shoulder, but I'm too old to argue. She [Tabitha] will probably be tomorrow.'*

**Consultant anaesthetist Duncan Myers, consultant surgeons Bev Frank (upper limb) and Lamar Porter (lower limb), and the Orthopaedic Junior, trauma meeting, Longside.**

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<sup>126</sup> Intramedullary nail. A device often used to fix subtrochanteric femoral fractures. It is a metal rod that sits in the medulla of the bone, secured with proximal and distal screws.

In the above discussion, which took place on a Saturday, there are two patients with hip fractures: Sally ('the DHS') and Tabitha ('the nail'). There are also two upper-limb cases, which have already been prioritised because the operating surgeon (Bev) is an upper-limb specialist. The team are now debating which of the hip fracture patients to assign to today's list, and which to defer to tomorrow when lower-limb surgeon Lamar will be operating. The principle adopted here (as Bev puts it: 'what it's all about') is that the frailest patient should be operated-on first, leaving the more robust patient for tomorrow. This involves the introduction of another abstracted quality, medical fitness, at the request of consultant anaesthetist Duncan Myers.

At this time, only the orthopaedic junior doctor has seen the patients, and the consultant surgeons and anaesthetist therefore ask him to decide the list order. The junior struggles to do this – he is being asked to pass comment on what is traditionally the anaesthetist's 'module' of interest, and although consultant surgeon Bev agrees with Duncan's prioritisation strategy (further evidence of 'morphing'), the junior is taken aback. A contributing factor to this may be that in this case there is additional complexity: although Sally is younger (age 62), she is markedly frailer than Tabitha (age 82) due to her extensive comorbidities<sup>127</sup>. The senior team end up 'forcing the hand' of the junior, and construct their own reality to justify this, incorrectly stating that 'The DHS is about ninety...', thus justifying her place on today's list. Whether this is due to a simple error in recall, sense-making in light of Sally's comorbid state (she's sicker, so

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<sup>127</sup> In the recent past she had broken her other hip and her humerus – the humeral fracture has not healed well and she wears a splint. She has COPD, scoliosis, epilepsy and a previous stroke. She is a heavy smoker and has a history of alcohol excess.

she must be older), or a strategic play to put each surgeon's preferred case on their respective list is uncertain. Whatever the reason, the function of this is to allow the key features of Sally's case to be translated between multiple communities of practice: her frailty, acuity, injury and procedure are all neatly summarised in the creation of the '90 year old DHS' in a way that can be understood by all team members.

As the above interactions demonstrate, the 'rush' described by Dustin Bellamy (above) does not always occur, at least not always with regards to hip fracture patients. Other patients who are clinically less urgent may be prioritised for reasons to do with the subspecialist expertise of the surgeon, who may instead 'rush' to operate on their preferred patients today, leaving the hip fractures for tomorrow. This is not because of a lack of expertise in operating on broken hips which are the 'bread and butter' of orthopaedic trauma surgery,<sup>128</sup> rather it is due to their expertise in other procedures which they feel cannot be left for others to do. Likewise, there are occasions where it is the anaesthetists who push for early operation, often in cases where the surgical team assume that a patient would not be fit for surgery. There is a clear advantage here in the multidisciplinary approach to planning the trauma list; such misconceptions can be challenged by redefining of what is considered reasonable. For this process to work effectively, the team who care for the hip fracture patient must form an effective CoP in addition to that to which they belong on the basis of their profession.

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<sup>128</sup> One exception to this is where the patient requires a total hip replacement. These are typically done by a specialist hip surgeon and therefore these patients are often deferred until such a surgeon is available.

### **Cracking On and the Good Anaesthetic**

How does the 'good anaesthetic' relate to 'cracking on'? There are clear tensions here. A time-consuming attempt to make a hip fracture patient better pre-operatively may in fact result in the patient becoming sicker due to their pain and immobility, however proceeding without consideration is a controversial approach as well. What the anaesthetists are doing in making it possible to proceed with an early operation is deciding which situations can be tolerated (the majority of circumstances), which situations justify a change in the usual plan, and as a last resort, which patients must be postponed allowing for optimisation. In order to achieve this, collaboration between professionally-situated CoPs is required. This is facilitated by forming a new CoP, the operating theatre team, through boundary-spanning measures such as the abstraction of patients into 'boundary objects' the 'brokering' of practices between communities, and the 'morphing' of anaesthetists and surgeons to form hybrids.

In concluding this chapter, I am struck by the dominance of 'cracking on' in anaesthetic practice. Given the prevalence of medical illness in the hip fracture population it is surprising how few patients are delayed for clinical reasons (logistical reasons being much more common). Why do I find this striking? If I imagine myself in the position of those who I have observed I do not think I would disagree with the decisions that were made about expediting hip fracture surgery; fundamentally I think I would 'crack on' just as they do. As anaesthetists we rarely see the practice of others, but as an ethnographer I have been given the opportunity to see a cross-section of anaesthetic practice. In this chapter I have found that this practice is characterised by variation: the way in which information is gathered, decisions are made, and collaborations enable and frustrate the process differs from anaesthetist to anaesthetist and from

hospital to hospital. However, despite this variation, what binds practice together is the notion that the anaesthetic should ideally occur as soon as if feasible, and that in order for this to happen compromises must be made.

In the next chapter I move from the wards and meeting rooms into the operating theatre. Because the 'good' anaesthetic is the one that gets done today, uncertainty is commonplace. I will examine how uncertainty influences anaesthesia, and how anaesthetists design their practices to minimise or mitigate it. These practices involve compromises and bear little resemblance to the type of anaesthetic that may be commonly administered to 'well' patients in the elective setting. As consultant anaesthetist Louis Tyrell suggests, where 'cracking on' is a priority, a good anaesthetic may not actually *look* 'good':

**LT:** 'It's difficult to have one that looks good. They are frail, complex. It feels like a compromise between getting it done and making it good...'

**Consultant anaesthetist Louis Tyrell, following Edith's anaesthetic, Longside.**

## Chapter 5: A Good Anaesthetic... Withstands Uncertainty

‘Uncertainty in anaesthesia is constantly increasing, along with the ageing population.’

**Klemola and Norros (1997)**

This is a study which is both inspired by and characterised by uncertainty. As a clinician I am uncertain what mode of anaesthetic I should provide, and in what way any given anaesthetic should be done. The biomedical evidence regarding hip fracture anaesthesia (Chapter 3) provides no direction regarding anaesthetic technique; although cohort studies from the USA (Neuman et al 2012 & 2014, Paterno et al 2014, Fields et al 2015, Basques et al 2015) have identified potential benefits to both regional and general anaesthesia, these studies are beset with methodological problems. Meta-analyses, less compromised methodologically, indicate no difference between modes. Using data from the NHFD, ASAP-2 (White et al 2016a) indicates that the avoidance of hypotension is related to an improvement in outcome, but beyond identifying that hypotension is less common with ‘low dose’ spinals<sup>129</sup>, it does not provide the clinician with strategies with which to accomplish this.

### Uncertainty in Medicine

How do clinicians deal with uncertainty? This question, according to Atkinson (1984) has become a ‘stock in trade’ for social scientists interested in health and medicine. This tradition builds upon the work of medical sociologist Renée Fox who, inspired by a long hospital stay during her undergraduate years, documented the training of medical students in the USA in the 1950’s. In her classic text *Training for Uncertainty* (1957; p208-209), she identifies three ‘types’ of uncertainty:

‘The first results from incomplete or imperfect mastery of available knowledge... The second depends upon limitations in current medical knowledge... A third source of uncertainty derives

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<sup>129</sup> Defined by as a dose of <10mg of bupivacaine.

from the first two. This consists of difficulty in distinguishing between personal ignorance or ineptitude and the limitations of present medical knowledge.'

Though six decades old and set in a different context to my study, Fox's work resonates with my findings in many places, as in this exchange with consultant anaesthetist Elroy Ashworth as he was explaining his choice of anaesthetic mode to me:

**EA:** 'So he was clear, he wants a GA. I think we need to be careful saying "oh, a spinal is so much safer," you'll know more about this than me because I don't do these lists too often. But there's not evidence that it is, is there?'

**Consultant anaesthetist Elroy Ashworth, after assessing Ivan, Mellbreak**

In this case the patient, Ivan, who possessed a degree in applied chemistry and had an interest in anaesthetic agents,<sup>130</sup> had been explicit in his wish to have a general anaesthetic. Elroy, despite believing that Ivan would have been 'better off with a spinal' agreed to do a GA, a decision which he justified to me in terms of the lack of empirical evidence to favour spinal anaesthesia: Fox's second type of uncertainty. However, his qualifier, in which he alluded to an incomplete knowledge of the evidence, indicates that Fox's third type of uncertainty was also present to some extent. Fox's first type was less clearly demonstrated in my data, probably because there is little in the way of evidence to be incompletely-knowledgeable of, and also because the majority of the anaesthetist participants in my study were experienced consultants. Though as Fox (1957; p208) points out, 'no one can have at his [*sic*]

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<sup>130</sup> As demonstrated by this unusual exchange during the pre-operative assessment:

**EA:** 'Any questions?'

**Iv:** 'What's the chemical name of the general anaesthetic medication?'

**EA:** *A look of surprise* - 'Propofol? Two-six-diisopropylphenol.'

**Iv:** *Nods*. 'And the local?'

**EA:** 'Bupivacaine.'

**Iv:** 'Used to be ether or chloroform.'

**Consultant anaesthetist Elroy Ashworth and Ivan, Mellbreak**

command all skills and all knowledge of the lore of medicine,' the participants in my study were certainly cognisant of the lack of directive evidence for anaesthetic mode in the context of hip fracture repair even if, like Elroy, they sometimes lacked faith in their own grasp of the literature. Numerous critiques and developments of Fox's work have been published in the intervening years which are relevant to this study (e.g. Light 1979, Atkinson 1984, Timmermans and Angell 2001). Light (1979; p310), draws on data from his own work and that of others, principally in observing residents (trainee doctors) in orthopaedics and psychiatry, to introduce an important additional source of uncertainty – the patient:

'... uncertainties constantly arise in professional work, principally in two ways. They arise in grey areas of expertise where knowledge is insufficient... More frequently, uncertainty arises from having to make a decision without full knowledge of the case or client.'

### **Patient-Based Uncertainty**

Anaesthetist Ulla-Maija Klemola and industrial psychologist Leena Norros (1997; p449) state that conventional models of medical work, 'problem solving, based on either a hypothetico-deductive or probabilistic model', fail to address the 'dynamic nature of anaesthesia.' The practice of the anaesthetist is not characterised by making a diagnosis and initiating a treatment, but managing dynamic physiological interactions between the patient, the anaesthetic, and the surgery; as Goodwin (2010; p76) puts it, in the words of one of her study participants: 'it's not often you get to diagnose anything in anaesthesia.' Diagnoses are nonetheless relevant to anaesthetic practice: for example, *de novo* diagnoses are made in emergency situations such as anaphylaxis, 'recognition and clinical diagnosis' being the vital first step (AAGBI 2009). More commonly however, existing diagnoses are considered when developing the anaesthetic plan. In the context of my study however, diagnoses that were made in

the past frequently become lost. As outlined in the previous chapters, delirium and dementia are commonplace and there is a perceived need to ‘crack on’ and get the operation done quickly. This closes down the usual techniques for obtaining a history that are used in medicine: patient accounts, collateral histories (e.g. from relatives) and casenote reviews. Partial knowledge of the ‘client’ (Light 1979), or to use the language of the operating theatre the patient<sup>131</sup>, therefore represents a recurrent source of uncertainty.

Drawing on the scientific controversies that followed the Chernobyl disaster, after which radioactive isotopes were deposited on the Cumbrian fells, sociologist of science Brian Wynne (1992) explores the different types of uncertainty faced by scientists. These range from well-circumscribed risks that can be expressed mathematically, to uncertainties with indeterminate causal chains. All of these types of uncertainty are prevalent in the hip fracture context, but patient-based uncertainty predominantly brings with it what Wynne (1992; p114) describes as *Uncertainty* – ‘don’t know the odds, may know the main parameters’, and *Ignorance* – ‘we don’t know what we don’t know’ (Figure 16).

Risk	Know the odds.
Uncertainty	Don’t know the odds: may know the main parameters. May reduce uncertainty but increase ignorance.
Ignorance	Don’t know what we don’t know. Ignorance increases with increased commitments based on given knowledge.
Indeterminacy	Causal chains or networks open.

Figure 16: Wynne’s taxonomy of uncertainty  
(1992; p114)

<sup>131</sup> Much of Light’s work was conducted in the setting of mental health, where the term ‘client’ is typically used instead of ‘patient.’

Re-visiting Ivan's case, *uncertainty* as defined by Wynne (1992) is articulated by Elroy during the team brief:

**EA:** 'Eighty-nine year old chap, don't know his meds, bronchiectasis, I'll put in an A-line awake and we'll tube him, He's got quite a harsh systolic murmur.'

**CH:** 'He's on some vitamins, something for CA prostate.'

**EA:** 'We could really do with his notes...'

**Consultant anaesthetist Elroy Ashworth and surgical registrar Crispin Hambledon, discussing Ivan, Mellbreak**

Despite Ivan's aforementioned interest in anaesthetic pharmacology, his knowledge of medications unfortunately did not extend to his own prescriptions, and the presence of a heart murmur could indicate cardiac valve pathology. Certain medications and heart valve lesions such as aortic stenosis, suspected in this case,<sup>132</sup> have significant implications for the conduct of anaesthesia (see Chapter 1) and it is therefore advantageous to know as much about them as possible. However, because this operation took place on a Sunday, when access to medical records is limited, the notes were not available. Faced with the option of proceeding without the notes, or delaying the operation for another day, Elroy opted for the former:

**EA:** *preparing equipment* – 'So, I'm going to put an A-line in awake, which is something I almost never do. He's got a collapsing pulse rather than a slow-rising one.' *A collapsing pulse is a sign of aortic regurgitation.* 'I asked a consultant colleague what to do, we decided just to get on with it, put an A-line in. I'm covering induction basically. If he has [aortic stenosis] what are you going to do? Treat it or get on with it with appropriate monitoring? Get on with it!'

**Consultant anaesthetist Elroy Ashworth, discussing Ivan, Mellbreak**

By siting an arterial ('A-') line<sup>133</sup>, Elroy devised a workaround to manage the uncertainty of Ivan's cardiac murmur, allowing him to 'get on with it.' The knowledge that was conceded through the lack of the casenotes was compensated-for through an enhanced knowledge of changes in Ivan's blood pressure. This is what Light (1979)

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<sup>132</sup> See footnote 6, *In search of the good anaesthetic*.

<sup>133</sup> An arterial line is a pressure transducer connected to the patient's artery via a cannula containing fluid under pressure. It allows beat-to-beat blood pressure monitoring. By knowing the blood pressure at all times, the clinician can respond more rapidly to changes.

refers to as a ‘control’: one of the ways that doctors learn to deal with uncertainty. A variation on this scenario, awaiting an echocardiogram to diagnose the cause of a cardiac murmur (as opposed to waiting for the notes) is addressed specifically in the AAGBI guidelines on anaesthesia for hip fracture (Griffiths et al 2011). Although the guideline acknowledges that ‘there is considerable debate concerning the postponement of surgery pending echocardiography’, it goes on to stipulate that postponement for such a reason is ‘unacceptable’ in the view of the guideline authors (Figure 17). Here then, Elroy’s practice was consistent with the guideline. By conforming to that advice, and that of his colleague whom he consulted; Elroy was developing a consensus for his plan: another form of ‘control’ (Light 1979).

Acceptable	Unacceptable
Haemoglobin concentration $< 8\text{g.dl}^{-1}$	Lack of facilities or theatre space.
Plasma sodium concentration $< 120$ or $>150$ $\text{mmol.l}^{-1}$ and potassium concentration $< 2.8$ or $> 6.0$ $\text{mmol.l}^{-1}$	Awaiting echocardiography.
Uncontrolled diabetes.	Unavailable surgical expertise.
Uncontrolled or acute onset left ventricular failure.	Minor electrolyte abnormalities.
Controllable cardiac arrhythmia with a ventricular rate $> 120.\text{min}^{-1}$	
Chest infection with sepsis.	
Reversible coagulopathy.	

Figure 17: ‘Acceptable’ and ‘unacceptable’ reasons for delay  
adapted from Griffiths et al 2011 (p13).

Examples of ‘client-based’ uncertainty were extremely prevalent in my observations and the presence of such uncertainty was rarely remarked-upon by the anaesthetists. Ignorance of the patients’ clinical history is an accepted part of hip fracture anaesthesia to the extent that some anaesthetists (e.g. Hyrarn Niles, Chapter 4) deemed pre-operative assessment a mere formality. What was deemed remarkable was the converse situation, as in this observation which followed the assessment of

Heather, the youngest patient in the study (24 years old), who had fractured her hip as a result of congenital rickets:

*We exit the room, onto the corridor:*

**BD:** 'Unusual, to have someone who is so interested and capable of retaining information with a fractured NOF. Usually it's just...' *He stops, leans back a little and looks at an undefined distant point, then cocks his head to one side and squints – I get what he means – "Usually it's just the end of the bed test."*

**Consultant anaesthetist Brent Dabney, discussing Heather, Beckfoot**

### The 'End of the Bed Test'

The 'end of the bed test' is seldom acknowledged in the literature pertaining to anaesthesia, but as a practicing anaesthetist it is a familiar concept to me: it is a 'gut feeling' of how a patient will respond to an anaesthetic, a synthesis of what can be seen and heard from the bedside and the mapping of that information to prior experience. I found evidence of the *test* in nearly every pre-operative assessment I observed. Usually it serves as a source of supplementary information to complement, or fill-in gaps in the formal pre-operative assessment, but in cases where the patient is confused or information is sparse, it may become the principal source of information:

**BB:** *...steps back from the bed a couple of paces and talks to me, quietly... 'He doesn't pass the end of the bed test, if you know what I mean?'*

**Me:** *I nod – I know about the "end of the bed test", and I can see what he means.*

**Consultant anaesthetist Briar Bonner, assessing Quintin, Mellbreak**

In the above observation, Briar is considering cancelling Quintin's operation. Quintin is 76-years-old, obese, diabetic and has heart failure. His initial admission was complicated by a suspected myocardial infarction and he has been waiting for his operation for three days whilst that diagnosis has been investigated and ruled-out. In the meantime, lying flat in bed, he has developed increasing breathlessness, likely to be due to a chest infection, and has become confused so is struggling to communicate.

Briar is aware that if he cancels the operation it will most probably result in palliation, as he later acknowledged during the team-brief.

The only history that Briar obtained first-hand was a single question about breathlessness, and the only examination was palpation of the radial pulse. Was this pre-operative assessment a dereliction of the usual standard of care that should be expected for a complex patient? The explicit components of the pre-operative assessment that I observed would not pass the most basic of medical school clinical examinations,<sup>134</sup> but Briar is not a medical student – he is a consultant acknowledged as an expert in hip fracture anaesthesia by his colleagues, and he is drawing on tacit knowledge in his assessment of fitness for surgery.

Michael Polanyi (1966; p4) introduces tacit knowledge in his classic text *The Tacit Dimension* as follows: 'I shall reconsider human knowledge by starting from the fact that we can know more than we can tell.' Forms of knowledge in anaesthesia have been explored ethnographically in *The Problem of Expertise in Anaesthesia*, in which Smith et al (2003a; p327) found that expertise is 'comprised of a complex balance of explicit and tacit knowledge.' Considering the work of both Smith et al and Polanyi, Larsson (2009; p443) describes tacit knowledge as a 'higher level of knowledge, integrated and ready to be used,' and presents its acquisition as an essential step in equipping expert anaesthetists with the capability to act 'correctly and at times uncannily fast in difficult and uncertain situations.' Seen in this light, Briar's seemingly minimal assessment makes more sense – a focussed history and examination,

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<sup>134</sup> I base this assertion on my experience as an OSCE examiner for three different medical schools.

acquiring explicit knowledge of the patient, is combined with the tacit. Which in this case because of Quintin's confusion, is the predominant clinical assessment.

It is no coincidence that the only mention of 'the end of the bed test' that I could locate in the clinical anaesthetic literature was in a review article regarding frailty, a concept inextricably connected to hip fracture: here, Hubbard and Story (2013; p26) contend that whilst frailty is 'often ignored, it is 'easy to spot.' Though its pathophysiology remains elusive, they suggest that it represents 'a vulnerability to stressors'; in the context of anaesthesia, as frailty increases, so does the risk of perioperative complications (e.g. Dasgupta et al 2009). Though experienced geriatricians appear to be consistently successful in identifying frailty 'from the end of the bed' (Olde Rikkert 1999), Hubbard and Story advocate the use of quantitative assessment scales such as the comprehensive geriatric assessment frailty index (FI-CGA) (Jones et al 2005) in the pre-operative setting, to compensate for what they believe is a lack of expertise amongst non-geriatricians.

Is the assessment of frailty what occurs in the anaesthetic 'end of the bed test'? This is part, but not all, of its purpose: after all, frailty is an expectation amongst proximal femoral fracture patients<sup>135</sup>. Instead of looking for frailty in the general sense, anaesthetists look for the patient's ability to withstand the stressors that they know they will apply as a result of their proposed anaesthetic – for example vasodilation, CNS depression, or ventilatory changes. In Quintin's case, following his initial assessment and aware of the implications of cancelling the operation, Briar requests

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<sup>135</sup> Only 31% of hip fracture patients are classified 'low frailty' when the FI-CGA is used (Krishnan et al 2014).

a second opinion from the consultant intensivist Amos Ackerman, and subsequently a cardiologist colleague. Together, they sequentially build on the 'end of the bed test' and focus on Quintin's respiratory system to unpick Briar's concerns; moving along a continuum of knowledge from the tacit towards the explicit:

08:30:

**BB:** 'It's probably his chest. It's a difficult one, if we do a GA we might not be able to extubate him. My gut feeling is that he might not survive an anaesthetic... But if we leave him, he's just going to get pneumonia and die anyway...'

09:10:

**AA:** 'Is there no way you could do it under a spinal?'

**BB:** 'We could... It's risk-benefit...'

**AA:** "'Cause if you intubate him, he's fucked, basically.'

**BB:** 'He doesn't pass the end of the bed test for me.'

**AA:** 'Well, if he doesn't pass *your* end of the bed test!' *Briar has a reputation for anaesthetising patients who are deemed high-risk by his colleagues.*

**BB:** 'You know my threshold.'

09:30:

**AA:** *Flicks through the notes – he points to an ABG result – PaCO<sub>2</sub> 6.85 kPa. He closes the notes. 'He looks like death warmed-up.'*

**BB:** 'He's got type-two respiratory failure.'

**CR:** 'He could have a spinal? That doesn't affect respiration.'

**BB:** 'More than you think. The diaphragm keeps working, but the intercostals...'

**AA:** 'And lying them flat... They look like death warmed-up, then you shake them up a bit, reaming bone, transfusing, the rest...'

**BB:** 'We could palliate him? What do you think Amos?'

**AA:** 'I think he'll die in theatre.'

**Consultant anaesthetist Briar Bonner, consultant intensivist Amos Ackerman, and the cardiology registrar, assessing Quintin, Mellbreak**

In the above sequence, though Briar's concerns are made more explicit by the three experienced clinicians working together to lend quantification to his assessment through the use of investigations such as the arterial blood gas (ABG), the tacit continues to contribute. Amos' assessment that Quintin looks 'like death warmed-up' is placed on an equal footing with a technical consideration of respiratory physiology and the impact of spinal anaesthesia thereon. As indicated by Smith (2003a), the eventual decision to palliate Quintin was not based exclusively on explicit or tacit knowledge, but on a blending of the two.

### **The Anaesthetics That Are Never Done.**

‘Masterly inactivity’ (e.g. Mai 2014) is a common refrain in medicine. In the absence of a treatment that is known to benefit a given condition, allowing the immune system to act without interference may be the best course of action. However, in anaesthesia this option is not available if an operation is to proceed. In the hip fracture setting, a non-operative approach is not to be taken lightly – six to eight weeks of limb traction and bed-rest is required to allow the fracture to heal (e.g. Griffiths et al 2011); in the context of frailty this is associated with a higher risk of morbidity and mortality, however exactly how high is unknown.<sup>136</sup>

Does the risk presented by increasing frailty ever justify a non-operative approach to hip fracture? Johansen and colleagues (2017) suggest not, cautioning against alarm on the basis of standard measures of outcome adopted within EBM – mortality at 30 days and one year<sup>137</sup>, timescales that are arguably less relevant to hip fracture patients than others. Instead, they advocate a more nuanced ‘cumulative’ approach to risk and emphasise that although 24.8% ASA-V<sup>138</sup> patients who were operated-on died in hospital, the risk of death amongst even these ‘moribund’ patients is approximately half that of patients who were left un-operated. They argue therefore that clinicians should avoid undue pessimism in the consent process and caution against

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<sup>136</sup> There is a Cochrane review on this topic (Parker et al 2008), which states that for extracapsular hip fractures (where the fracture does not interrupt the blood supply to the femoral head) the evidence ‘does not suggest major differences in outcome’ between operative and non-operative management. However, there are no RCTs from the last three decades and the authors concede that ‘it is difficult to conceive circumstances in which future trials would be viable or practical.’ Data from the NHFD (Johansen et al 2017) indicates a 48.6% in-hospital mortality rate amongst such patients, and a less-complete case series describes a one-year mortality of 95% (Rashidiford et al 2016).

<sup>137</sup> I have so-far been unable to trace the origins of the 30-day and 1-year measures of mortality.

<sup>138</sup> ‘ASA V: A moribund patient who is not expected to survive without the operation’ (ASA House of Delegates 2014)

underestimating 'the benefit of surgery, even for dying patients, which can allow them to 'spend their final days in comfort and dignity.' Complete as Johansen's data may be in providing 'the odds' for what Wynne (1992, see figure 16) classifies as *risk*, adopting a simply statistical approach derived from population-based data does not acknowledge the unique situation of each patient. Drawing on Wynne's taxonomy, Strand et al (2009; p232) apply this problem to risk in medicine:

'Is my patient "representative" for the group(s) for which I have risk information, or is my patient too different? Of which peculiarities of my patient am I ignorant, and how relevant are these peculiarities?'

In my study there were only two patients, Quintin and Cyril, for whom the anaesthetist decided not to proceed; both patients were deemed to be dying and likely to die 'on the table' if surgery proceeded. As predicted, both patients died in the ensuing few days. These were the anaesthetics that were never done; as such it cannot be said how the clinical course may have differed if these patients had gone to theatre. Death 'on the table' or shortly afterwards exposes the patient to the stress and discomfort of the anaesthetic and the surgery and if this is not counterbalanced by a suitable gain, it is deemed inappropriate. Trauma specialist nurse Eleanor Tobias reflected on a previous case when I asked her if she thought Cyril was likely to go to theatre:

**ET:** 'I don't think so, he's very sick. We might have to move to palliation. We took a patient like him to theatre a few months ago and I don't think that she died on the day of surgery, but she died the day after. I don't think we did her any favours, but you know... we don't have a crystal ball.'

**Trauma nurse specialist Eleanor Tobias, discussing Cyril, Mellbreak**

Here, for Eleanor, it appears that death on the day of- or the day following surgery renders surgery futile. Others resolved, as Johansen (2017) advocates, to continue on humanitarian grounds even when perioperative death was deemed to be likely. But as with those who opted to cancel operations, these decisions were not taken lightly:

**AH:** 'It's a difficult decision, isn't it? Some people would have cancelled her; made some poor bugger do her tomorrow: "oh her anticoagulation's got to be just right, heparin infusion until 3am." I've never been one to shy away, but I was thinking "what are we doing here?" She's got dementia, she doesn't get out, [chronic kidney disease], mitral valve replacement, poor [left ventricular function]. But it's recommended as a palliative procedure; the coroner's not going to be hard on you for having a go.'

**Consultant anaesthetist Arlo Holme, Diedre's anaesthetic, Longside**

**Me:** 'You seemed keen to avoid a cemented hemi?'

**MW:** 'Yes, but the surgeon wasn't having any of it. He said she'd get pain. I thought "she might not live long enough to get pain." But that's not something to say in the operating theatre. My wife actually asked last night "why are you operating?" Not in a harsh way. I said, "for pain."'

**Consultant anaesthetist Martie Winter, Brigid's anaesthetic, Mellbreak**

Despite differences in their chronological age (Diedre was 79 and Brigid was 102 – the oldest patient in the study), both patients in the above excerpts were undeniably frail – both had dementia and multiple comorbidities and were 'fully' reliant on carers. As demonstrated in the dialogue above, the anaesthetists caring for them were aware that the objective was not to restore a 'normal' level of function, these patients had long-since declined beyond what could be deemed 'normal.' Instead, the anaesthetic and the surgery are palliative in nature – aiming to relieve pain and restore dignity for what time the patient has left. As implied by the concerns of Martie's wife, the prospect of undergoing an operation in order to *reduce* pain in the near-term is counter to the public perception; elective surgery usually results in an initial worsening of pain with the aim of improving function in the longer-term (e.g. Mangione et al 1997). Likewise, the prospect of undergoing an operation to reduce the risk of morbidity and mortality for a frail patient may appear counter-intuitive. This issue was apparent in Diedre's case, when her son (her mental capacity consultee) confided in me that he was concerned because his mother had previously been declined a total hip replacement (at Longside Hospital) due to her frailty, and now the same clinicians were proposing to do what appeared to him to be the same procedure. Patient and

family understanding of the dynamic nature of risk is acknowledged as a key issue by Johansen (2017; p964):

‘Most patients with hip fracture have complex past medical and surgical histories, and some will have previously been told that they are ‘not fit’ for an elective operation. Thus, they and their families can become fearful when considering surgery for hip fracture, especially if clinicians start talking about the ‘high risk’ of anaesthesia.’

Arlo’s declaration that ‘the coroner’s not going to be hard on you for having a go’ provides an insight into how risk may extend to the clinical team. Deaths associated with anaesthesia are specifically cited as a reason for referral to the coroner in the *Guidance for Doctors Completing Medical Certificates of the Cause of Death* (Office of National Statistics 2010) and may therefore result in legal proceedings. However, in the same document there is reassurance (p4):

‘... for example, 75% of deaths with fractured neck of femur mentioned on the certificate are registered from the original [medical certificate of cause of death] following referral to the coroner, while only about 15% go to inquest, and 10% are registered after a coroner’s autopsy.’

The use of hip fracture as the representative example to illustrate that few coroners’ referrals lead to formal investigation is not explained in the document, however its effect is to mitigate some of the perceived risk for clinicians in deciding to proceed with surgery. This down-playing of possible medicolegal consequences does not however spare clinicians the emotional distress of being involved in a perioperative death. Returning to Quintin’s case, Briar confides that his reasoning has been influenced by a recent experience:

**BB:** ‘Last week, I did someone who died when I woke them up, from a [pulmonary embolism]. So, I’m a bit cautious.’

**AA:** ‘I can understand. They’ve been lay in bed for a week, and you regret not doing it. I hate that.’

**Consultant anaesthetist Briar Bonner and consultant intensivist Amos Ackerman, discussing Quintin, Mellbreak**

Briar's admission that he is 'a bit cautious' is used here to justify in-part his seeking a second opinion. Amos appears sympathetic to Briar's predicament, and despite knowing no more about the previous case that Briar has just told him, he suggests that the cause of the pulmonary embolism was not within Briar's control; Briar was an innocent victim of an inevitable event. Likewise, Briar is similarly considerate of the effect that the prior patient's death may have had on the theatre team – his first action when he came into work on the day in question was to present them with a box of chocolates by way of an apology for their involvement in the unsuccessful resuscitation: he felt responsible for the decision to bring the patient to theatre and wanted to make amends. This issue returns, with the dark humour typical of the NHS, during the team brief:

**BB:** 'This one, very high-risk. It's now or never basically.'

**SN:** 'Not another one like last week?'

**BB:** 'That's why I brought the chocolates.'

**SN:** 'We're going to bankrupt you with chocolates!' *They share a laugh.*

...

**BB:** 'I'll find out who the ITU consultant is...' *He wants to seek a second opinion... He picks up the phone and calls switchboard... As Briar holds on the phone, I hear the scrub nurse say to a colleague:*

**SN:** 'If this one goes off<sup>139</sup>, I'm never going to do a PFNA [*proximal femoral nail*] again.'

**Consultant anaesthetist Briar Bonner and the scrub nurse, team brief, Mellbreak**

Whether the recent death changed the eventual decision in Quintin's case is not clear – the same conclusion may have been reached in a different context. What is clear however is that recent events have an inertial effect and go on to impact subsequent practice by shaping knowledge. In Briar's case, his 'cautious' approach to risk is analogous to a 'recalibration', as described by *Migration Theory* (Rasmussen 1997, applied to health by Amalberti et al 2006), in which a safety-critical incident leads to

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<sup>139</sup> NHS slang for acute deterioration.

reflection amongst the clinical team, and a contraction of what are known as the ‘borderline tolerated conditions of use’: areas of practice that sit between what is universally deemed to be safe, and what is universally deemed to be forbidden. Following an incident, the ‘forbidden’ area temporarily expands, and the ‘borderline’ area temporarily contracts. Subsequently, over time, the borderline area re-expands until another incident provokes further recalibration (Figure 18).

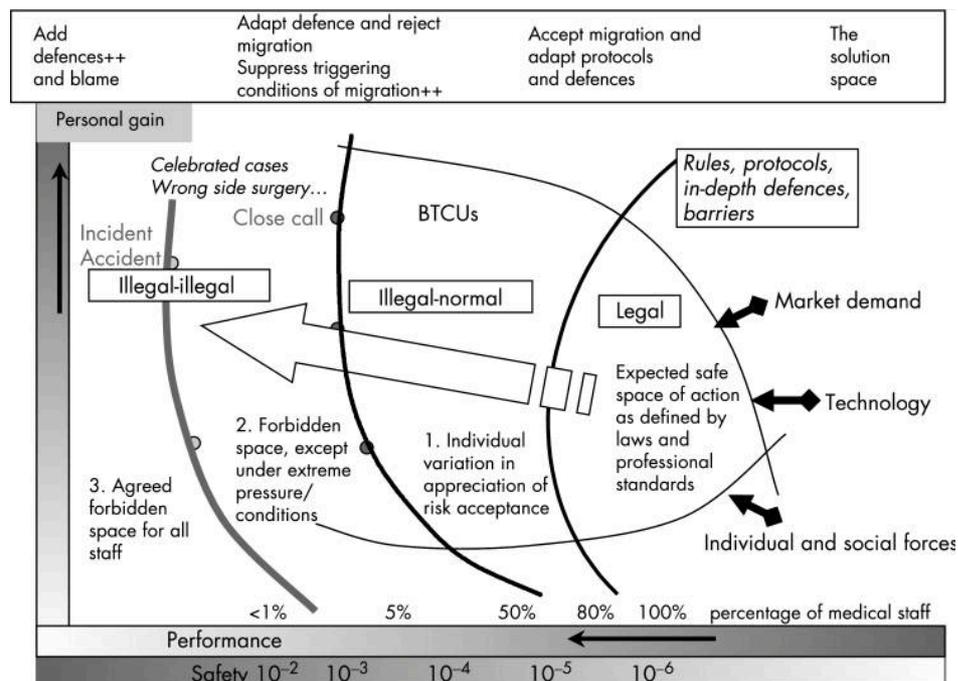


Figure 18: Amalberti's migration model

reproduced from Quality and Safety in Health Care, Amalberti R, Vincent C, Auroy Y, de Saint Maurice G, 15, i66-i71, 2006 with permission from BMJ Publishing Group Ltd

Though Amalberti describes practices that stray into the borderline area as *violations* – ‘deliberate deviations from standard instructions’ (p166), medical ethicist Nancy Berlinger (2016; p32) contends that such practices are actually *workarounds* – solutions which ‘get the job done when the rules do not match the situation at hand’. This resonates with the practice of hip fracture anaesthesia because it occurs in circumstances that in most other situations would be deemed unacceptable (see ‘cracking on’, Chapter 4). Expert trauma anaesthetists are cognisant, and sometimes

resentful, that they are compelled by their less-expert colleagues to operate at the borderline, as explained by Jonathan Sidney as he was preparing to anaesthetise Joy, a patient with a rare cardiac condition<sup>140</sup> who had been delayed for several days pending echocardiography despite cardiological advice that this was not required:

**Me:** 'She's a complicated patient.'

**JS:** 'Me, Linette, Stafford, Martie Winter... We all tend to...' *He's treading carefully, picking his words.*

**Me:** 'Attract these patients?' *Martie anaesthetised a patient over 100 yrs old last time I observed him; the last time I observed Linette she anaesthetised a cancer patient with fast atrial fibrillation.*

**JS:** 'Well, our colleagues find reasons not to do them, so they...' *He's not finishing his sentences – it's a delicate topic. He doesn't want to explicitly accuse his colleagues of cancelling challenging cases.*

**Me:** 'Accumulate for you?'

**JA:** 'Yes.' *He moves on.*

**Consultant anaesthetist Jonathan Sidney, discussing Joy, Mellbreak.**

### Procedure-Based Uncertainty

Though patient-based uncertainty is virtually ubiquitous in hip fracture anaesthesia, uncertainty regarding the procedure for which the patient is scheduled is manifest amongst anaesthetists. The procedure is analogous to what is termed the 'case' by Light (1979). The procedure-based uncertainty that I encountered is due in-part to anaesthetists' unfamiliarity with orthopaedic surgical techniques, but more substantially because there is significant variation in the duration of any given procedure. This was the most commonly-cited concern regarding low-dose spinal anaesthesia by the anaesthetists in my study. As White points out however (e.g. 2016c), a low-dose spinal<sup>141</sup> provides over two hours of surgical anaesthesia in hip fracture repair (e.g. Imbelloni et al 2014). This should be sufficient time to carry out

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<sup>140</sup> Ebstein's anomaly, a congenital abnormality of the tricuspid valve, can lead to cardiac failure and arrhythmias.

<sup>141</sup> <10mg bupivacaine.

the majority of primary procedures, with only complex surgeries lasting longer. However, the time that a spinal anaesthetic must last is not only the operating time; positioning the patient and reducing the fracture must also be accommodated. This time is often 'lost' when the operative time is discussed at the team brief, as neither the surgeon nor the anaesthetist believes that it 'belongs' to their practice<sup>142</sup>. Combined with the inherently unpredictable nature of trauma surgery, this has the effect of diminishing the faith that anaesthetists have in the abilities of their surgical colleagues to complete procedures in the timeframe offered by low-dose spinal anaesthesia, or in some cases spinal anaesthesia of any dose:

**MW:** 'I don't do ultra-low volume spinals, I need my anaesthetic to be practical. I can't go to all the effort of putting a spinal in only to have to do it again. This is a teaching hospital with full trauma lists, we don't get stuff done. I can't spend an hour in the anaesthetic room. That's the problem with the Peterborough model, it's not applicable in the real world.'

**Consultant anaesthetist Martie Winter, Brigid's anaesthetic, Mellbreak**

In the above excerpt, Martie justifies his choice of 3ml (15mg) of 0.5% heavy bupivacaine to provide spinal anaesthesia for Brigid – a 102-year-old patient undergoing a hip hemiarthroplasty. His assertion that 'the Peterborough model [is] not applicable in the real world' warrants further exploration.

### **Peterborough and 'The Real World'**

Peterborough is the city in which my grandmother lived until her death in 2012. As such, it is familiar to me – a place I visited frequently for the first three decades of my life. One of my final memories of Peterborough was visiting Peterborough City Hospital

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<sup>142</sup> This was a source of controversy relating to the *Christmas BMJ* paper 'Operating theatre time, where does it all go?' (Travis et al 2014), which studied the accuracy of time estimates at the team brief. This paper (written by orthopaedic surgeons), classified 'surgical time' as commencing only when the patient was draped, thereby assigning positioning, fracture reduction and skin preparation to 'anaesthetic time', a methodological detail to which anaesthetists Tavare and Pandit objected in their response (2014).

during my grandmother's terminal illness – it is a busy district general hospital with an overworked and understaffed elderly care unit, like every other hospital in which I have worked and very much 'the real world.' However, in the context of hip fracture anaesthesia 'Peterborough' is shorthand. It refers to the home institution of Richard Griffiths (see Chapter 3), who is known to anaesthetists as an advocate of low-dose spinal anaesthesia, nerve blocks, the avoidance of sedation, the maintenance of near-normal blood pressure.

'The Peterborough model' and similar references to Brighton and Nottingham (the hospitals where Griffiths' collaborators Stuart White and Iain Moppett work) are therefore often used to mean the ASAP standards and 'minimally invasive standardised anaesthesia for hip fracture' (White 2016d), which will be discussed in detail in Chapter 6. That the work of Griffiths and colleagues appears to have permeated the consciousness of the anaesthetists in my study is testament to the influence that they hold within UK anaesthetic community. By enshrining their approach in the standards laid down by the AAGBI (Griffiths et al 2011), and subsequently the ASAP (Boulton et al 2014), their preferred technique has become a yardstick against which other anaesthetics are measured. Whether Griffiths and colleagues' work is viewed positively or not depends on the concordance of participants' techniques with the standards that they helped to develop:

**VR:** '[ASAP standards] kind of fitted in with what I did or was happy to do from the research reading that I have and meetings that I've attended and discussions I've had with Richard Griffiths in the past. It seemed to me a reasonable thing to be doing. I'm not saying it's definitely the right thing but [we have decided to] move forward and try and deliver it consistently 'cause I do think if we're all trying to do a similar thing, then it makes it easier for all the staff involved in the hip fracture pathway.'

**Lead trauma anaesthetist Vernon Rowntree, introductory interview, Beckfoot**

**LP:** '... we don't buy into the [ASAP standards]. I mean, obviously they're all the standards on the sprint audit and I think that we don't agree with all of them... So, although there is a

preference for spinal... the dose they're suggesting... wouldn't work here for the duration that it takes to do our hips, including the positioning.... you'd end up with a really high conversion rate to GA, based on those low doses. So, that wouldn't work.'

**Lead trauma anaesthetist Linette Payne, introductory interview, Mellbreak**

**LP:** *Asks me about the study:* 'So are you trying to work out a standard way of doing hip fracture anaesthesia?'

**Me:** 'I'm not sure how possible that is.'

**JV:** *Refers to a recent editorial in the journal Anaesthesia "Standardising anaesthesia for hip fracture surgery" by White, Griffiths and Moppett.* 'There were some throwaway comments, like a hip fracture patient in Brighton is the same as a hip fracture patient in Nottingham. But they're different in Nottingham and Longside!'

**Consultant surgeon Lamar Porter and lead trauma anaesthetist Joshua Varnham, Renee's anaesthetic, Longside**

Joshua Varnham's objection to the ASAP standards is based on his belief that 'Longside patients' are different from those in places where the standards were developed. This 'difference' appears to be a cultural distinction rather than a medical one; it should be noted that in my observations (in north-west England) I saw no types of pathology or degrees of frailty at Longside that I didn't observe in Mellbreak or Beckfoot. This is likely to be because, unlike in cases of major trauma in which complex cases are transported to specific hospitals (e.g. McQueen et al 2015), hip fracture patients are simply taken to their local emergency department. Although all three of the hospitals in my study offered (different) specialist tertiary services, no patient participant had been transferred for specialist management from another trust.

Linette Payne's objection to the ASAP standards, also articulated by fellow Mellbreak anaesthetist Martie Winter (above) is different: it relates to procedure-based uncertainty. Anxiety regarding surgical duration appeared particularly prevalent at Mellbreak hospital, and as a result, low-dose spinal appeared to be performed only rarely. The only example that I observed was provided by Jonathan Sidney for Joy, the patient with Ebstein's anomaly. Though Jonathan was comparatively unfamiliar with

the technique, in this case he felt compelled to do it for reasons of cardiovascular stability:

**Me:** 'You mentioned "low-." What are you going to use?'

**JS:** 'Bupivacaine. I don't change the drug, I'm usually a high-volume man, but I'm concerned about haemodynamics, so I'm going to use a low volume on the bad side for five minutes.'

**Me:** 'How much do you usually use?'

**JS:** 'Three-point-five mils.'

**Me:** 'For her?'

**JS:** 'Two mils.'

**Consultant anaesthetist Jonathan Sidney, discussing Joy, Mellbreak**

For Joy's above operation, a DHS, Jonathan injected the spinal anaesthetic at 15:05, surgery commenced at 15:50, and Joy was transferred off the operating table at 17:07.

The operating surgeons were both trainees: Hedley, only weeks off completion of training (ST8), was supervising Kipling, a junior trainee (ST2). Though the anaesthetic proceeded uneventfully (no interventions were made to treat Joy's physiology), Jonathan's dialogue during the observation was increasingly characterised by references to what I thought of as a form of 'range anxiety' – a fear that the spinal would wear off before surgery was completed.

**JS:** Talks to me, quietly: 'I did make it clear on Friday I wanted someone senior to operate. I have pity for the trainee, he needs to learn...' *Kipling has been doing most of the operating. Jonathan leans past the drape and raises his voice a little so Hedley can hear him – 'I did want someone senior to do this. Spinal's wearing off.'*

**HH:** 'I'll finish it then.' *He takes over operating.*

**Consultant anaesthetist Jonathan Sidney and surgical registrar Hedley Huff, Joy's anaesthetic, Mellbreak**

Part of the mythology of Peterborough, and the root of some of the scepticism regarding the ASAP standards, is an understanding that procedure-based uncertainty is minimised there. It was a recurrent claim that '[Richard Griffiths] has a surgeon who can do a hip in half an hour.' Whether or not this is the case I cannot say, but the conference address given by Peterborough hip fracture surgeon Martyn Parker to the *Fourth Irish Hip Fracture Conference* (2015), in which he presented his eponymous

'rules of hip fracture surgery', included the statement that 'operations should be less than one hour.' Whether or not Parker follows his own rules is outside the scope of this study, but it is evident that the surgeon has an important impact on the uncertainty which anaesthesia must accommodate:

**Me:** '... do you have a standard dose for a spinal anaesthetic? What would you normally use in your own practice?'

**LP:** 'Yeah, I keep trying to go lower but 1- three mls is fairly standard for me, actually, but it depends on which surgeon I'm working with and what sort of operation they're doing.'

**Lead trauma anaesthetist Linette Payne, introductory interview, Mellbreak**

### **The Certainty Trough**

Although much of the expertise of the anaesthetist relies on the application of explicit and tacit knowledge to make predictions about how a patient will be affected by anaesthesia, uncertainties and singularities related to patients and procedures mean that the results and requirements of any given anaesthetic technique cannot be completely predicted. Every anaesthetic is therefore given in unique circumstances, 'untested' in the precise conditions in which it will be used. For this reason, every time an anaesthetic is done new knowledge is produced – the knowledge of how *that* anaesthetic performed for *that* patient.

Uncertainties in predicting the performance of an unproven technology were the subject of a study by sociologist Donald MacKenzie. In *Inventing Accuracy* (1990) he examined the design and development of guidance systems for nuclear missiles, which at the time of interest to MacKenzie relied primarily on inertial navigation: dead reckoning through the use of motion sensors. Through his analysis of written sources and interviews, he identified that individuals' uncertainty about missile accuracy related to their proximity to the development of guidance technology. Those committed to different technologies (i.e. piloted bomber aircraft) or excluded from

institutions where knowledge was produced expressed the highest degree of uncertainty regarding the capability of a guidance system to deliver a missile to the intended target. This was not unexpected given these respondents' distance from knowledge production and/or vested interests in alternative technologies. However, what MacKenzie found more surprising was that, amongst those committed to guided missiles, those directly involved in knowledge production – designers and engineers – expressed more uncertainty about its capabilities than those who were further removed – the users of the knowledge. He ascribed this finding to knowledge producers' appreciation of numerous contingencies and complexities; the ways that technology could fail, which was less apparent to those at a greater distance. He went on to suggest that a 'certainty trough' (Figure 19) may represent 'the distribution of certainty about any established technology.'

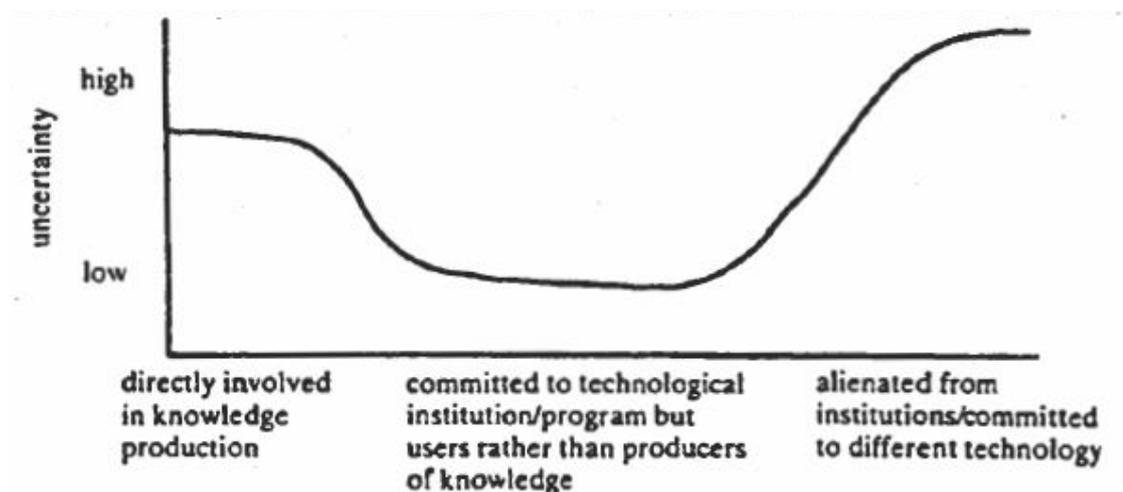


Figure 19: MacKenzie's 'Certainty Trough'  
(1990; p372), reproduced with the permission of MIT Press

Though perhaps an incongruous comparison, hip fracture anaesthesia and missile accuracy have a number of similarities when uncertainty is considered:

- Though on a profoundly different scale, both are high-stakes; error may inflict unintended death or injury.
- Two basic modes of delivery (each with numerous possible variations) are available to achieve the desired outcome: spinal and general in the case of anaesthesia, ballistic missile and piloted aircraft in the case of nuclear weapons.
- In the pre-operative condition, because of the complexities outlined above, each individual anaesthetic is untested. Just as nuclear missiles remain untested in 'combat conditions.'
- The information available to anaesthetists through monitoring is 'mediated' (Klemola and Norros 1997); the anaesthetic monitor is similar to the inertial missile guidance system in that it does not directly measure the majority of the parameters that are of interest to the anaesthetist, just as a guidance system does not directly measure the position of a missile. A sceptical approach to such information presented is well recognised in anaesthesia (Klemola and Norros 1997, Smith et al 2003b), and forms the basis of some of the arguments against guided ballistic missiles (MacKenzie 1990).
- The key actors in hip fracture anaesthesia: anaesthetists, surgeons and patients can be seen as analogous to the groups specified on the x-axis of Mackenzie's Certainty Trough, as they are progressively distant from the production of knowledge about anaesthesia.

There are however a number of important differences:

- A missile guidance system is a physical product, a 'black box'<sup>143</sup> that is materially available. Unlike many of the technologies studied by sociologists of technology, much of anaesthesia is intangible: drugs are injected or inhaled into the human body, distributed throughout its tissues, and in many cases, never seen again – they are metabolised and excreted as something else.
- Whilst a ballistic nuclear missile has never been fired at an enemy, hip fracture anaesthesia gets done many times every day. So, whilst hip fracture anaesthesia starts off untested, apart from those cases involving 'the anaesthetics that are never done', patients and practitioners are able to reflect on their anaesthetics post-operatively. This means that those people most remote from the production of knowledge in the pre-operative state develop a unique and intimate (if incomplete) knowledge of anaesthesia by experiencing its effects directly.
- Unlike inertial missile guidance systems, which are self-contained and do not rely on external sources of information once deployed, anaesthetists constantly monitor the patient during anaesthesia and may alter their anaesthetic accordingly – for example altering the concentration of volatile agent to 'lighten' or 'deepen' anaesthesia. An anaesthetic can therefore

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<sup>143</sup> According to MacKenzie, guidance systems are actually painted gold – highlighting their precious and fragile nature to maintenance crews.

undergo 'corrections' of a sort that are not available to many of the missiles described by MacKenzie (1990)<sup>144</sup>.

- The objective of a guidance system, to deliver a warhead to a given location, is relatively simple. There is less consensus about what an anaesthetic for hip fracture repair needs to do to be deemed 'successful'.

#### *Anaesthetists and Uncertainty:*

Pre-operatively, considering the question 'what would be a good anaesthetic *for this patient*', anaesthetists are manifestly aware of uncertainties, however this is mitigated to some extent by their prior experience, allowing a certain degree of prediction to occur, even if all that is predicted is unpredictability itself:

**MW:** 'It's not comfortable anaesthesia, it's [going to be] a bit veterinary in this case.'

**Consultant anaesthetist Martie Winter before Brigid's anaesthetic, Mellbreak**

Martie's use of the term 'veterinary' in his prediction of Brigid's anaesthetic is one of medicine's linguistic codes – it is an analogy often used in the paediatric context to describe dealing with a patient who cannot communicate their needs. Here, Martie is transferring it to the context of a patient with dementia to confer the same notion. This appreciation of unpredictability maps to the first point on the graph – moderate uncertainty amongst anaesthetists. But how do patients and surgeons approach the same question? The degree of certainty displayed by the other stakeholder groups, patients and surgeons, seems to be analogous to MacKenzie's Certainty Trough (Figure 20).

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<sup>144</sup> MacKenzie describes that stellar guidance (calculating location based on the position of the stars) were developed to supplement 'black boxed' inertial guidance systems for the purpose of course corrections.

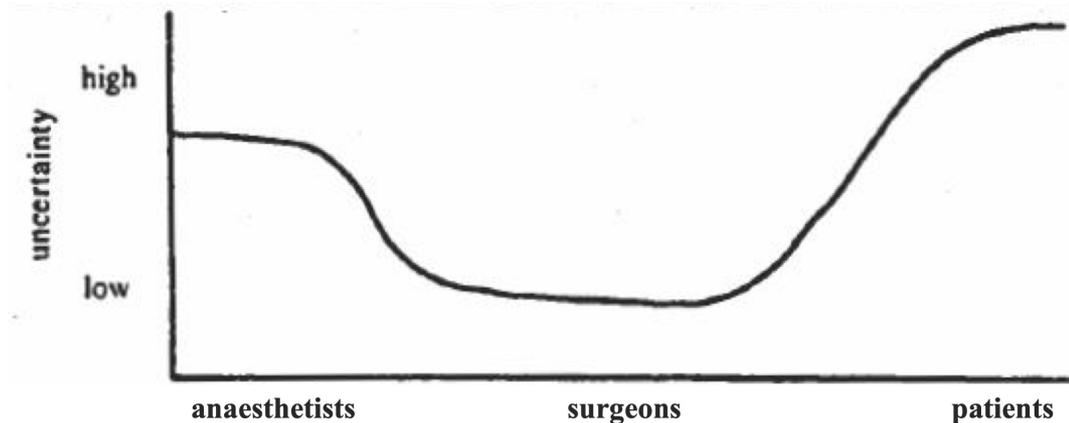


Figure 20: Pre-operative uncertainty about 'good anaesthesia'  
adapted from MacKenzie (1990; p372).

### *Patients and Uncertainty:*

Having spent a decade immersed in the world of clinical anaesthesia, I brought numerous preconceptions to this study that were rooted in my clinical role. One such presumption was that patients would have spent at least some of the time prior to their pre-operative assessment considering their anaesthetic, the risks that they may undertake, and the options available to them. After all, if I was in that situation it is exactly what I would do. However, I was taken aback by how far this was from the reality. Except for in unusual situations, such as that of Ivan, who had a pre-existing interest in anaesthetic agents, I found that in my pre-operative interviews with patients, conducted prior to the anaesthetist's visit, my questions about anaesthesia were seen as something of a novelty:

**Me:** 'So what are you expecting from your anaesthetic for this operation?'

**Ed:** 'The anaesthetic? [*mild surprise - as if she's not given it any thought*] I reckon I'll just have that and take it and I'm not sort of over worried or anxious about that. Hopefully it will work well.'

**Me:** 'And do you have any hopes or expectations about your anaesthetic? I mean what do you hope the anaesthetic will be like?'

**Ed:** 'I don't know very much about it. I mean I've seen them, I've seen films of them [**Me:** Yeah] and so-on and so-forth and [the anaesthetists] would not be doing it, if [they] didn't think it was pretty safe and successful normally.'

**Me:** 'Okay.'

**Ed:** 'I just hope I'm right.'

**Me:** ‘... what do you think a good anaesthetic would involve? What would be a good anaesthetic to you?’

**Ed:** ‘Just take the medication and just hope that it’s going to work and hopefully that will be it.’

**Excerpt from pre-operative interview with Edith, Longside**

In the above exchange, which was typical of the dialogue of the pre-operative interviews, Edith appears not to have considered anaesthesia up to this point. Indeed, I suspect that she was not aware of the most basic principles about how an anaesthetic is done; her supposition that she will have to ‘take the medication’ implies that she is expecting a tablet or suspension, not the injected or inhaled agents that are used in anaesthesia. At times like this I resisted the temptation to offer additional information about anaesthesia as I wanted to see how patients’ pre-existing knowledge was handled in the consent process. However, even though I was making a conscious effort to avoid giving additional information, I became concerned as the project progressed that even by asking patients about anaesthesia before their anaesthetic review, I was offering them a ‘primer’ that they would not otherwise have had.

Patients’ high levels of uncertainty were therefore based on being ‘alienated’ from pre-existing knowledge about anaesthesia (Mackenzie 1990), not as the result of deliberate attempts to exclude patients, but simply because anaesthesia had hitherto not been considered as anything other than an incidental facilitator of surgery<sup>145</sup>. Except in exceptional circumstances, therefore, patients had little basis on which to consider what constituted a ‘good anaesthetic’ prior to the commencement of the consent process.

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<sup>145</sup> The RCoA seems to be aware of this problem. For example, it includes pages entitled ‘What is anaesthesia?’ and ‘Who are anaesthetists?’ in the area of its website which is directed at patients and carers (<https://www.rcoa.ac.uk/patients-and-relatives>).

*Surgeons and Uncertainty:*

Whilst patients are the recipients of anaesthesia, surgeons could be said to be its 'users' – an anaesthetic is performed in order to allow the patient to tolerate the work of the surgeon. Surgeons have a knowledge of the principles of anaesthesia, and through working alongside anaesthetists they have familiarity with its practice. However, because of the structure of medical training mandates gaining experience of surgery whilst gaining experience of anaesthesia is optional (e.g Health Education North West 2017) it would be unusual for a surgeon to have worked in the anaesthetic setting. Thus, surgeons' knowledge of anaesthesia is typically as a relative 'outsider', and they are not involved in generating knowledge of anaesthesia in the same way as their anaesthetic colleagues. This comparative distance from knowledge production resulted in reductionist and assured views about 'the good anaesthetic': two surgeons (one at Mellbreak and one at Beckfoot) even took it upon themselves to attempt to pre-empt the results of the study by annotating the participant information sheet that accompanied their consent form, which carries the short title: 'What is a good anaesthetic for hip fracture surgery?':

**NB:** 'Shall I tell you what the answer is?'

**Me:** 'Ok.'

**NB:** *Takes out his pen and writes 'GA' on his information sheet just below the title – he's responding to the question. He hands it back to me. 'They spend so long in there. Sometimes two hours! If we did GA's for every patient, we could get more done. All they need is to have their hip fixed quickly.'*

**Consultant surgeon Nolan Brooke, Beckfoot**

Nolan's philosophy is consistent in-part with 'cracking on' – the anaesthetists in this study would not tend to disagree with the principle of repairing patients' fractured hips as quickly as possible. However, they would disagree with the assertion that '*all* they need is to have their hip fixed quickly' [emphasis added]. The reduction of the

measure of anaesthetic success to a single variable – speed of delivery – diminishes the role of the anaesthetist to that of a technician and does not reflect an understanding of the challenges of hip fracture anaesthesia. It does however illuminate a compromise that occurs in our resource-limited system: spending more time on one case reduces the available time for subsequent cases.

Despite often holding strong opinions about what constitutes ‘a good anaesthetic’, typically (but not exclusively) expressing a preference for GA, which was viewed as more consistent and faster to induce, surgeons did not tend to explicitly attempt to influence anaesthetic practices. Implicit criticism, especially of prolonged time spent in the anaesthetic room, was however commonplace – the ‘eye at the anaesthetic room door’ to check on progress was the typical expression of this, and anaesthetists were aware of its significance. Sometimes surgeons saw it as necessary however to make formal complaints about anaesthetic time, as illustrated by Sam Stone, clinical director of anaesthesia at Longside:

**SS:** ‘... I often get the odd email from orthopaedic surgeons giving me feedback on the service they’ve received particularly over the weekend from the [trauma anaesthetists] and I recall one particular instance about four or five months ago when a consultant who hadn’t done the list for [a long time] took a very long time in the anaesthetic room with two difficult patients and I got a complaining email back from the consultant surgeon involved with the list and also his clinical director complaining that “this was unacceptable and they’ve got a lot of work to do and they needed to get through it.”’

**Me:** ‘Yes’

**SS:** ‘When I investigated things a bit further it turned out that both patients were extremely difficult with some significant comorbidities; one had had an MI recently for example, and the other had a critical aortic stenosis and they had put art lines in and a central line and I think both went to HDU afterwards as well. So, you get these murmurings about the duration of time being an important factor in terms of the feedback that you get from the orthopaedic lot.’

**Clinical director of anaesthesia Sam Stone, introductory interview, Longside**

As might be expected, anaesthetists exhibited a reciprocally reductionist view of orthopaedic trauma surgery – a mirror to surgeons’ views about anaesthetic practice.

Again, time was often the point of contention. In essence, all parties agreed that the

process of hip fracture repair should be expeditious, but had little sympathy for their colleagues taking any longer than they deemed appropriate:

*Pre-op:*

**TC:** 'But the other problem is, here they take too long. An hour and a half to do a DHS!'

*Post-op: (procedure lasted approximately 1hr)*

**TC:** 'Can you believe it's taken 'til now? See what I mean? A DHS!'

**Staff grade anaesthetist Tobias Clifford, Linda's anaesthetic, Beckfoot**

### **Institutional Uncertainties**

So far in this chapter I have discussed anaesthetists as a group – blending data from Mellbreak, Beckfoot and Longside. Whilst the basis for uncertainty, and anaesthetists' awareness of it, appears to be universal, how this manifests in practice is different. The most obvious difference between the institutions (which formed the basis of my sampling strategy) is that at Longside they do general anaesthesia, at Beckfoot they do spinal anaesthesia, and at Mellbreak they do both (Figure 21). How do anaesthetists justify such divergence when the conditions of uncertainty that they face appear largely to be universal? In order to address this question, I will describe the uncertainties regarding mode of anaesthesia at each institution.

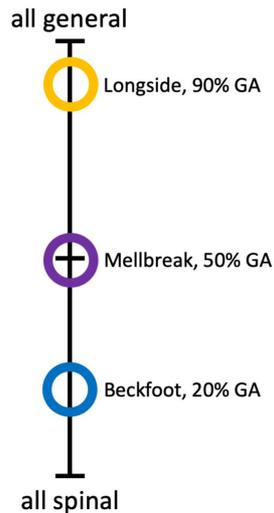


Figure 21: Anaesthetic mode  
(to the nearest 10%), NHFD data (Boulton et al 2014, 2015)

*'Predominant Mode' Institutions: Longside and Beckfoot*

According to the national hip fracture database (Boulton et al 2014, 2015) approximately 90% of hip fracture surgery is undertaken under general anaesthesia at Longside Hospital, whereas at Beckfoot approximately 80% of hip fracture surgery is undertaken under spinal anaesthesia (Figure 21). In this study, I observed 16 anaesthetics at Longside and 17 at Beckfoot. Of those, one Longside anaesthetic (Leonard) was a spinal, and one (Maria) was an attempted spinal, which was abandoned and converted to a general. Two Beckfoot anaesthetics (Heather and Ralph) were GA. These 'predominant mode' institutions therefore performed as expected. When the usual mode of anaesthesia was not performed the cases were all unusual in some way. At Longside, Leonard and Maria were both anaesthetised by Betsy Fox, who seldom worked in the trauma theatres but was forthright in defending her practice:

**Me:** *I explain that this is the first spinal anaesthetic that I've seen at Longside. 'Do you do spinal a lot?'*

**BF:** 'Why wouldn't I? There is me and one other anaesthetist, Dr Suggitt. If we can't do a spinal it can't be done.' *She takes obvious pride in her ability with spinal anaesthesia.* 'My colleagues here can't do it in elderly patients. You have to go lateral and you have to go paramedian,'  
**Consultant anaesthetist Betsy Fox, Leonard's anaesthetic, Longside**

Apart from in exceptional clinical circumstances such as severe respiratory disease, as discussed by Arlo Holme in Chapter 4, spinal anaesthesia at Longside appears only to be routinely done by those anaesthetists such as Betsy who are comparative 'outsiders', a possibility alluded to by Clinical Director Sam Stone:

**SS:** '... There are a couple of anaesthetists [who] are chronic pain anaesthetists that cover the list.

**Me:** 'Ok.'

**SS:** 'And I suspect but I am not sure they might tend towards a regional technique more than the others.'

**Clinical director of anaesthesia Sam Stone, introductory interview, Longside**

The use of GA did not appear to be as a result of 'outsider' clinicians at Beckfoot; unusual clinical circumstances appeared to be the sole motivation. In Ralph's case, he was taking clopidogrel, an antiplatelet drug which theoretically increases the risk of developing a haematoma within the vertebral canal following spinal anaesthesia. At Beckfoot, the use of clopidogrel is not in itself seen as an 'absolute' contraindication to spinal anaesthesia, despite AAGBI guidelines which suggest that the risk of epidural haematoma remains elevated for seven days following cessation of the medication (Harrop-Griffiths et al 2013)<sup>146</sup>: I observed several cases in which the risk was felt to be outweighed by the perceived benefits of spinal anaesthesia. However, in the absence of a clear benefit, Tobias was more cautious about stepping outside the guideline's advice:

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<sup>146</sup> These guidelines are about regional anaesthesia in general; according to the SIGN guideline (2009) on hip fracture, spinal anaesthesia is contraindicated only for patients who take two or more antiplatelet agents.

**TC:** 'I keep getting patients like this recently.... He's on clopidogrel but no respiratory distress, so I don't see why I should take the risk [of epidural haematoma]. If they're like: [*He coughs and wheezes in impersonation of respiratory morbidity*] I think "fuck it, I'll do a spinal."'

**Staff grade anaesthetist Tobias Clifford, after assessing Ralph, Beckfoot**

In Heather's case the exceptional circumstance was that she was 24 years old – the youngest patient in the study by several decades. In common with most other hip fracture patients her injury was low-energy trauma, however the underlying pathology was not osteoporosis; in her case it was a congenital form of rickets – meaning that although her bones were fragile, she was not globally frail. Consultant anaesthetist Brent Dabney discussed the anaesthetic options:

**BD:** '... The other way is to make everything numb from the waist down. We can do it awake or give you some sedation, make you a bit dozy...'

**He:** *Cuts him off:* 'No, asleep.'

**BD:** 'Ok, we can do that for you. We sometimes push the numb-below-the-waist with the old, frail people. But with you the risks are about the same.'

**Consultant anaesthetist Brent Dabney, talking with Heather, Beckfoot Hospital**

He later explained the choice of anaesthetic mode to me:

**BD:** 'She's young and fit. Most of the talking about what makes a good anaesthetic for fractured NOF is around frail, elderly, likely to have worse outcomes with general anaesthetics, especially low blood pressure. Low blood pressure means hypoperfusion. And maybe there's an effect on the brain. She is twenty-five, this is not my fractured NOF anaesthetic. She wanted a GA and if I was in her situation I would want a GA. I wouldn't want to roll onto my fractured hip; I wouldn't want to sit up. She's intubated because she described fairly significant reflux. If she hadn't, she'd be on an LMA but it's no big deal intubating her. The cardiovascular effects of raised intrathoracic pressure don't matter for her. If she was frail, elderly, I may have done an LMA, gas induction. But I'd have been more keen for a spinal...'

**Consultant anaesthetist Brent Dabney, discussing Heather, Beckfoot Hospital**

Brent's explanation of why 'this is not my fractured NOF anaesthetic' provides insights into how, for Brent, frailty closes down options that would otherwise be suitable, such as endotracheal intubation and general anaesthesia. He indicates that a certain amount of risk (i.e. of pulmonary aspiration with a supraglottic airway) or discomfort (i.e. in positioning the patient for the spinal) is justified to achieve the physiological goals that he believes are more relevant in frailty than in other cases. Indeed, he deems it worthwhile for his patients to go through pain that he admits that he himself

'wouldn't want'. At Longside, anaesthetists were aware of these compromises, and used the same issues to justify the alternative approach:

**CP:** 'I've done this list since 2011. I always do the same. I just do what Hiram Niles does. They all get a GA, they all get a tube, they all get a fascia iliaca block with a blunt needle. I don't do spinals. I think it's cruel to move someone with a broken hip onto their side. I don't even move them in the bed. I GA them and drag them into the right position to ventilate. She [Nancy]'s got metallic heart valves and bronchiectasis so she might have been a candidate for a spinal, but not while she's fully anticoagulated. I know Richard Griffiths is fond of spinals, but I object for ethical reasons. And people say to move them you give a bit of ketamine, a bit of fent[anyl], you might as well give them a GA!'

**Consultant anaesthetist Conor Paris, prior to assessing Nancy, Longside**

Here, Conor is advocating a similar technique to the one that Brent perceives as unsuitable in the hip fracture context: GA with endotracheal intubation. And although he alludes to the benefits of spinal anaesthesia for a patient with respiratory illness (bronchiectasis), to Conor and his colleagues the potential for pain during positioning rules spinal anaesthesia out 'for ethical reasons'. This 'claiming' of the various advantages and disadvantages of either anaesthetic mode was recurrent at both Longside and Beckfoot, where anaesthetists were keen to extol the virtues of their institutional practice, whilst diminishing the value of the other option.

What was demonstrated at Longside and Beckfoot is what Light (1979; p313) describes as the adoption of 'a "school" of professional work'; providing 'answers, in the form of philosophies or beliefs, to the unresolved problems that limited knowledge produces.'

At Longside, anaesthetists united around the practices of senior consultant colleagues, in particular Hiram Niles (see Conor, above), and Duncan Myers, as explained by clinical director Sam Stone when I asked him about anaesthetic technique:

**SS:** 'It's very much left to the discretion of the individual anaesthetists, we've not gone down the route of saying we will all do things the same way but I think most anaesthetists here would probably anaesthetise people in the way I've described; GA plus a regional block and I think the reason for that is cultural.'

**CS:** 'Yes.'

**SS:** 'There are one or two significant influences in the department who have done orthopaedic trauma for a long time and they're very respected individuals and I think as new consultants have been appointed and they've come in, they've, and even when they've been trainees on the rotation they've come in, they've seen the sort of technique that these people do and they've probably thought "that's not a bad way of doing it; if doctor so and so is doing it that way that looks pretty good."'

**CS:** 'Yes.'

**SS:** 'I think one of those cultural influences is probably Duncan Myers... He does a slightly different technique to me in that he will intubate them as I will, give them a GA but he will have them breathing spontaneously, I paralyse them, but he does it a very similar way. I think I have probably been influenced by him as well, when I was first appointed.'

**CS:** 'You mentioned there was more than one...?'

**SS:** 'Hyrarn Niles perhaps, but I think Hyram gives them a GA but he does it on a laryngeal mask which is something I don't do.'

**Clinical director of anaesthesia Sam Stone, introductory interview, Longside**

Considering Conor and Sam's accounts of the influence of these 'very respected individuals', their authority is evident. But it is also evident that what they *actually do* is uncertain to the colleagues who claim to emulate their practice: even at the most basic level, Conor believes that Hyrarn makes use of endotracheal intubation, whereas Sam is under the impression that he uses LMAs. If *what* anaesthetic is done is so uncertain, *how* it is done will be even more opaque.

In contrast, it was only at Beckfoot where there was any attempt to standardise anaesthetic practice through the use of a guideline. This document, developed by lead trauma anaesthetist Vernon Rowntree, can be found pinned to the wall in the anaesthetic department. It begins with the following statement:

'The anaesthetic department has agreed to support the adoption of the 2011 AAGBI Guideline "Management of Proximal Femoral Fractures" and subsequent 12 standards from the 2014 AAGBI "Anaesthesia Sprint Audit of Practice (ASAP)."

The guideline goes on to define twelve 'anaesthetic standards of care', derived from the ASAP (Boulton et al 2014; Figure 2). Styling these criteria as 'standards of care' is an assertive statement, which appears to be typical of Vernon Rowntree's approach, as alluded-to in this incidental conversation:

**YH:** ... to pass the time he talks to me about non-Luer spinal needles – needles that reduce the risk of accidental injection of drugs into the intrathecal or epidural spaces but haven't been universally adopted yet. He concludes: '... It takes a long time, we need someone to take the bull by the horns, someone like Vernon Rowntree.'

**TSW:** 'People do [criticise] him, but all the projects he takes on get done.' I wonder if they know that Vernon is my local collaborator on this project.

**ODP York Henry and a theatre support worker<sup>147</sup>, Beckfoot**

In addition to producing the guideline, Vernon produced a sticker for use on the anaesthetic charts which prompted anaesthetists to state whether each standard had been met, and to provide explanation if it had not. Though Vernon described the sticker as simply being an audit tool, to his colleagues it was variously a set of didactic instructions, an *aide memoire*, and a 'recipe' open to interpretation.

The factor that seemed to most influence the way in which Vernon's sticker was used appeared to be the anaesthetist's level of expertise in managing hip fractures: consultants who only covered the trauma list sporadically and trainees who lacked experience tended to seek out the sticker for use as an instructional tool, as in the below observation with registrar Brendon Mallory<sup>148</sup>:

**TSW:** Pops his head into the anaesthetic room, from theatre: 'Do you need bloods?' I guess they are trying to send and the ward has informed them that they are waiting for blood tests.

**BM:** 'Just send. Her K is three-point-two. We'll just pray it's higher.' He turns to me: 'It should be quite good for you to see me. I don't do these, it's been a while, you revert to what you know.... We need a...' He looks around, and then points to the poster on the wall which advertises the guideline sticker '... a "this is what we do here."'

**Anaesthetic registrar Brendon Mallory and a Theatre Support Worker, Queenie's anaesthetic, Beckfoot**

In the above episode, Brendon demonstrates uncertainty regarding the importance of hypokalaemia<sup>149</sup>. He had earlier requested a repeat set of blood tests to check if

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<sup>147</sup> Theatre support workers are members of the operating theatre team whose role is to support the scrub team. They are often 'commandeered' by the anaesthetic team to assist with moving and handling of the patient. At Beckfoot they demonstrated a particular expertise in sitting patients up for spinal anaesthesia.

<sup>148</sup> This was the only observation in the study in which the anaesthetist running the trauma list was a trainee.

<sup>149</sup> Queenie's serum potassium ('K') is 3.2mmol/l. The normal range is usually stated to be 3.5-5mmol/l.

Queenie's potassium had increased in response to therapy. However, the surgeon had requested that she be brought to theatre before her blood test results were available. Caught between expediting the surgery and waiting for the blood result he chooses the former but with obvious discomfort. Brendon is frank about his unease here and is keen to point out that not only is this outside his area of clinical interest, but that it has been a long time since his last hip fracture anaesthetic. Though he uses the sticker to guide his practice, his nickname for it is illuminating; by referring to it as 'a "this is what we do here"' he subtly undermines the notion that these are definitive 'standards' and implies that they instead represent something that is workable in Beckfoot; a perspective that Vernon Rowntree validated:

**VR:** '...the only reason it was chosen is 'cause when I came here everybody was giving spinals anyhow, and they generally agreed that, yeah, they liked the sound of Sprint and continued pushing it, yeah. So, I was coming into a culture where most people were doing spinals initially anyhow. Whereas, if I'd come into a hospital that had a culture of giving mostly GA's, it would have been a bit churlish to start [laughter] pushing the Sprint audit, may have come across a lot of obstruction. But there was no obstruction; people were just adapting the Sprint.

**Consultant Anaesthetist Vernon Rowntree, Focus group, Beckfoot Hospital**

Vernon's reflection here is consistent with Timmermans and Berg's (1997; p274) assessment that although new standards constitute an 'attempt to change and replace [existing] practices... the same standards need, to a certain extent, to incorporate and extend those routines.'

Expert hip fracture anaesthetists were more likely to take a flexible approach to Beckfoot's departmental standards. They base this on a nuanced understanding of the context in which the standards were developed: they are a standard approach to the 'standard' hip fracture patient having a 'standard' operation. In instances where these factors were deemed to be atypical, the standards were treated as open to interpretation, as in Brent's approach to 24-year-old Heather:

**BD:** *...shows me a page on the chart:* 'Have you seen these stickers we have for fractured neck of femur?'

**Me:** 'I have.'

**BD:** 'I'm going to fill one of those in, make it look like I don't give a shit.' *As he goes through the sticker, he narrates his answers:* 'Consultant... Spinal considered, but GA, patient's choice... Low dose... [*He ticks "N/A"*] Opiates in spinal, N/A... Sedation N/A... Supplemental O<sub>2</sub>, done... Inhalational induction not done... Spontaneous ventilation contra-indicated... Nerve block done... Spinal and GA not combined, drops in BP avoided... [*He ticks the box labelled "attempted"*] BCIS N/A.' ...

**Me:** 'Can I see one of the stickers?'

**BD:** *Shows me:* 'We did this in response to a [external] review, which was in response to an increased mortality rate. Amongst the anaesthetists we privately agreed that anaesthetics were nothing to do with it, but you've got to show willing... This lady is an example of why these standards should be seen as guidelines, or why the anaesthetists for these patients should be people who will treat them as guidelines...'

**Consultant anaesthetist Brent Dabney during Heather's anaesthetic, Beckfoot**

Here, Brent's dialogue warns of some of the problems of attempting to standardise care: that the desire to be seen to 'show willing' may lead to un evidenced practices being legitimised and applied without consideration. Indeed, the effect of defining standards as an enabler of audit may lead to deviation from the standard (as in this case) being interpreted as substandard care. These pitfalls, he contends, are a principal justification for consultant-led anaesthetic care: with seniority comes the perspective, and the authority, to treat such standards as advisory rather than compulsory.

The function of the establishment of 'schools of work' (Light 1979) at Beckfoot and Longside is to reduce uncertainty by producing a 'collective rationale' on an institutional level, even if there is not one to be found in the wider world. The resultant confidence in the predominant technique, and a reciprocal lack of confidence in the alternative was manifest in consent conversations, where it was common for the alternative technique to be devalued if it was mentioned at all:

**JV:** 'We're going to fix your hip. You've had your other hip done. How did they do that? An injection in your back?'

**FI:** 'An injection in my back.'

**JV:** 'Have you had general anaesthetics? You know, the normal anaesthetic where they put you out?'

**Consultant anaesthetist Joshua Varnham, talking with Florence, Longside**

**NS:** 'We can do these with "off to sleep" but we think spinal is safer. You've got problems with your heart...'

**Je:** 'Have I?' *This is clearly news to her.*

**NS:** 'Yes. Going off to sleep can put a lot of strain on your heart...'

**Anaesthetic SHO Nicholas Steele, talking with Jean, Beckfoot.**

In the above cases, two approaches that, to use Brent's phrase, 'push' a given mode of anaesthesia are demonstrated: Joshua normalises general anaesthesia, thus implying that spinal anaesthesia is in some way abnormal even though Florence had undergone spinal anaesthesia for a similar procedure in the past. Nicholas is more explicit, suggesting that spinal anaesthesia would be safer in Jean's case, despite there being little evidence that Jean's comorbidities (atrial fibrillation and ischaemic heart disease) are associated with worse outcomes in general anaesthesia (e.g. Kettner et al, 2011). I did not observe any deliberate attempt to mislead patients in such instances, rather this appears to be an unconscious expression of institutional norms, a benign attempt to do what is believed to be best. However, because of their pain, fear and high levels of uncertainty about 'good anaesthesia', patients are not equipped to negotiate (discussed in detail in Chapter 7): in every case where I observed one mode of anaesthesia being promoted (explicitly or implicitly) by the consenting anaesthetist at Longside and Beckfoot, the recommendation was followed.

#### *Mixed-Mode Institution: Mellbreak*

According to the NHFD (Boulton et al 2014, 2015) Mellbreak Hospital undertakes an approximately equal number of general and spinal anaesthetics (Figure 21). In this study I observed 14 anaesthetics at Mellbreak, of which four were spinal anaesthetics and ten were general anaesthetics. Though my study was not designed to make any statistical inferences about anaesthetic mode, this 2.5:1 preponderance of general anaesthesia amongst my data was somewhat surprising – was this simply an anomaly

or a result of my purposive sampling strategy?<sup>150</sup> I am unable to say; however what is evident is that the confident positions regarding anaesthetic mode demonstrated at Longside and Beckfoot are not taken at Mellbreak. Here, uncertainty extends to the consent process: though general anaesthesia was predominant in my data, doubts were frequently expressed as to its superiority:

**EA:** 'So a spinal would have been better for him, but he was quite clear about it. It's not clear-cut for me, I didn't try to persuade him. I don't like persuading people. If you've ever had a minor complication you think "thank god I didn't talk him into it!"'

**Consultant anaesthetist Elroy Ashworth, Ivan's anaesthetic, Mellbreak**

The most notable example of uncertainty regarding mode of anaesthesia that I encountered at Mellbreak was in the pre-operative assessment and consent of Gloria, who was blind and did not speak English<sup>151</sup>, and had been listed for a hemiarthroplasty<sup>152</sup>. Because of limitations in theatre capacity and problems booking an interpreter her operation was postponed twice before she was taken to theatre on the third day of her admission. On each day there was a different consultant anaesthetist in the trauma theatre. On the third day I accompanied Darin Garnet, the anaesthetic registrar, to review Gloria. He had been on the trauma list yesterday and had therefore met her already. I asked about yesterday's plan:

**DG:** 'A spinal, with the interpreter in theatre.'

**Me:** 'Why a spinal?'

**DG:** 'Three reasons: pain relief post-op, because she's blind to reduce the opiates and reduce the risk of delirium, and also she has a potentially difficult airway. Her mouth opening's not great. If we needed to convert to a GA we were going to have the McGrath and a fibre-optic available.'

**Anaesthetic registrar Darin Garnet, before reviewing Gloria, Mellbreak**

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<sup>150</sup> This pattern does not represent a transition to a more GA-predominant approach at Mellbreak: The NHFD dashboard ([www.nhfd.co.uk/dashboards](http://www.nhfd.co.uk/dashboards)) indicates that the ratio of spinal to GA has been maintained from the time of the study to the time of writing (April 2019).

<sup>151</sup> I was able to 'commandeer' Gloria's NHS-funded interpreter to translate the consent process for my study, and one of the trauma nurses acted as a witness.

<sup>152</sup> An operation in which the femoral head and neck are replaced with a prosthesis. Used to repair intracapsular hip fractures.

Darin went on to consent Gloria for spinal anaesthesia via the interpreter. However, I had talked to the consultant anaesthetist Elroy Ashworth earlier in the day and, despite the very reasonable justification for spinal anaesthesia articulated by Darin<sup>153</sup>, I was aware that Elroy favoured a GA:

**EA:** 'I'm just going to do a GA for her. *She* might be able to cope with a spinal, but she's blind and with the communication difficulties, I couldn't!'

**Consultant anaesthetist Elroy Ashworth, discussing Gloria, Mellbreak**

If I was present at Mellbreak as a clinician I would have taken Darin aside and informed him of Elroy's plan, however as a researcher I was interested to see how this real-world situation would be reconciled. Though I felt uncomfortable allowing Darin to waste his time and get himself into an embarrassing situation, I decided to 'play dumb' and follow him back to theatre. I went to make myself a cup of tea whilst he reported back to Elroy – I didn't want my omission to be revealed. A few minutes later Darin came to find me in the coffee room:

**DG:** 'The boss wants to do a GA. Do you want to come?' *He looks exasperated. He's going to have to go back to the ward and explain that the plan has changed. I tag along and we chat on the corridor on the way back to the ward:*

**Me:** *I continue to play dumb:* 'So he wants to do a GA?'

**DG:** 'He used the same justification but took a different spin on it. He thought that because she's blind there would be communication difficulties and she'd be better asleep, also there's a murmur. We don't know if it's [aortic stenosis].'

**Anaesthetic registrar Darin Garnet, before reviewing Gloria (again), Mellbreak**

Darin returned to the ward and explained that the plan had changed – he also asked Gloria specifically about chest pain and syncope – symptoms of severe aortic stenosis.

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<sup>153</sup> Opiate use, advanced age, and sensory impairment are all risk factors for delirium (e.g. Ahmed et al 2014, Yang et al 2017).

She revealed that she sometimes gets chest pain when she climbs the stairs. On the way back the theatre I asked Darin about the pre-operative assessment:

**Me:** 'Do you find it difficult, when the plan changes?'

**DG:** 'Yes I do, because at the end of the day it's just another consultant's opinion. And also, yesterday I took a history and she told me she didn't have chest pain or breathlessness. Today she tells me she does, and I find myself veering towards general anaesthetic and A-line. When the story changes you look like an idiot.'

**Me:** *I empathise with Darin here – we've all had this experience – I share some stories from my days in acute medicine, where patient's histories seemed to change every time they were taken.*

**Anaesthetic registrar Darin Garnet, after reviewing Gloria, Mellbreak**

Darin's concern here is that his credibility has been undermined by uncertainties related to both the patient and his consultant colleagues; as a registrar he lacks the agency to make decisions when working with a consultant, and in the Mellbreak context he was unable to predict Elroy's plan – corroboration of Longside anaesthetist Vernon Rowntree's contention that 'If we're all trying to do a similar thing, then it makes it easier for all the staff...'

Should ease for the staff be the primary consideration, or should the needs of the patient take precedence? Proponents of standardisation argue that the two are inextricably aligned, that if practice is made 'easy' for staff, they provide safer, better-quality care. So, is Mellbreak simply a free-for-all? One consultant's opinion colliding destructively with another's with no institutional norms to guide practice? Darin's exasperated complaint may suggest so, however my analysis suggests that, like Beckfoot and Longside, Mellbreak has also adopted a school of professional work, but Mellbreak's 'school' is not defined chiefly by mode – rather a version of patient-centredness is the defining feature. Not in the sense that it is dominated by patient opinion, but in that an individualised plan is formed for each case, even if it involves sacrificing what the anaesthetist feels would be the better mode of anaesthesia (e.g.

Ivan), or trying out an untested technique (e.g. Joy). Martie Winter, explained this approach:

**Me:** 'Would you say that you favour one mode of anaesthesia over another as a rule?'

**MW:** 'Absolutely not... I do have an issue with phrases like "I always do" or "just because" or "we'll get away with X, Y, Z." It's not that. It's each person is different, each case is different, each surgery is different and I've worked in it long enough to see all the differences and know that there is no "one size fits all" whatsoever. I'm very much against that.'

**Consultant anaesthetist Martie Winter, introductory interview, Mellbreak**

### **Uncertainty and the Good Anaesthetic**

Arising from their interview-based study of 'expert' anaesthetists, Klemola and Norros (1997) describe two orientations in relation to work: those with a 'realistic' orientation recognise the uncertainties of anaesthesia and adopt a 'communicative relationship' with the patient in order to accommodate their unique characteristics. Conversely, anaesthetists with an 'objectivistic' orientation did not recognise uncertainty and provided a 'deterministic implementation of a preoperative plan', without considering individual patient factors. In common with the findings of Smith et al's ethnography of expertise in anaesthesia (2003a), I found little evidence of an 'objectivistic' blindness to individuality. The anaesthetists in my study work *with* and *on* uncertainty in its many forms: patients present unique medical challenges, communication difficulties lead to lost diagnoses, surgeons take longer than expected and procedures go wrong. This explains why expert anaesthetists, the producers of anaesthetic knowledge (MacKenzie 1990), remain somewhat uncertain about the good anaesthetic.

When faced with the challenge of how to deal with uncertainty, anaesthetists at the three institutions in my study acted differently: at Mellbreak, anaesthetists demonstrated a patient-centred approach and were prepared to be flexible in their provision of anaesthetic mode, tending to select what they deemed to be best for the

patient even if at times it made them and their colleagues uncomfortable. Anaesthetists at Longside and Beckfoot adopt schools of practice based on mode, and exhibited high levels of confidence in their preference, to the extent that clinicians were prepared to 'push' patients during the consent process. Superficially this may appear to be what Klemola and Norros may consider 'objectivistic'. However, I would contend that an objectivistic stance was not truly demonstrated: though anaesthetists consistently provide their institutions' predominant mode of anaesthesia at Longside and Beckfoot, the way that anaesthetists actually 'do' their anaesthetics is highly varied. Therefore, even in the institutions that superficially appear to standardise a patient-centred approach is often adopted in order that uncertainties can be mitigated. This means that classifying anaesthesia only by mode does little to represent practice – it presents a veneer of uniformity even when variation is ubiquitous. In the next chapter I will unpack this variation, and in doing so I will propose an alternative classification of anaesthetic technique – one that is not based on the mode of anaesthesia, but on the ideas that underpin practice.

## Chapter 6: A Good Anaesthetic... Treads Lightly

“Everything should be as simple as it can be, but not simpler” – a scientist’s defense of art and knowledge – of lightness, completeness and accuracy.’

**Louis Zukofsky (1950; p180), citing a quotation attributed to Albert Einstein**

In this chapter I revisit White’s ‘minimally invasive standardised anaesthesia’ (2016d) and ask to what extent it is applied in hip fracture anaesthetic practice. I will unpack what ‘minimally invasive’ means to anaesthetists, examine the ways in which it is enacted, and explore why it is not always done. Here, I offer an alternative approach by which anaesthesia can be understood and suggest a new way in which hip fracture anaesthesia may be investigated in future research. Not in terms of modes of anaesthesia, but in terms of the ideologies which underpin the way that anaesthetic technique is done.

### The New Surgery

‘Minimally invasive’ is an often-used phrase in medical practice. It is defined by Collins Dictionary (2018) as:

‘(of surgery) involving as little incision into the body as possible, through the use of techniques such as keyhole surgery and laser treatment.’

The phrase was coined by urologist John Wickham, lauded as ‘British urology’s greatest innovator’ due to his role in developing surgical techniques that minimised tissue trauma (Goddard, 2017). His early innovations were motivated by a desire to change the way that renal stones were removed, as he described to fellow urologist Dominic Hodgson (2012; p112):

‘I was appalled by the way surgery for stones was done. The standard operation for a staghorn calculus was to open up the patient, mobilise the kidney and get the assistant to compress the pedicle with his fingers whilst the kidney was split in half. The stones were then picked out and the kidney put back together and stitched up like a weekend sirloin!’

Wickham's innovations lead to a demonstrable reduction in mortality, morbidity and recovery time (Hodgson 2012). However, despite these benefits for patients and the health service, Wickham's approach was derided by many of his colleagues, who claimed that it was simply 'not surgery'. Medical historian Sally Frampton and professor of surgical education Roger Kneebone (2016) situate this attitude within a tradition of scepticism towards minimally invasive techniques: surgeons generally wanted the best access to the organ in question and 'keyhole surgery' made access convoluted. It was in this context that Wickham published *The New Surgery*, an editorial in the *British Medical Journal* (1987; p1581):

'Surgeons applaud large incisions and denigrate "keyhole surgery." Patients, in contrast, want the smallest wound possible, and we at Britain's first department of minimally invasive surgery are convinced that patients are right. What makes patients ill after an operation is the iatrogenic damage that surgeons have inflicted in achieving their technical aim.'

Wickham (1987) goes on to predict that the history of surgery will come to be classified into three phases: historically it was 'rough, rapid, brutal, ablative, and had only limited applications.' Subsequently, improved anaesthesia facilitated complex procedures, but which were conducted without consideration of their effect on the patient. In his third, contemporary, phase Wickham contended that '*some* surgeons have realised that operations could be performed more elegantly and less traumatically' (emphasis added). He also outlined his vision of the future, predicting amongst other innovations, the development of the laparoscopic cholecystectomy, a procedure which would go on to become a prototypical example of the problematic nature of the introduction of new technologies in healthcare.

### The Biggest 'Free-For-All'

According to Reynolds (2001), laparoscopic cholecystectomy was first performed by Mühe of Böblingen in 1985, two years prior to Wickham's editorial (1987). That Wickham was unaware that the procedure had already been performed is indicative of Mühe's reception when he presented the technique at the German Surgical Society Congress: his colleagues were so sceptical that they excluded his paper from the conference proceedings. Despite these early misgivings however, in the years that followed the rise of the laparoscopic cholecystectomy was meteoric:

'The percentage of cholecystectomies that are laparoscopic procedures has climbed from 0% in 1987 to 80% in 1992<sup>154</sup>. Seldom has a new surgical procedure gained acceptance so quickly.'  
**Legorreta et al 1993 (p1429)**

The rapid adoption of this technique was greeted with enthusiasm by patients and the media. However, it had not been subject to any prospective research study<sup>155</sup> prior to its wholesale adoption, and this became cause for concern amongst researchers, economists and ethicists alike. In their examination of *the ethics of applying new medical technologies*, Iserson and Chiasson (2002) contend that, due to the lack of external controls on surgical procedures<sup>156</sup>, the role of the individual practitioner is central to their success and safety. This lack of oversight, according to Cuschieri (1995), lead to an uncontrolled expansion of the laparoscopic cholecystectomy which he denounced as 'the biggest unaudited free-for-all in the history of surgery' (p9).

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<sup>154</sup> USA data.

<sup>155</sup> There have been sufficient RCTs published since 1992 for a Cochrane review to have been conducted (Keus et al 2006). It concludes that 'meta-analysis of all trials suggests less overall complications in the laparoscopic group, but the high-quality trials show no significant difference.'

<sup>156</sup> As Johnson (1998) points out: 'if a procedure is introduced without a randomised controlled trial, it does not need hospital ethics committee approval, whereas if a controlled trial is to be performed, this counts as research and has to have ethical committee approval!'

Laparoscopic cholecystectomy however did not remain 'unaudited' for long: early data revealed that the rate of cholecystectomy was rapidly rising (e.g. Legorreta et al 1993, Lam et al 1996), which Cuschieri (1995) ascribes to surgeons being willing to conduct laparoscopic operations on patients who would have been deemed too 'high risk' for the open procedure, and patients requesting surgery for even minor symptoms now that it was perceived less painful. As the popularity of the laparoscopic technique increased however, so it appeared did the rate of complications: an anonymous editorial in *The Lancet* (1992) speculated that 'more bileducts<sup>157</sup> have probably been damaged in one year of laparoscopic cholecystectomy than in the previous decade [of open surgery].' These concerns were borne out: estimates<sup>158</sup> in the early 1990's indicated a two- to fifteen- fold increase in common bileduct injures with the laparoscopic technique (e.g. Bernard and Hartman 1993, Gouma and Go 1994). In recent years, however, the rate of complications has returned to the historical level (Halbert et al 2016). This indicates a 'learning curve', with the learning taking place on real patients (e.g Johnson 1998, Cuschieri 1995).

Minimally invasive surgery has now become the dominant paradigm for many operations, however, as exemplified by the case of the laparoscopic cholecystectomy, its introduction was controversial. Minimally invasive anaesthesia as outlined by White (2016d) is at an earlier stage of development. Below, I consider the case for its adoption, and ask if it is in danger of repeating the history of its surgical counterpart.

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<sup>157</sup> A major common bileduct (CBD) injury confers a substantial risk of mortality which has been reported to be as high as 11% (Flum et al 2001).

<sup>158</sup> Accurately estimating complications of laparoscopic cholecystectomy is challenging as there is no mandatory reporting system (e.g. Iserson and Chiasson 2002).

### ***The New Hip Fracture Anaesthesia?***

To what extent does minimally invasive anaesthesia for hip fracture repair mirror minimally invasive surgery? Its primary aim – to avoid iatrogenic injury – is the same. However, the means by which this aim is approached are different. According to Frampton and Kneebone (2016), to Wickham and his colleagues it was ‘crucial that their new methods were framed as patient-centred rather than an assertion and expansion of medical authority.’ However, they outline two ways in which minimally invasive surgery could diminish the role of the patient: firstly, it is heavily dependent on technology, and secondly an increased duration of anaesthesia is required to undertake technically-demanding techniques. To put it another way, minimally invasive surgery may require a more invasive anaesthetic.

In surgery *invasiveness* can be understood in terms of the degree of tissue trauma. As explained by Cuschieri (1995), the greatest gains are available when a small intervention is required in an organ which is difficult to access, such as the kidney. Minimally invasive surgery is therefore centred on minimising *access trauma*, as described in the words of Wickham by Frampton and Kneebone (2016; p552):

‘I was fed up taking out tiny little stones and going to the patient the following day and saying “look we got your stone out!” with a socking great gash... which seemed totally daft.’

What constitutes invasiveness in anaesthesia? According to White (2016d; Figure 14) minimally invasive anaesthesia minimises the use of opioids and sedative medications, and avoids hypotension, all of which expose the patient to a risk of undesired and potentially long-term side effects. For anaesthetists then, *invasiveness* is not about access trauma; the number of potentially painful procedures (e.g. FICB to reduce opioid use, arterial line insertion to monitor blood pressure more precisely) may be

greater if the principles of minimally invasive anaesthesia are to be followed. Instead, it is about *transience*: a minimally invasive anaesthetic is one that leaves no trace. This resonates less with Wickham's principles and more with the concept of *invasiveness* as described in ecology and conservation, where tourists and scientists alike are encouraged to 'take only photographs, leave only footprints' (e.g. Williamson 1997, Mills et al 2016).

Though White (2016d) has set out the principles of minimally invasive anaesthesia in text, they perhaps have been more effectively epitomised by an image that he has presented at numerous anaesthesia conferences<sup>159</sup>. This photograph (Figure 22) features a patient sat up in bed in the recovery room post-operatively; she looks tired but alert and is drinking a cup of tea, visual proof of the transience of her anaesthetic. White uses the pseudonym 'Margie Nallgaynes' for this patient, a play on the 'aggregation of marginal gains' philosophy of British Cycling performance director Dave Brailsford, a concept which has garnered admiration in the anaesthetic literature (e.g. Lumb and McLure 2016, Durrand et al 2014). The notion here is that multiple minor improvements can result in a major improvement overall. 'Margie's' role in communicating the concept of minimally invasive anaesthesia was evident in my study:

**VR:** *Goes into theatre, then pops his head into the anaesthetic room: 'Cliff, see?' I look; there is an elderly gentleman sat on a trolley in theatre – the previous patient – also with a hip fracture but I wasn't able to enroll him in the project. He looks bright, fully alert. If I didn't know, it would be difficult to guess that he'd just had an operation.*

**Me:** 'Have you seen Stu White's talk from the WSM?' *He reminds me of that image.*

**VR:** 'The one where she's drinking a cup of tea? We need to start doing that here.'

**Consultant anaesthetist Vernon Rowntree, Patricia's anaesthetic, Beckfoot**

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<sup>159</sup> According to White (personal communication 2018) these include the AAGBI Winter Scientific Meeting 2017 and Hip Fracture Symposia 2017 and 2018, The RCoA Summer Scientific Meeting 2017, and the Regional Anaesthesia-UK Annual Congress 2017.

**JS:** ‘... I actually do spinals for quite advanced dementia.’

**Me:** ‘Do you ever sedate them?’

**JS:** ‘I offer them a choice, but I don’t like to. The point is to let them have a cup of tea after. The research suggests that’s the benefit of spinals.’

**Consultant anaesthetist Jonathan Sidney, Joy’s anaesthetic, Mellbreak**



**Figure 22: ‘Margie Nallgaynes’**

photograph taken with consent and used with the permission of Stuart White

Minimally invasive anaesthesia can therefore be seen as something of a counterpoint to its surgical equivalent: in surgery, *persistence* (definitive repair of pathology) is the goal and *access trauma* can be minimised, in anaesthesia *access trauma* may have to be increased in the pursuit of *transience*.

### **Minimally Invasive Anaesthesia: Transience, Fragility and Agency**

Minimally invasive anaesthesia, then, is transient. This makes practice more complex because it generates new uncertainties: transience brings with it a sense of fragility; just as Wickham’s techniques were labelled pejoratively by his colleagues as ‘not

surgery', there is a perennial risk that minimally invasive anaesthesia may unintentionally become 'not anaesthesia':

**DM:** 'I always, if I'm doing a GA, I always intubate but I never paralyse to ventilate. So I... homeopathic doses of drugs, slip the tube down as I chase the patient down the bed because they're still wriggling.'

**LT:** 'Yep.'

**JS:** 'Mmm hmm' [*agreement*]

*The others are nodding too*

**DM:** 'Spontaneous breathing, very low, very low concentration of volatile and regional block.'

**Me:** 'There seems to be quite a lot of agreement...'

**DM:** 'Only between us two...' [*indicates JS*]

[*general laughter/over speaking*]

**PL:** 'I would follow the same principles...'

**LT:** 'What you say would describe the principles of mine as well.'

**CP:** 'And mine as well.'

**VB:** 'Yes, yeah, I used<sup>160</sup> to do a half and half, so I'd give them maybe 2 or 3mls of propofol and two per cent sevo[flurane] and they'd be wriggling, and then the tube goes down as Duncan says, they got a half-induction...'

**Consultant anaesthetists Duncan Myers, Louis Tyrell, Jacqueline Studwick, Pamela Lynton, Vaughn Bates and Conor Paris, Focus group, Longside**

In the above discussion, the 'wriggling' patient is perceived as a marker of good anaesthesia, achieved intentionally using a 'half-induction'. But why does the patient 'wriggle?' In 1950, Liverpool anaesthetists Jackson Rees and Gray defined the 'triad of [general] anaesthesia', comprising narcosis, relaxation<sup>161</sup> and analgesia. According to this model, a standard which is taught to anaesthetists early in their training (e.g. RCoA 2017), a wriggling patient is inappropriate. In Duncan's description however, the patient is certainly not fully relaxed, the nociception<sup>162</sup> of laryngoscopy is incompletely mitigated, and the patient may even be aware.

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<sup>160</sup> The past tense here is because Vaughn no longer works on the trauma list.

<sup>161</sup> Though 'relaxation' is sometimes interpreted to mean the use of muscle relaxant drugs, Jackson Rees and Gray subsequently (1952; p891) clarified that a reduction in muscle tone could also be achieved by 'reducing the number of stimuli passing down the motor nerve'. More recent versions of the *triad* therefore often refer to *lack of response*.

<sup>162</sup> 'Nociception' is the detection of noxious stimuli by the nervous system. 'Pain' is not used because its perception requires the patient to be conscious.

Accidental awareness under general anaesthesia (AAGA) is 'one of the most feared complications' (AAGBI 2014). However, to many of the anaesthetists at Longside, the benefits of 'lightness' outweigh its risks. In the following excerpt, Duncan has already administered 50mcg of fentanyl and slowly titrated 100mg of propofol to Tabitha, an 82-year-old woman who is about to undergo a femoral nailing. He gives the muscle relaxant suxamethonium ('sux') once she has closed her eyes:

**DM:** Gives suxamethonium 0.6ml (30mg), then takes the mask from Ina and turns the sevoflurane on to 2%.

**IP:** Activates the timer. 'Do you want her up a bit?' Tabitha is slouched in her bed.

**Tab:** Begins to fasciculate<sup>163</sup>.

**DM:** 'There's the sux, real fasciculations.'

After the fasciculations stop, Duncan and Ina drag Tabitha up the bed.

**DM:** Hand-ventilates.

**IP:** 'She's good for her age, isn't she?'

**DM:** 'She is.' He ventilates until the timer shows 1 minute after the sux, then inserts the laryngoscope.

**IP:** 'She's got a crown at the back, and one at the front.'

**DM:** Uses 1% xylocaine to spray Tabitha's vocal cords.

**IP:** Stands, hands on hips, waiting for Duncan to finish spraying.

**DM:** Sprays xylocaine onto the ETT cuff then inserts it.

**Mon:** Alarms: HR 130. It is fast AF.

**Tab:** Coughs.

**DM:** 'I don't think that sux has worked at all.' Matter of fact. No sense of stress.

**IP:** 'Sometimes you get a funny batch like that.'

**Mon:** The heart rate settles to 70 after about 30 seconds.

**Consultant anaesthetist Duncan Myers and ODP Ina Platt, Tabitha's anaesthetic, Longside**

Because Duncan gives small doses of fentanyl, propofol<sup>164</sup> and suxamethonium<sup>165</sup>, he also uses supplementary local anaesthesia of the vocal cords. As an observer, I wasn't sure whether this strategy had been a success: Tabitha's coughing and tachycardia are not consistent with the 'smoothness' of practice that anaesthetists often described as desirable. However, Duncan does not react as if this is unexpected: rather than

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<sup>163</sup> Fasciculation is the uncoordinated contraction and relaxation of the skeletal muscles which heralds the onset of action of suxamethonium.

<sup>164</sup> In this instance the dose, 100mg, is just below the 'standard' dose range of 2-3mg/kg (e.g. O'Donnell 2002). This is perhaps more than would be expected for the 'light' induction of an elderly patient; this relative resilience to the effects of propofol is perhaps reflected in Ina's comment that Tabitha is 'good for her age.'

<sup>165</sup> 30mg is less than 0.5mg/kg for Tabitha. The usual dose is 1-1.5mg/kg (Wilson and Walke, 2011).

intervening, he 'rides it out' until the heart rate settles. His brief explanation for the observed phenomena focuses not on the 'lightness' of anaesthesia or analgesia, but instead on the ineffectiveness of the (sub-therapeutic dose of) suxamethonium, a drug that has no effect on consciousness. This indicates that the *hypnosis* and *analgesia* elements of his anaesthetic were in Duncan's view, appropriately minimal.

To Duncan and his colleagues, the 'wriggling' patient is communicating something important, they are verifying their 'lightness'. But in order to permit this, anaesthetists must defy convention. The authors of the fifth National Audit Project (NAP5), a national study of AAGA sponsored by the AAGBI and the RCoA (Pandit and Cook 2014), advise against intentionally using low doses of induction agents. Furthermore, they specifically identify 'lack of movement in response to airway manoeuvres' as an indication of adequate depth of anaesthesia for instrumentation of the airway (Palmer and Pandit 2014). Duncan's technique could therefore be seen as an anathema to some of the most fundamental orthodoxies of anaesthetic practice, and yet it attracted the universal approval of his colleagues. How can such discordance be reconciled?

In *Refashioning Bodies, Reshaping Agency*, Goodwin (2008) describes how patients retain some ability to communicate under anaesthesia. In order for this to be achieved they are attached to monitors which extend internal physiological signals that would otherwise be invisible (e.g. blood pressure, electrocardiogram), and these are observed by an anaesthetist who is skilled in interpreting their meaning. Together, these elements form a 'cyborg'; the patient has been technologically-enhanced to restore some of the communicative ability that anaesthesia has removed. This allows

the patient to maintain, as Goodwin puts it 'agency – without intentionality.' Watching the patient 'wriggle' however, is not dependent on monitoring; the communication here is visual and tactile. But the role of expertise in interpreting its meaning is just as vital:

**HB:** 'She's still holding my hand.'

**JV:** 'She needs to start breathing again.' *He holds the mask on for another 45 seconds or so. Florence starts to breathe again. Joshua checks her jaw. It opens and closes easily.*

**HB:** 'She's still squeezing.'

**JV:** 'As long as her mouth's asleep... We'll see how we go.' *He removes the mask and takes a size 4 i-gel from Harvey.*

**Mon:** *Alarms: no ETCO<sub>2</sub> Harvey silences.*

**JV:** *inserts the i-gel.*

**Consultant anaesthetist Joshua Varnham and ODP Harvey Bramson, Florence's anaesthetic, Longside**

In the above observation, ODP Harvey Bramson is concerned that Florence is still squeezing his hand as Joshua Varnham prepares to insert a supraglottic airway device (i-gel), but Joshua reassures him that he is prepared to accept this 'as long as her mouth's asleep' (i.e. as long as she is sufficiently unconscious to accept the i-gel). In most other circumstances, movement from the patient would be a clear indication that something was amiss, but in the hip fracture context, the patients' most pressing needs are different to those of others. Anaesthetists are therefore prepared to tread close to the boundary of accidental awareness in order to make their anaesthetic transient.

Are these anaesthetists unconcerned about AAGA? Of relevance to my study was the finding in NAP5 that this is less likely in elderly patients than the general population (Pandit and Cook 2014), presumably because they require a reduced dose of anaesthetic agent (e.g Lerou 2004). Indeed, the greatest concern of the anaesthetists in my study with regards to anaesthetic dosing was to avoid too high a dose of anaesthetic, which is associated with side effects including hypotension and

postoperative delirium (e.g. Messina et al 2013, Dundee et al 1986, Radtke et al 2013).

Giving a 'light' anaesthetic was perceived therefore as a distinguishing feature of expertise:

**LT:** 'Junior trainees worry about awareness a lot. They always turn the MAC<sup>166</sup> up; I turn it down.'

**Louis Tyrell, consultant anaesthetist, Edith's anaesthetic, Longside**

Anaesthetists therefore tended to view measures of anaesthetic dose and depth: minimum alveolar concentration (MAC), and electroencephalogram-based depth-of-anaesthesia monitoring such as bispectral index (BIS)<sup>167</sup> not as tools with which to prevent AAGA, but to provide justification by which the dose of anaesthetic could be minimised:

**Me:** 'Do you use BIS a lot?'

**EA:** 'In all my majors, and old patients... I heard a colleague in the coffee room saying, "if you don't know if someone's asleep you shouldn't be giving an anaesthetic." I thought "what a load of shit." ... you increase the cardiac output by reducing the anaesthetic. Anaesthetics are poisons, so give less!' *As he says this, he reduces the desflurane vapouriser to 4.5%.*

**Consultant anaesthetist Elroy Ashworth, Gloria's anaesthetic, Mellbreak**

Here, Elroy explains that BIS provides a basis on which to turn the anaesthetic dose down; consistent with Goodwin's concept of agency without intentionality (2008), the BIS monitor provides a numerical representation of the patient's need – allowing them to be unconscious whilst being spared any more 'poisons' than are absolutely

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<sup>166</sup> One MAC is the concentration of an inhaled anaesthetic agent, measured at the end of expiration, at which 50% of patients will not move in response to a standard surgical stimulus. As patients get older the dose of anaesthetic they require reduces. In order to avoid over-dosing, the MAC can be 'age-adjusted' (Lerou 2004).

<sup>167</sup> Processed electroencephalogram (EEG) depth-of-anaesthesia monitors such as BIS record the EEG using electrodes applied to the patient's forehead and use a (confidential) proprietary algorithm to generate (dimensionless) numerical values that relate to consciousness. For BIS, the scale ranges from 0 (no brain activity) to 100 (awake); 40-60 is stated to indicate surgical anaesthesia (e.g. NICE 2012). The use of a proprietary algorithm to generate a dimensionless number makes it somewhat unclear what BIS actually 'is'; it is one of anaesthesia's most 'blackboxed', and therefore most controversial technologies (e.g. Todd 1998).

necessary. He also illustrates the scepticism of some of his colleagues towards BIS; they would rather rely on their personal experience. Depth of anaesthesia monitoring, though seen as an unnecessary competitor to experience by some, was seen as a strategy through which to *build* personal experiential knowledge by others:

**DM:** 'I thought I was a fucking good anaesthetist until I started using BIS pre-induction as part of some audit work, to see how much we could save by optimising depth of anaesthesia. I was getting the BIS down to twenty in the anaesthetic room: over-anaesthetising them. So, I realised I was giving the propofol too quickly. If I give it so slowly it drives me potty, I get the BIS to forty-five. But you don't get the prolonged effect of an overdose.'

**Consultant anaesthetist Duncan Myers, Tabitha's anaesthetic, Longside**

In Duncan's description, he recalls how a short period of time spent using BIS lead to a persistent change in his practice; it reassured him that 'wriggling' is consistent with *appropriate lightness* rather than *accidental awareness*. Though he did not use BIS monitoring in either case in which I observed him, he applied the learning which he had acquired from his previous experience: it is notable that the rate at which he administers the propofol is not expressed mathematically (e.g. ml/second), but in relation to his sense of frustration at its slowness. This is typical of the way that anaesthetists 'feel' the dose of induction drugs and this expression of tacit knowledge challenges the usefulness of 'standard doses' as advocated in NAP5 (Palmer and Pandit 2014).

Duncan's refinement of his tacit knowledge through the use of monitoring involves what Mort et al (2005) describe, borrowing a phrase from Lucy Suchman (2002), as 'artful integration'; in this case the reconciliation of multiple knowledge sources (e.g. clinical, electronic, experiential). Interestingly, in this paper Mort et al speculate on the influence of depth of anaesthesia monitors (rarely-used in UK clinical practice at the time) with trepidation, citing Mackenzie's (1999; p211) concerns that humans

working in technologically automated environments ‘may [lose] the intangible cognitive benefits from their having to constantly integrate and make sense of the data flowing in.’ However, in Duncan’s case the additional electronic information from BIS monitoring provided just such an ‘intangible cognitive benefit’, providing a basis for him to reconsider his ideas about how induction agents are given. This is a development of previously-described mechanisms for the acquisition of tacit knowledge in anaesthesia, in which contact between experts and learners is perceived as critically-important (Pope et al 2003). With Duncan, the BIS monitor *was* the ‘expert’, providing feedback which other practitioners could not.

To deliver a ‘light’ general anaesthetic then, anaesthetists break with some of anaesthesia’s conventions, as laid-down by the AAGBI and the RCoA. In a similar fashion, minimally invasive spinal anaesthesia involves a break with convention, one that is established early in anaesthetic training when spinal anaesthesia is first learned in obstetric practice. This ‘prototypical’ obstetric spinal is a standard of a sort; and as Bowker and Star point out (1999; p5), ‘each standard... valorizes some point of view and silences another’. This, they contend, means that standardisation can be ‘dangerous’, it has the capacity to cause harm: ‘there is no natural law that the best standard shall win’, and once established standards can be very difficult to change. The inertia of the practice of spinal anaesthesia learned early in training is articulated by White, Moppett and Griffiths (2016e; p1391):

‘Very few anaesthetists have received practical training in how to anaesthetise hip fracture patients to a very high quality (we certainly didn’t) and commonly admit to transferring knowledge from extensive formal training in obstetric anaesthesia, where patients are younger, fitter and at very low risk of anaesthesia- related complications.’

The above extract is from *Standardising Anaesthesia for Hip Fracture Surgery*, the source of the social media controversy illustrated in Chapter 3 (Figure 15). Though written as a call for standardisation, this illustrates one of standardisation's potential problems: the establishment of standards in one context may lead to them being transferred to others without due consideration.

If the 'obstetric spinal' represents anaesthetists' first exposure to spinal anaesthesia<sup>168</sup> this could be deemed to be the spinal anaesthetic against which all others may be compared. Although lower-dose regimens have been described (e.g. Roofthoof and Van de Velde 2008), well-known texts indicate that a 'typical' formula for Caesarean section under spinal anaesthesia comprises around 2.5ml (12.5mg) of 0.5% heavy bupivacaine and 300mcg of diamorphine<sup>169</sup>. This regimen is striking in its similarity to the data from ASAP (Boulton et al 2014), in which the median dose of 0.5% heavy bupivacaine for hip fracture repair was 2.5ml and 49.7% of patients received intrathecal diamorphine (dose not recorded). Is this evidence to support White and colleagues' accusation that practice is unthinkingly transferred from one setting to another? My findings suggest that obstetric spinals may be seen as prototypes, and that many anaesthetists are actively trying to depart from this orthodoxy. The on-

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<sup>168</sup> This was the case in my own training and likely that of many other anaesthetists; the second assessment of 'competence' in the anaesthesia training curriculum relates to obstetrics, in which spinal anaesthesia is the predominant technique (RCoA 2018).

<sup>169</sup> Writing in *The Oxford Handbook of Anaesthesia*, Eldridge (2011) suggests 2.5ml of 0.5% heavy bupivacaine and 300mcg diamorphine, the *Managing Obstetric Emergencies and Trauma* manual (Paterson-Brown and Howell 2014) states that a typical dose of bupivacaine is between 2.2 and 2.7ml and that 'opiates are often added'; the NICE Caesarean section guideline (2011) suggests 300-400 mcg diamorphine. My own practice is to use 2.7ml of 0.5% heavy bupivacaine and 300mcg diamorphine for almost every Caesarean section.

going and gradual attempt to move towards the minimally invasive was a common refrain:

**Me:** 'Is two mls of heavy bupivacaine always your dose?'

**NS:** 'it's still more than that AAGBI recommends, so I'm trying to work my way down. I'm comfortable giving two. Not comfortable going below that yet. The fentanyl is a new thing. I'm happy to wean myself off diamorphine – well not myself, wean myself off the use of diamorphine. That was down to not knowing how to use it, I didn't know the dose.'

**Me:** 'Did you use diamorph as a trainee?'

**NS:** 'Yes, that was all I used as a reg.'

**Consultant anaesthetist Nathan Samuelson, Kenneth's anaesthetic, Beckfoot**

In the above exchange, Nathan Samuels, a recently-appointed anaesthetic consultant, has administered a spinal anaesthetic to Kenneth, an 85-year old gentleman with severe dementia. Here, he explains that he is trying to change his technique to be less invasive in two respects: he has reduced the dose of bupivacaine to 2ml (10mg) and his 'new thing' is to swap long-acting diamorphine for short-acting fentanyl. His language here, describing a process of 'weaning', evokes dependence; Nathan plays on diamorphine's well-known use as a street drug (heroin), drawing a comparison between the physical dependence of a drug-user and his practice-based dependence on a persistent standard from obstetric anaesthesia, which as Bowker and Star explain (1999), may not be the 'best standard' for hip fracture patients.

Opioids<sup>170</sup> have numerous effects including analgesia, cough-suppression, sedation, cognitive changes, respiratory depression, itching, and nausea. Some of these (analgesia, and in the context of general anaesthesia, cough suppression and sedation) make them useful in anaesthesia, however once the anaesthetic has concluded, the

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<sup>170</sup> Opioids act at receptors which are predominantly located in the central nervous system. They are linked to inhibitory G-proteins, which reduce neuronal cell excitability and hence nerve transmission and neurotransmitter release (McDonald and Lambert 2014). 'Long-acting' opioids include morphine, diamorphine and oxycodone.

only desirable persistent effect is analgesia; the others are problematic. Such side effects are more pronounced in older people due to a reduced capacity to metabolise and excrete such drugs, and a pre-existing preponderance for developing delirium. This justifies the attempt to avoid long-acting opioid drugs as articulated by Nathan, who, in common with nearly every anaesthetist in my study provided a ‘block’<sup>171</sup> in order to provide analgesia. The use of blocks as enablers of a minimally invasive approach was further explained by his colleague, Jerred Goode:

**JG:** ‘What I do, what we do here, all of us: midazolam, ketamine, we try to avoid that. As soon as they come in, warmed fluids, do a fascia iliaca block. I wait for at least ten to fifteen minutes before I wash, or let the trainee go and wash for the spinal. I believe we don’t give enough time. I want to sit them up if possible or roll on their side.’

**Consultant anaesthetist Jerred Goode, prior to Daisy’s anaesthetic, Beckfoot**

As Jerred explains, in spinal anaesthesia blocks usually ‘bracket’ the anaesthetic: they are performed before positioning the patient in order to provide analgesia for what would otherwise require the use of intravenous agents (‘midazolam, ketamine<sup>172</sup>’), and because blocks last longer than the spinal, they also provide post-operative analgesia. Some persistence here is therefore desirable, though it is a different form of persistence than that of opioids, midazolam or ketamine; whilst these drugs act predominantly on the *central* nervous system, the block is *peripheral*, its persistence isolated to the injured limb.

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<sup>171</sup> In this case, Nathan provided a FICB to facilitate positioning and provide post-operative pain relief.

<sup>172</sup> Midazolam is a benzodiazepine, ketamine is an NMDA receptor antagonist. Both are sedatives and ketamine is also an analgesic. Like opioids, they act centrally and have problematic side effects in the elderly.

Whilst opioids have problematic effects, they are at least reliable in providing analgesia, whereas blocks are not always completely successful<sup>173</sup>. This is an important uncertainty in general anaesthesia because nerve blocks are typically given after induction, and therefore cannot be formally 'tested', for example by moving the injured limb, until after the patient regains consciousness. That the success of a nerve block under GA cannot be verified (unlike in spinal anaesthesia where positioning the patient is an effective 'test') is a challenge to anaesthetists' commitment to minimally invasive principles:

**PL:** '... I sneaked in one milligram of morphine.'

**Me:** 'Do you find that they benefit from some opiate?'

**PL:** 'Perhaps I don't have enough confidence in my block, to think that they would be one hundred per cent effective.'

**Consultant anaesthetist Pamela Lynton, Gail's anaesthetic, Longside**

In the above observation, Pamela's language suggests embarrassment; her furtive admission that she 'sneaked' in some morphine reveals that, to her, long-acting opioids are an undesirable intervention, though preferable to her patient awaking in pain. To Pamela therefore, Gail's loss of agency as a result of general anaesthesia has put her in a position where she feels a need to 'hedge her bets' and give Gail a small dose of morphine.

Some assessment of block effectiveness can be made under GA however. As with the assessment of depth of anaesthesia, the unconscious patient has some of their communicative capacity restored through the monitor and the anaesthetic machine, allowing the anaesthetist to interpret their needs. An enhanced awareness of nerve

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<sup>173</sup> According to Dolan et al (2008), the loss of sensation to the anterior, medial and lateral thigh was achieved with FICB in 47% of cases when an anatomical landmark technique was used, and 82% when ultrasound guidance was used.

block adequacy was stated to be one of the benefits of maintaining spontaneous respiration intraoperatively – by allowing the patient to breathe, another channel of communication is maintained:

**Me:** *I ask Duncan how he will know if the fascia iliaca block is working:*

**DM:** 'The best indication is the resp rate. If when they plunge the knife in the resp rate is twenty-five that's an indication that it's not working. She's on one MAC of des. I think des is a very poor anaesthetic agent. It's hard to keep someone settled unless you have very good analgesia. BP's not reliable, it drops, then you give aramine and it goes up. Heart rate of eighty, neither fast nor slow. I've got fifty of fent spare. I don't draw up morphine. If we come in [to theatre] quickly it may not be working [yet]. I used to give morphine two to three milligrams for everyone. If the fascia iliaca block worked they were unresponsive: they've not slept, they were stuporose. So now if the fascia iliaca block works I don't give them anything. She's got a big hole in her thigh [*he points to the incision on Sally's right thigh*], her heart rate's drifting down, BP's drifting down after the last dose of metaraminol, resp rate of sixteen. I'm quite happy...'

**Consultant anaesthetist Duncan Myers during Sally's anaesthetic, Longside**

Here, Duncan articulates what he perceives are contextual benefits of the 'very poor' volatile anaesthetic agent desflurane. It is a respiratory irritant and comparatively ineffective at suppressing coughing and tachycardia in response to stimulation (e.g. Smith et al 2011, Klock et al 2001), qualities which Duncan uses to enable his patient to communicate their needs. In this delicate balancing act, a light desflurane anaesthetic acts as a 'hair trigger'; allowing Duncan to omit opioids with confidence if the respiratory rate remains low.

The maintenance of spontaneous respiration is advocated in the ASAP standards (Boulton et al 2014), not because of its relationship with agency, but because it has haemodynamic benefits. By avoiding high intrathoracic pressures, venous return to the heart is maintained and the cardiac output is consequently less diminished in comparison with positive pressure ventilation. This concept was central to the technique of some anaesthetists, such as Longside trauma lead Joshua Varnham, who

explained that he believed that the use of supraglottic airways<sup>174</sup> and the maintenance of spontaneous respiration are key points for trainee anaesthetists to learn during their training in the trauma setting:

**JV:** I'm always particularly keen for them to take away the fact that you can, provided there's no other contraindications, you can use supraglottic airway and spontaneously breathing and to have a think about the cardio-respiratory physiology of that and how I think it causes less cardiovascular upset.

**Lead hip fracture anaesthetist Joshua Varnham, introductory interview, Longside.**

As Joshua implies however, this minimally invasive principle is not without controversy – the ‘contraindications’ that he describes relate to the risk of pulmonary aspiration if the patient regurgitates under anaesthesia. Some anaesthetists therefore advocated endotracheal intubation as the default option<sup>175</sup>. To them, the use of supraglottic airway is *too* minimally invasive: the risks are not worth the benefits. In the following excerpt, from the Longside focus group, consultant anaesthetists Joshua Varnham, a proponent of supraglottic airways, and Vaughn Bates, a proponent of intubation, debate their merits with their consultant colleagues Pamela Lynton and Jacqueline Studwick, who adopt a case-by-case approach:

**JV:** ‘I mean, I’m different because I don’t intubate the patients so because that’s, having not trained in the region I was just, never would have dreamed of putting tubes in most fracture neck of femurs unless there’s a reason to intubate them, like you could have with any patient having any operation. And that’s actually - *[over speaking from the group]* and actually that’s the national guidance so, I mean because there is a, there is a morbidity from sticking a lump of plastic across someone’s vocal cords and potentially positive pressure ventilating them and you don’t have to do that. And I’ve had, I had one aspiration and a few close calls so I’ve - but that then has just altered my threshold for me, if I’m not happy to put a supraglottic airway in, I either intubate them without any muscle relaxant, just with alfentanil and lignocaine which is a technique that sometimes can be a bit messy, so I’m working on that... or it’s a reason to give them a spinal.’

**VB:** ‘Yeah. I just, my view was that an 80-year-old patient is, with my ITU background is very, very unlikely to be able to tolerate an aspiration. So I just felt that the risk of, the risk of an

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<sup>174</sup> Supraglottic airways such as the Laryngeal Mask Airway (LMA) and the i-gel sit above the vocal cords and are therefore less stimulating than endotracheal intubation, in which the endotracheal tube (ETT) passes through the cords. However, supraglottic airways provide a less ‘definitive’ airway.

<sup>175</sup> This rather broadly-defined technique was predominant in my observations: of 26 observed general anaesthetics, an LMA was used in 9 cases, and an ETT in 17.

aspiration, either with a spinal or a an LMA versus the risk of a tube in my hands, the tube was more favourable because any hint of aspiration, whether it's detected or sometimes undetected, a common reason these patients die on a ward is through hospital acquired or aspiration pneumonia or pneumonitis, so I just felt that was a kind of barn door kind of way to do it as well. To look at -'

**PL:** *[interrupts]* 'I've seen quite a few people regurgitate past the endotracheal tube and I'm always glad that they've got that tube in place. It's only the relatively younger, slimmer ones who I would risk putting a supraglottic airway in.'

**JS:** 'I think you're talking about two different operations generally, aren't you? As well, which I think does change, maybe changes my thinking. So, you're talking about a DHS where the patient's up here somewhere *[she reaches upwards]* and you've got no access to them whatsoever and all that. I think I would feel very nervous about a supraglottic airway up there. But when on the other hand if you're doing a hemiarthroplasty, the patient's right next to you and they're turned on their side, that might change your thinking slightly.'

**Consultant anaesthetists Joshua Varnham, Vaughn Bates, Pamela Lynton and Jacqueline Studwick, focus group, Longside**

In the above excerpt, the Longside anaesthetists discuss the limits of their minimally invasive practice. Though the benefits of the supraglottic airway are acknowledged, the risk of pulmonary aspiration – a complication that hip fracture patients are 'very, very unlikely to be able to tolerate', means that an attempt to be minimally invasive may render patients vulnerable to a highly-invasive complication.

Minimally invasive anaesthesia is underpinned by the idea that persistent effects should be avoided. In order to achieve this, anaesthetists tread a fine line between anaesthesia that is appropriately-light, and anaesthesia that is 'not anaesthesia.' Likewise, analgesia is pushed to the periphery, using nerve blocks instead of centrally-acting drugs; again, this runs a risk of failure. Anaesthetists mitigate the fragility of minimally invasive techniques by finding ways to maintain the agency of the patient, most obviously by avoiding drugs that interfere with consciousness, but as Goodwin (2008) explains, even under GA the patient still has agency. By using low-doses, enhanced monitoring, and 'poor' anaesthetic agents, anaesthetists allow these patients to communicate their needs. Nevertheless, the fragility of minimally invasive

techniques is deemed to be too risky by some. These anaesthetists adopt a more 'comprehensive' approach.

### **Comprehensive Anaesthesia: the Disappearing Patient?**

Minimally invasive anaesthesia was the predominant approach in my observations overall. But not all anaesthetists embrace these principles. Is this due to the unthinking transfer of techniques learned in other contexts and a lack of training in the specific setting of hip fracture anaesthesia as alluded-to by White et al (2016e)? This explanation is rarely represented in my findings: instead, anaesthetists who do not use minimally invasive techniques tend to be manifestly aware of the relevant literature, but elect to utilise a more comprehensive approach for reasons concerned with their institutional practices:

**BB:** 'I don't know about low-dose spinals, I see them as a pointless step. I use a higher dose: three mils. Not the two mils from the 2013 audit. Richard Griffiths does, but he works at Peterborough.'

**Consultant anaesthetist Briar Bonner, following Arthur's assessment, Mellbreak**

Here, it is evident from Briar's dialogue that he is well aware of the concept of minimally invasive anaesthesia and that it is enshrined within national 'standards' – he substantiates this by citing the year in which the ASAP data collection took place. His case against adopting the practice is the 'Peterborough versus the real world' argument (Chapter 5). This perspective was supported by his colleague, lead trauma anaesthetist Linette Payne:

**LP:** '... the dose they're suggesting [in ASAP] wouldn't work here for the duration that it takes to do our hips, including the positioning. So, they were suggesting a dose of less than two mils, which you'd end up with a really high conversion rate to GA, based on those low doses. So, that wouldn't work...' *we discuss some aspects of general anaesthesia...*

**Me:** '... do you have a standard dose for a spinal anesthetic? What would you normally use in your own practice?'

**LP:** 'Yeah, I keep trying to go lower but I- three mils is fairly standard for me, actually, but it depends on which surgeon I'm working with and what sort of operation they're doing.'

**Lead trauma anaesthetist Linette Payne, introductory interview, Mellbreak**

Linette is explicit about her concerns here. She illustrates what she believes would be the consequence of pursuing a low-dose spinal technique at Mellbreak: that anaesthesia would wear off before the completion of surgery, requiring 'conversion' to GA and therefore exposing the patient to the risks of both. If this concern was realised, in attempting to be minimally invasive, one may in fact be compelled to do two anaesthetics, arguably the most invasive possible option. This *invasiveness paradox* is analogous to the concerns raised in the early days of laparoscopic cholecystectomy, in which an unacceptably-high number of patients were exposed to (open) corrective surgery in order to repair damage inflicted in the course of the 'free-for-all' course of its adoption.

Instead of exposing her patients to the risk of this eventuality, Linette opts for a compromise: she performs a more 'comprehensive' version of spinal anaesthesia: a larger dose of heavy bupivacaine allows her to accommodate the practices of the surgeons with whom she works, her primary concern being that they seem to take a long time to operate. However, she is aware that her compromise may result in negative effects on the patient and expresses an as-yet unrealised desire to 'go lower'.

As can be seen from the above excerpts, a more comprehensive approach may have to be routinely adopted to take account of institutional considerations. Furthermore, anaesthetists who are proponents of minimally invasive techniques in 'standard' circumstances may modify their practice in others. Even the most ardent supporters of minimally invasive anaesthesia have their limits, as in the below observation where Vernon Rowntree justifies a departure from his usual 'recipe':

**VR:** 'I think it's right for each institution to stick to a recipe. Mine is low-dose spinal. I gave her two point six mils, a mil more than usual, but this procedure- It could drag on. I don't want to do a GA ninety minutes in, and if she was a GA, she'd need IPPV.'

**Me:** 'So you'd tube her if it was a GA?'

**VR:** 'Yes, because of her body habitus and length of procedure. And the position of the table. If it was a DHS I might use an i-Gel, but not for two hours. And I've been sat here for two hours with Mr Simmons many a day.'

**Consultant anaesthetist Vernon Rowntree, Patricia's anaesthetic, Beckfoot**

In the above excerpt, Vernon explains his spinal anaesthetic for Patricia, an obese 82-year-old woman with a subtrochanteric hip fracture. He cites a potentially lengthy operation (femoral nail) and a surgeon (Mr Simmons) who he knows to be a slower operator than his colleagues as justification for a more comprehensive approach. In doing this, Vernon knowingly exposes Patricia to an increased risk of hypotension, which he attempts to mitigate with only limited success using prophylactic boluses of metaraminol<sup>176</sup>. This is the beginning of a series of events, each causing the anaesthetic to become yet more invasive: as a result of the hypotension Patricia becomes nauseous<sup>177</sup>, which causes her to become distressed. Vernon reassures her but also intervenes using three pharmacological therapies: additional metaraminol to treat hypotension, an antiemetic to treat nausea, and a small bolus<sup>178</sup> of propofol to manage her distress. Patricia subsequently loses consciousness and her airway becomes obstructed, causing her oxygen saturations to fall to 80%<sup>179</sup>, necessitating airway manoeuvres.

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<sup>176</sup> Vernon's attempt to avoid hypotension is only partly successful – early-on in the case Patricia's blood pressure fell to a nadir of 74/55mmHg despite prophylactic metaraminol boluses. It subsequently stabilised with the metaraminol infusion.

<sup>177</sup> Nausea associated with hypotension during spinal anaesthesia is thought to occur due to brainstem hypoperfusion and ischaemia (e.g. Borgeat et al 2003).

<sup>178</sup> 1ml (10mg) of propofol 1%.

<sup>179</sup> 'Normal' oxygen saturations are greater than 96% (e.g O'Driscoll et al 2017).

This sequence of having to treat the side effects of drugs with yet more drugs is relatively common in my data and demonstrates two important points: it emphasises the frailty of hip fracture patients by demonstrating the profound effects that even conservative doses of drugs can induce, and it demonstrates a number of the potential complications associated with adopting a more comprehensive anaesthetic technique, in this case hypotension, over-sedation and hypoxia. Anaesthetists were notably aware of these risks and tended to anticipate their occurrence; in the above case Vernon had already drawn up the metaraminol, propofol and antiemetic drugs. Why would an anaesthetist knowingly expose a patient to a potentially harmful process when a less-harmful alternative exists? Vernon explains this in terms of a trade of risks: he is willing to accept the relatively minor harms of comprehensive anaesthesia in order to mitigate what he perceives may be a major harm: a mid-procedure conversion to GA which, due to Patricia's obesity, would compel him to conduct yet more invasive procedures: intubation and positive pressure ventilation.

A similar argument was often invoked in cases where the anaesthetist had opted to undertake general anaesthesia, as in the below excerpt from Longside hospital, which takes place two hours into Keith's anaesthetic. A surgical complication has occurred, there is significant bleeding, and the planned operation has been converted to a much more extensive procedure:

**GL:** *Turns the desflurane down to 6.5. I note that the BIS is 27. He then goes to the computer at the other side of the room briefly, taps something into the keyboard, and then returns – I wonder why – he has a computer attached to his anaesthetic machine. I think he wanted to take another look at the operative site but didn't want to stand and stare, so he took the chance to look on his way to and from the computer.*

**Me:** *It occurs to me how little dialogue there has been for the last few minutes as the kit is unpacked. Everyone is waiting – the surgeons for the nail, the anaesthetic team for the blood. No progress can be made whilst the kit and the blood products are checked and transported.*

**GL:** *'This is when you think, "I'm bloody glad I didn't do a spinal."'*...

**Consultant anaesthetist Granville Long, Keith's anaesthetic, Longside**

In the above excerpt, Granville Long, a consultant anaesthetist whose orthopaedic practice is largely restricted to the elective setting, has administered a 'comprehensive' general anaesthetic. As with Vernon, he demonstrated an appreciation that his technique was not harm-free<sup>180</sup> but as the case proceeded, he expressed relief that he had opted for this approach and thus avoided the need to convert from one form of anaesthesia to another. It is notable that Granville's technique for general anaesthesia involved muscle relaxation, intubation and positive pressure ventilation: interventions that are advised-against in the AAGBI guideline (2011), and which Vernon specifically criticised in his explanation of Patricia's anaesthetic. I was interested to know if these were a routine part of Granville's technique:

**Me:** *I ask Granville if he always intubates when he does a GA for hip fracture patients:*

**GL:** 'Yes. A lot of them have reflux, which you can cope with at induction if they're head up, but I've known a few people aspirate breathing on LMAs. I did go through a phase of LMAs though.'

**Me:** 'What inspired that phase?'

**GL:** 'I thought we could get away with it. But we had a few instances... one, anyway, of green stuff coming up. I thought: "this isn't the best way." Well, maybe if they were completely well, young, and it was a surgeon I know to be slick and quick...'

**Consultant anaesthetist Granville Long, Keith's anaesthetic, Longside**

In justifying his more comprehensive approach, Granville articulates the precarious nature of trying to 'get away with' minimally invasive anaesthesia. In his technique, the patient is knowingly exposed to what he perceives as a predictable but minor harm (endotracheal intubation) in order to mitigate the possibility of a catastrophic complication. The risk of pulmonary aspiration was often cited as an argument against the wholesale adoption of a minimally invasive approach, as in this reflection from

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<sup>180</sup> Although I did not observe the pre-operative assessment, Granville explained to me prior to starting the anaesthetic that he had offered Keith a spinal, but that he had declined.

Louis Tyrell, an experienced trauma anaesthetist who had recently (and somewhat unusually) moved to Longside as an already-established consultant:

**LT:** ‘... having moved to Longside fairly recently... from a hospital where we predominantly did spinals, I kind of learned the Longside way, because it works well. I mean, I’ve witnessed a lot of spinals that would be ineffective or wear off where patients then get a laryngeal mask and would aspirate, and I would be the consultant called in...’

**Consultant anaesthetist Louis Tyrell, focus group, Longside**

In the above excerpt, Louis conveys a sense of liberation at having adopted GA and endotracheal intubation as a default approach. His rapid transition to what he describes as ‘the Longside way’ demonstrates the power of institutional norms and context:

**LT:** ‘... The first trauma list I did [here] I said “I’m going to do a spinal” and the ODP was, like, “Oh.. Right..” [*he raises his eyebrows in impersonation of his colleague’s scepticism*] so you ask what the guy next door does, and they all do GA’s here.’

**Consultant anaesthetist Louis Tyrell, Edith’s anaesthetic, Longside**

From the Longside perspective, Louis’s former institution’s commitment to comparatively minimally invasive techniques placed the patients in a perilous position. The approach Louis has since adopted offers, in his current view, a worthwhile trade-off in sacrificing some of the benefits of minimally invasive anaesthesia in exchange for a more predictable intraoperative course.

What does the comprehensive approach, regardless of mode of anaesthesia, mean for the patient? Through the use of opioids, sedatives, muscle relaxants, positive-pressure ventilation and larger doses of intrathecal<sup>181</sup> local anaesthesia, the patient is less able to represent their needs; the anaesthetist working *with* the patient is less evident here. Instead, the anaesthetic trajectory is set by the anaesthetist; it is predictable and

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<sup>181</sup> Into the subarachnoid space, i.e. in spinal anaesthesia.

reproducible, qualities seen by some as being inseparable from safety. But in achieving this predictability the patient is exposed to known risks. This form of risk management has parallels in obstetric practice: in *The Vanishing Mother* obstetrician and anthropologist Claire Wendland (2007) describes how elective Caesarean section 'magically wards off the unpredictability and danger of birth.'

Wendland (2007) situates her analysis in the context of breech foetal presentation, now almost always universally managed by elective Caesarean section in developed healthcare systems (e.g. Impey et al 2017). Wendland explains the profound influence of the *Term Breech Trial (TBT)* in directing this practice. The *TBT*, published in *The Lancet* (Hannah et al 2000), was a large international RCT which allocated expectant mothers with breech presentation to either planned vaginal birth or planned Caesarean section. The trial showed lower perinatal and neonatal morbidity and mortality in the Caesarean section group, to the extent that it was halted at an interim stage because the authors deemed the planned vaginal birth group 'too dangerous' to continue. This had the effect, Wendland contends (p220), of framing vaginal breech delivery as 'extraordinarily perilous for women, babies and their obstetricians', a stance which parallels the approach to risk adopted by 'comprehensive' anaesthetists, warding off what they see as the unpredictability of minimally invasive anaesthesia.

However, Wendland identifies an important omission in what was classified as a 'major maternal morbidity' in the *TBT*: the surgical trauma itself. Wendland asserts that by editing-out of this 'intended' harm, 'the mother's experience of birth and its aftermath vanishes', whereas unintended operative injuries, which as Saad (1997; p659) points out are 'injurious to the surgeons honour', are accentuated. In my study,

anaesthetists' honour was similarly impugned if there was a need to supplement or abandon regional anaesthesia, even though unexpectedly prolonged surgery (outside the anaesthetist's influence) was often the cause. Re-visiting Patricia's case, after two hours of operating, Vernon's 'comprehensive' spinal has started to wear off:

**VR:** *Goes to ask the surgeons where they are up to. He reports back to me: 'I'm hopeful... they've got to change that distal locking screw, then it's all jig work.' The distal locking screw is inserted freehand which can take some trial-and-error. The other screws have a jig which attaches to the nail, making it quicker to insert them. 'If she does need a GA it'll be the second time in... Seven years. If she needs it, I'm blaming you.' He smiles - he's kidding.*

**Consultant anaesthetist Vernon Rowntree, Patricia's anaesthetic, Beckfoot**

Though he makes light of the situation, Vernon is evidently anxious about the ongoing duration of the surgery; his checks on the surgeons' progress becoming frequent. Before opting for general anaesthesia however, he attempts to eke out the spinal a little longer, administering fentanyl and propofol, this time by target-controlled infusion, and requesting that the surgeons provide additional local anaesthesia. Despite this more cautious approach to the administration of propofol, its sedative effects are as pronounced as before; he supports Patricia's airway as he reflects on the case:

**VR:** *'That's right, nice big breaths.' He does a jaw thrust – the snoring abates.*

**AL:** *'She really responds to that!'*

**VR:** *Reduces the propofol TCI to 0.7mcg/ml. 'Yes. I'm hanging on to her chin.'*

**Me:** *I walk round to see where the surgeons are up to – they've closed the proximal incision and are starting on the distal one.*

**VR:** *Still holding Patricia's airway: 'It's a bit disappointing this. It's real-world though.'*

**Me:** *'The spinal's been in for two and a half hours.' I'm trying to reassure him.*

**VR:** *'She's not distressed, she just felt some pulling, tension. It was unpleasant. I responded to it.'*

**Consultant anaesthetist Vernon Rowntree and ODP Adelyn Lovell, Patricia's anaesthetic, Beckfoot**

In the above excerpt Vernon's disappointment is palpable. He tries to take solace in the fact that his actions were appropriate: he planned for a prolonged procedure, and

he intervened as soon as the sensation became 'unpleasant'. At the end of the anaesthetic his first action was to apologise to Patricia:

**VR:** 'How are you doing?'

**Pat:** 'Not bad, they were pulling at my skin.'

**VR:** 'Sorry about that.'

**Pat:** 'It's alright, it wasn't you.'

**VR:** 'But I was the one who was supposed to stop it.'

**Pat:** 'You did a good job.'

**Me:** *On the way back to the anaesthetic room I ask Vernon if he thinks that was a good anaesthetic.*

**VR:** 'I'm disappointed that she was sedated, and you had to witness it...'

**Consultant anaesthetist Vernon Rowntree and Patricia, following Patricia's anaesthetic, Beckfoot**

Here, the difference between the anaesthetist's perspective and that of the patient is marked: to Patricia, her discomfort was an understandable and expected part of the process and the anaesthetic was a complete success<sup>182</sup>. To Vernon however, the anaesthetic was a failure; it was insufficient to remove the sensation of surgery and he came uncomfortably close to having to convert to GA. Consistent with Wendland's (2007) observation about the different values assigned to morbidities of similar magnitude, although Patricia's intra-operative discomfort was the focus of Vernon's concern, it was not the most painful moment: prior to her spinal anaesthetic she was sat-up to allow Vernon access her back, a process that was evidently painful despite her FICB. Despite Patricia's discomfort however, Vernon and the team treated this as a part of the normal routine, employing coaxing and encouragement rather than analgesic drugs: only pain that was unexpected was treated pharmacologically.

**VR:** 'Let's just sit you up a bit more.' *He elevates the head of the bed to about 60 degrees.*

**Pat:** 'Ooh.' *She screws her face up – movement is very painful.*

**VR:** 'You're not going to manage, are you?'

**Pat:** 'I'm ok.'

**VR:** 'Do you have any pain now?'

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<sup>182</sup> In our subsequent post-operative discussion, Patricia's reflection on her anaesthetic was replete with superlatives; it was 'perfect', and 'like Heaven.'

**Pat:** 'It's ok when I'm not moving.'

**VR:** *Takes the pillow from behind Patricia's head and placed it on her lap. 'Reach for your toes... Are you going to sit yourself up? I'm not going to force you.'* *Vernon and Adelyn manage to coax Patricia to sit herself up to 90 degrees.*

**VR:** *Drops the back of the bed whilst Adelyn supports Patricia in a sitting position. 'Can we do that?' He palpates Patricia's back with his right hand. 'That's perfect. You've done really well there. It's amazing what you can manage isn't it?'*

**Pat:** 'I'm determined to help you. You helped me.'

**Consultant anaesthetist Vernon Rowntree, ODP Adelyn Lovell, and Patricia, prior to Patricia's anaesthetic, Beckfoot**

To Wendland (2007), the invisibility of 'intentional wound[s]' is a scandal, facilitating the construction of an agenda which casts natural birth process as 'deviant and "risky"' whilst promoting Caesarean section as the safe, controlled alternative. In hip fracture anaesthesia there is an important difference however; there is no 'natural' option. The starting point is a pathological injury, and whether minimally invasive or comprehensive, anaesthesia involves interference with numerous natural processes.

Unlike the obstetric researchers discussed by Wendland, Vernon does not appear blind to Patricia's pain. His approach is not to ignore it, but to enrol Patricia as a member of the team and give her the option to try to prevail over her discomfort and position herself, a role in which Patricia seems happy to participate. By supporting Patricia through her pain rather than attempting to abolish it, Vernon maintains some normality in an otherwise profoundly abnormal situation; this is akin to 'working with pain' as described in the midwifery literature (e.g. Leap and Anderson 2004), in which psychological support is advocated for 'normal pain' and pharmacological intervention is reserved only for 'abnormal' cases. Within Patricia's case, a demonstration of the benefits of the non-pharmacological approach is borne-out: 'working with pain' appeared to result in a small sense of triumph for Patricia when she eventually sat herself up, but in both instances where sedative medication was employed to treat 'abnormal' sensation, over-sedation resulted. Why then did Vernon adopt two

different approaches to unpleasant sensation during Patricia's anaesthetic? The pain on positioning was incurred in order to achieve what Vernon deemed to be a worthwhile goal, the administration of spinal anaesthesia, whereas the intra-operative discomfort two and a half hours later served no purpose. To Patricia however, without the nuanced healthcare professional perspective, not burdened by feelings of professional pride, and lacking personal experience of similar procedures in the past, both episodes were simply part of a journey that she was prepared to endure in pursuit of her goal – the repair of her fractured hip. This supports Wendland's view (2007) that distinctions which are drawn by clinicians and researchers do not map to the patient perspective; a finding that will be discussed in more detail in Chapter 7.

### **Blood Pressure: a Worked Example of Anaesthetic Approaches in Action**

The approach to anaesthetic side effects provides another lens through which the concepts of minimally invasive and comprehensive anaesthesia can be viewed: in minimally invasive practice, in order to achieve *transience* physiological disturbance must be avoided, whereas in comprehensive anaesthesia, physiological disturbance may be tolerated in pursuit of *control*, or otherwise it must be treated in order to restore a state of relative 'normality.' In the final section of this chapter, I consider how one such side effect, hypotension, is managed in different anaesthetic approaches.

Arterial blood pressure permits blood to flow against resistance in order to perfuse the vital organs. Anaesthesia and surgery can impact on blood pressure in a number of ways: most anaesthetic agents are cardiac depressants, pre-operative starvation and bleeding reduce blood volume, and both general and regional anaesthesia cause

vasodilation. A reduction in blood pressure is termed 'hypotension', though there is little agreement in the medical literature about what constitutes its onset, with some favouring arbitrary values and others preferring a relative definition, typically a percentage drop from pre-operative values (e.g. Brady and Hogue 2013).

Hypotension has a special significance in hip fracture anaesthesia: the influential ASAP-2 study (White et al 2016a) found that even small reductions in blood pressure are associated with increased mortality, a concerning finding considering that more than half of hip fracture experience 'significant hypotension' during their anaesthetic (Boulton et al 2014). On the basis of their findings, White and colleagues suggest that hip fracture patients are at particularly high risk of 'critical organ hypoperfusion'.

Though the ASAP-2 study demonstrated a correlation between increased doses of intrathecal bupivacaine and hypotension, the authors admit that this association is statistically 'weak' and suggest that interventions by the anaesthetist such as fluid or vasopressor administration may have made any 'direct causal effect' of high dose bupivacaine difficult to detect. Hypotension therefore has a complex relationship with anaesthesia, one that quantitative methodologies are ill-equipped to understand.

Viewing the concept of hypotension through the lens of the minimally invasive and comprehensive anaesthesia allows an understanding of how the approaches side effects of anaesthesia depend on the ideologies that are employed. The anaesthetists in my study were universally aware of importance of hypotension, but their actions relating to it depended on whether they adopted a minimally invasive or comprehensive approach. In this sense, hypotension provides a useful example of how

the concepts of minimally invasive and comprehensive anaesthesia interact with the undesirable actions of anaesthetic drugs and techniques.

To proponents of a minimally invasive technique, treatment of anaesthesia-induced hypotension is not the goal. Instead, they aim to mitigate the risk of it occurring in the first place. The most forthright proponent of this approach was Longside anaesthetist Joshua Varnham, who was unique in not drawing up any 'emergency drugs'<sup>183</sup> prior to his anaesthetic:

**Me:** 'I noticed that you didn't draw up emergency drugs?'

**HB:** 'He doesn't believe in them.'

**JV:** 'I've always thought that there are five things you can do if the blood pressure is low: turn the anaesthetic down, give fluid, if you're ventilating then make sure the CO<sub>2</sub> is normal...'

**Me:** 'What are the other two things?'

**JV:** 'You're right, maybe there aren't five things. Classic *viva* mistake...'

**Me:** *I feel guilty for putting him on the spot* 'It's not an exam.'

**JV:** 'Actually maybe there are five: you can let the surgeon start, or position them if, for example, they're sitting up. If you have them it's tempting to use them.'

...

**JV:** 'The data shows that a [mean arterial pressure] below 55 gives a worse outcome. I would treat below that; but I'd wait for the next BP. I try not to give [drugs] where I don't need them. If I'd just given 20ml of propofol I'd be more inclined to give vasopressors.' *Propofol is a drug that Joshua avoids in hip fracture anaesthesia. 'I know the evidence shows that a low BP is bad, but does it show that treating it with ephedrine helps?' I get the impression that this speech is a well-trodden path. 'It makes you give lazy anaesthesia. It's, like, a cultural thing. They tell you when you're a new SHO that you'll take your stethoscope off from round your neck after a year – and you do! And where I trained, as an SR you stop drawing up emergency drugs.'*

**Consultant anaesthetist Joshua Varnham and ODP Harvey Bramson, Florence's Anaesthetic, Longside**

In the above excerpt, Joshua is derisory towards those who allow the circumstances to develop where pharmacological treatment of hypotension is required. To him, giving a dose of anaesthetic that induces hypotension and then opting to treat it with another drug is 'lazy': an inelegant solution to a problem that should not occur. In outlining his argument against defaulting to vasopressor therapy, Joshua raises a key

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<sup>183</sup> 'Emergency drugs' are often drawn up before a high-risk anaesthetic. They typically include a vasopressor (e.g. metaraminol) with which to treat vasodilation, and an anticholinergic (e.g. glycopyrrolate) with which to treat bradycardia.

point: though there is evidence that hypotension has negative consequences, we do not yet know the importance of the means by which hypotension is avoided or treated. Joshua's argument is that by inducing hypotension and then correcting it pharmacologically<sup>184</sup>, a different situation arises to that which would have been present if hypotension had been avoided. Though the 'visible' blood pressure reading is maintained on the monitor, this may at the expense of blood flow to vital organs in the patient<sup>185</sup>. The patient's ability to communicate under anaesthesia is therefore corrupted; the blood pressure becomes further detached from what it is supposed to represent. Furthermore, patients do not respond consistently to vasoactive agents: a dose that produces only a small increase in blood pressure in one patient may precipitate an exaggerated reaction in another:

**Me:** *To Nicholas: 'Are you targeting a particular blood pressure?'*

**NS:** *'The objective is to keep the systolic around a hundred.'* *As we chat the BP cycles – 95/55. Nicholas notices that he's run out of metaraminol – he goes into the anaesthetic room and returns with 2mls more in a 5ml syringe. He gives 1ml (0.5mg). 'You ok Jean?'*

**Jean:** *Nods*

**Me:** *'Is a hundred your objective, or has Nathan told you to target that?'*

**NS:** *'That's Nathan's objective.'*

**Me:** *'If you were doing this on your own would you pick a hundred as well?'*

**NS:** *'I think it's reasonable, she's got [ischaemic heart disease]... There's a sticker around here somewhere with suggested parameters. If I was on my own, I'd use that.'*

**Mon:** *Cycles BP: 151/88*

**NS:** *'We've overshot a bit there. Never mind... Obviously I want to balance perfusion with haemorrhage.'*

**Anaesthetic SHO Nicholas Steele, during Jean's anaesthetic, Beckfoot**

In the above observation trainee anaesthetist Nicholas administers a conventional dose of the vasopressor metaraminol in order to increase Jean's systolic blood pressure above the 'objective' of 100mmHg. Nicholas' diligence in his pursuit of this

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<sup>184</sup> Joshua refers to ephedrine, an agonist at alpha and beta adrenoceptors which causes an increase in heart rate and contractility, as well as constricting blood vessels, as an example.

<sup>185</sup> For example, according to the review on *the splanchnic circulation* by Harper and Chandler (2016), the vasopressor phenylephrine is stated to cause a reduction in blood flow to the gut.

value results in what he describes as ‘over[shooting]’ by a substantial degree. He is clearly aware that this is not ideal as it may increase the rate of surgical bleeding, but perhaps more important is that Nicholas’ approach leads to a sudden alternation between low and high blood pressure. ‘Alpine anaesthesia’, so named due to the peaks and valleys that are seen on the anaesthetic chart as the blood pressures are recorded, has attracted recent attention as a predictive factor for postoperative delirium (Devinney et al 2015, Hirsch et al 2015). As with Patricia’s case (above) Jean has received a somewhat more ‘comprehensive’ anaesthetic than is the institutional norm, and Nicholas has had to react in order to mitigate the hypotension induced by the technique. In other cases, either when the patient was particularly frail or when the anaesthetist felt compelled to deliver a yet more ‘comprehensive’ technique, significant hypotension was deemed to be a virtual certainty, and instead of opting for a ‘reactive’ strategy, the onset of hypotension was pre-empted:

**TC:** *Gets on with the anaesthetic straight away: He places the facemask on Ralph’s face and turns the oxygen on – I can’t see the flow rate. ‘Something to relax you.’ He gives 1.5ml (75mcg) fentanyl. ‘Something to stop you feeling sick.’ 2ml (4mg) ondansetron. He starts the meraraminol infusion at 5ml (2.5mg)/hr. ‘Now, some penguin milk.’ He gives 5ml (50mg) propofol. ‘I’ve come to the conclusion that calling it “penguin milk” works better with adults than with kids...’*

**Associate specialist anaesthetist Tobias Clifford, during Ralph’s anaesthetic, Beckfoot**

In this scenario Tobias, usually a proponent of spinal anaesthesia, had opted for a GA because Ralph, the patient, takes the antiplatelet agent clopidogrel, which theoretically increases the risk of bleeding in the spinal canal following spinal anaesthesia (Harrop-Griffiths et al 2013). Though his spinal anaesthetic technique has

many minimally invasive features<sup>186</sup>, Tobias adopts a more comprehensive approach for this GA:

**TC:** '... I'm not going to do this gas induction shit, I think its bollocks.'

**Me:** 'Why?' *It's a technique I often use in my own practice.*

**TC:** 'It's an hour and a half operation, they can't breathe on their own. He's eighty-five so I'll have to give pressure support anyway. I might even paralyse him to help the surgeons get the hip in and out. If it's difficult for them it takes longer, and you don't want that. So, this is the one time I might actually help the surgeons.'

**Associate specialist anaesthetist Tobias Clifford, prior to Ralph's anaesthetic, Beckfoot**

Tobias' rejection of minimally invasive principles (i.e. inhalational induction, spontaneous respiration) are based on legitimate concerns relating to frailty and the need for a quick operation. Having decided to adopt a comprehensive technique however, Tobias is pragmatic about its likely complications and does not wait for them to occur, instead he starts the metaraminol virtually simultaneously with administering the propofol, planning for their cardiovascular effects to cancel one another out.

### **Institutional Norms and Anaesthetic Ideologies**

Anaesthesia, then, can be classified in terms of invasiveness as well as in terms of mode. On this basis of classification there exists a continuum of approaches, from the minimally-invasive prioritisation of *transience*, to the comprehensive prioritisation of *control*. As described above, both of these techniques have advantages and disadvantages in the hip fracture context, in which anaesthetists must account not only for the needs of the patient, but also the requirements of the operation, the practices of the surgeons and the norms of the institution. Though there was an

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<sup>186</sup> In my other observation with Tobias, he gave Linda a FICB, a spinal with 2ml of 0.5% bupivacaine and 20mcg fentanyl, and a small titrated dose of midazolam sedation (2mg total) – all compliant with ASAP's 'minimally invasive' standards (Boulton et al 2014)

appreciation of the potential benefits that a minimally-invasive anaesthetic could offer across all institutions, in some cases it was felt to be too fragile an approach to meet the other requirements of practice.

Here, there were institutional trends; at both Longside and Beckfoot anaesthetists tended towards a minimally invasive approach by default, whereas at Mellbreak a more comprehensive approach was predominant, with minimally-invasive anaesthesia being reserved for unusual cases (e.g. Jonathan Sidney and Joy, Chapter 5). However, no institution could be described as fully-committed to either ideology; whereas Beckfoot anaesthetists tended to use low-dose spinals, for example, the use of additional sedation was prevalent, and at Longside endotracheal intubation tended to be used in preference to supraglottic airways. Likewise, at Mellbreak the concepts of minimally invasive anaesthesia were not abandoned altogether, instead they were accommodated where it was deemed appropriate, within a general approach that was comprehensive in nature (e.g. Elroy Ashworth's use of BIS with Gloria, above). Adding an axis that represents invasiveness to the graph of anaesthetic techniques provides a new perspective on anaesthesia: the institutions that are the most divergent on the basis of mode are the most coherent on the basis of invasiveness (figure 23).

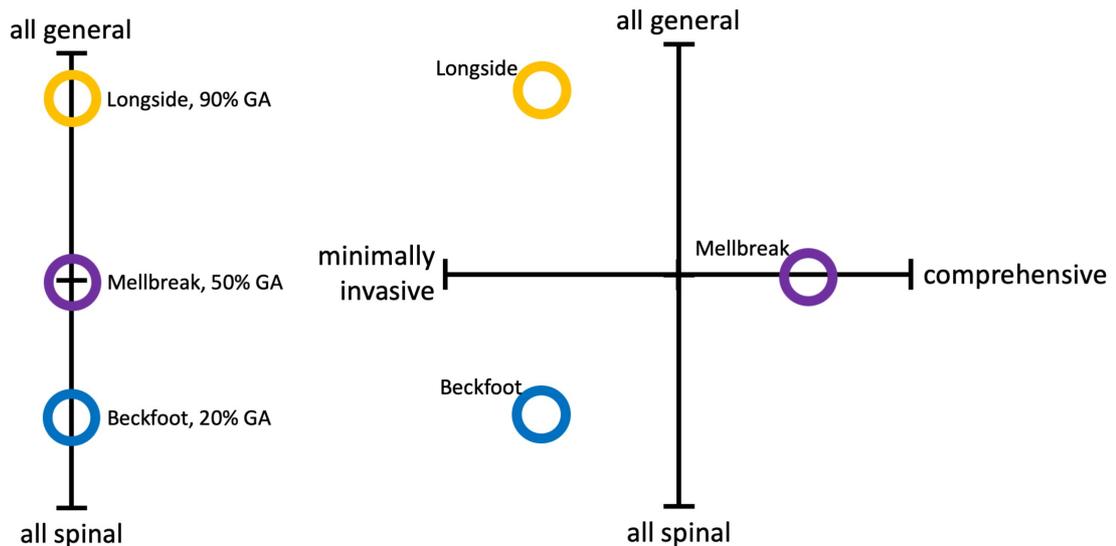


Figure 23: Anaesthetic mode, and plotted against 'invasiveness'  
(mode to the nearest 10%)

What makes it more possible to deliver minimally-invasive anaesthesia at Beckfoot and Longside? To some degree, it appears that the institutional practices of Mellbreak which are outside the control of the anaesthetist such as the time taken for surgical repair, compel them to deliver more comprehensive anaesthesia. But my analysis also indicates that by concentrating on one mode, both Beckfoot and Longside have been able to finesse their practice in order to minimise its invasiveness:

**JV:** 'Maybe the national advice about supraglottic airways is because you've then got the benefits of spontaneously breathing and it may be that they just don't feel a, you know, there's not enough experience of an intubated but spontaneously breathing technique to actually recommend that, but that may be a better option to me.'

**PL:** 'It would have to be that much deeper to tolerate an ET tube though.'

**JV:** 'Yeah, I agree as well.'

**DM:** '...a little bit of Lidocaine spray on the cords...'

**JV:** 'Well that's what I do, yeah...'

**VB:** 'I did use a bit of paralysis and I often did ventilate them through the case, obviously with a very light anaesthetic and I've, so I'm probably a little heavier than Duncan's approach, but they were breathing by the end of the case, so I'd let them kind of come around and start, but they just get like 20mg of atracurium or something...'

**DM:** 'And I only use like, 20mg of sux...'

**JV:** 'Oh, I don't use any paralysis...'

**Consultant anaesthetists Joshua Varnham, Pamela Lynton, Duncan Myers and Vaughn Bates, focus group, Longside**

Above, Longside anaesthetists discuss how they achieve spontaneous breathing together with endotracheal intubation, a fusion of a minimally invasive approach to breathing and a comprehensive approach to airway management. Importantly, it is evident that they all do so differently. They have developed their own versions of minimally invasive practice that exceed the expectations of what Joshua refers to as the 'national advice': in ASAP (Boulton et al 2014) there were no recorded cases in which intubated patients had a spontaneously-breathing anaesthetic, and yet in 2018 four anaesthetists sat together in a focus group and explained how they can achieve this in four different ways. What the Longside anaesthetists describe here is a series of new practices, inspired by what they see as the benefits of minimally invasive anaesthesia reconciled with those of a comprehensive approach. Their development appears to have been achieved through an iterative process, gaining and sharing experience of making incremental adjustments to their technique.

### **Invasiveness and the Good Anaesthetic**

To the most ardent proponents of minimally invasive anaesthesia such as Joshua Varnham, an anaesthetic in which side effects occur is one in which too much anaesthetic has been given. *Transience* is the guiding principle. In order to accomplish this, anaesthetists reduce their doses and find ways for their patients to indicate their needs as the anaesthetic proceeds. Anaesthetists who adopt a comprehensive approach are also aware of the importance of the side effects of anaesthesia, however they prioritise *control* over *transience* and as a result, accept that side effects will occur. Some pre-empt these undesired effects of anaesthesia, for example by starting vasopressors prior to giving the induction agents. Between these two extremes there is a middle ground where elements of comprehensive and minimally-invasive practice

are evident and a reactive approach to side effects is adopted. This strategy represents the majority of practice and suggests that few anaesthetists are fundamentally committed to either the minimally invasive or comprehensive paradigm. Instead, they adopt a flexible approach, tending towards the minimally invasive where possible but accepting incremental moves in the direction of the comprehensive when circumstances dictate.

What divides institutions is not the knowledge of the principles of minimally invasive anaesthesia, but faith in whether its benefits are worth its drawbacks. At Mellbreak, this manifests as a preponderance of the comprehensive, whereas at Longside and Beckfoot, anaesthetists have worked to produce versions of minimally invasive anaesthesia that suit their institutional practices, facilitated in-part by concentrating on one anaesthetic mode. The corollary of this is that, if anaesthetists wish to pursue a more minimally-invasive approach, they cannot unilaterally decide to do this; anaesthesia is never an end in itself. The surgeons, operations and institutional practices may also need to change if minimally invasive anaesthesia is to be accommodated; surgery may need to be faster, strategies to deal with spinal anaesthesia wearing off may need to be developed, and positioning time may need to be 'claimed' and minimised. A minimally-invasive *standard* may be achievable, but *standardisation* does not appear to be the way to achieve it. Instead, practice needs to be tailored to the context in which it is enacted.

Analogous to Einstein's declaration on simplicity, to the majority of anaesthetists regardless of their preference for general or regional anaesthesia, *everything should be as minimally invasive as it can be, but not more so.*

### **A Note on the Chapter That Follows**

In the final empirical chapter, I focus on patients' experiences and priorities regarding hip fracture anaesthesia care, and how anaesthetists connect with these. Though much of the material was obtained whilst shadowing medical professionals, I found it invaluable to record discussions with patients when possible.

Many of these patient encounters would be considered extremely brief by the usual standards of qualitative research; their median durations were 7 minutes (pre-operative) and 9 minutes (post-operative) in length. This I ascribe to the situation in which they were recorded: during the in-hospital interviews patients were in an unfamiliar environment, often tired, and under the influence of analgesic medication yet uncomfortable. Indeed, the difficulty of acquiring patient accounts during episodes of acute illness are well recognised: as Rier (2000) points out, even sociological illness narratives scarcely include 'the perspective of the patient during the weakest, impaired state', instead focusing on pre- or post- illness experiences.

The follow-up interviews were similarly concise (median duration 12 minutes), and I believe this to be an important finding in itself. Though I was asking patients to describe what was unanimously recalled as a traumatic time and a certain brevity is therefore understandable, it is perhaps more important that even six months post-injury, almost every patient was still experiencing significant ill health and disability relating to their injury and its subsequent management. Hip fracture is not simply an acute injury; in many cases it represents the beginning of a chronic disabling illness. I am therefore grateful that the patients were willing to participate at all.

Though the quantity of data was limited, I found the patient accounts to be universally enlightening – anaesthetists rarely have the opportunity to visit patients post-operatively, and long-term anaesthetic follow-up is virtually non-existent. It was therefore the first time in my career that I was able to hear accounts such as these. I hope that I have been able to represent these hip fracture patients' experiences authentically in the chapter that follows.

## Chapter 7: A Good Anaesthetic... is Easily Forgotten

I telephone Carmel at home and, after the usual preliminaries, I begin our follow-up discussion by asking how she feels. She responds to my question flatly: 'Terrible. I have been very, very disappointed.'

I double-check my notes as we continue; the last time I talked with Carmel was on the day of her operation, three hours after her return to the ward. At that time, she was effusive, looking forward to her recovery; our discussion had been enjoyable for us both. Her optimism, so remarkable previously, is now entirely absent. I ask her why; she tells me that she still can't walk properly, but what is really bothering her is her memory.

Fifteen difficult minutes later we say our goodbyes. I am struck by the deterioration in her quality of life, and her recall of the hospital episode is harrowing. I go back through my notes from six months ago once again:

It is the 12<sup>th</sup> December 2017, I stand at the foot of Carmel's bed in the hip fracture ward of Longside\_Hospital with my notebook. Carmel manages to look dignified despite her situation; she is sat up in bed and I note that unlike many patients she's done her hair and make-up. Consultant anaesthetist Arlo Holme introduces himself cheerily and talks reassuringly. 'Had a bit of a tumble? We'll get you fixed today, get you up tomorrow.' As they talk, I jot down some details:

Carmel is 89 years old, is usually in good health,<sup>187</sup> and leads an independent life. Yesterday she stumbled and fell whilst at a local café, a place she visits regularly. Though she only fell from a standing height she had severe pain in her left groin and couldn't get back up; the staff at the café called for an ambulance. She was admitted to Longside Hospital, an x-ray was taken, and she was diagnosed with a fracture of her left hip. She's had a sleepless night in a shared bay of the ward, the woman next to her having been delirious and agitated overnight.

Arlo goes on to explain the anaesthetic: 'We'll get you down, check who you are, attach some monitoring, give you a nice strong painkiller and get you off to sleep. I'll put some local anaesthetic in.' He doesn't say much about risks, apart from pointing out that 'it can make your teeth a bit more wobbly', but this doesn't seem to matter to Carmel, her priority is to get her hip fixed.

The operation goes as planned. Carmel's anaesthetic lasts for about an hour and a half, her blood pressure doesn't drop much, and Arlo is diligent in limiting the doses of narcotics and sedatives. Carmel seems drowsy but comfortable in the recovery room. A few hours later I see her on the ward; she is wide awake, fully oriented and able to converse. I talk to her about her experience. She doesn't recall much detail but she is clearly happy; she went to theatre first-thing in the morning and received 'very good attention'. She laughs and jokes as we talk; her dialogue is awash with superlatives. She describes her anaesthetic as 'perfect' and 'excellent'; she tells me the staff were 'marvellous.'

### **An account of Carmel's experience (operation at Longside)**

This is a chapter about forgetting and its relationship with a 'good anaesthetic.' In the above account there are two forms of forgetting for Carmel. As with many of the respondents in my study, when I asked about her anaesthetic she couldn't recall the

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<sup>187</sup> Her only active comorbidities are osteoporosis and psoriasis. Of note, she fractured her right hip two years previously and seems to have made a good recovery.

detail. All she could tell me about what happened was that she ‘saw a lot of people.’ Her early, positive, feedback centres on these people; her interactions with staff and what they did for her. She was pleased to have had her surgery promptly, reassured by the way the staff ‘put her at ease’, and impressed that the anaesthetist was a ‘specialist.’ Forgetting the detail of her anaesthetic was not a problem, its inconspicuous nature was an asset; it made her surgery as easy as possible. Maybe Carmel didn’t lose this knowledge, perhaps she just didn’t see a need to remember what seemed like a trivial component of her care. The second form of forgetting is of a different sort; six months after her operation Carmel is struggling with her memory and can’t remember how to do simple things that she used to be able to do before. Her independence is compromised, her quality of life affected.

There is also a form of forgetting for Arlo, the consultant anaesthetist, here. He was well aware of the risk of cognitive complications following hip fracture repair; he mentioned them to me during the observation and specifically took steps to prevent his anaesthetic from contributing to them, yet he did not mention them to Carmel. What sort of forgetting was this?

Forgetting is important in the experience of the ‘good anaesthetic’: forgetting about anaesthesia because of its apparent ease and simplicity is a marker of quality; forgetting how to live your life as you once did obviously is not. Why do anaesthetists ‘forget’ to talk about these complications? Though this appears contrary to legal and practice guidance, I will argue that it is rooted in a form of sensitivity to patients’ needs. Forgetting then is sometimes good, sometimes bad, and sometimes perceived as a necessary workaround. The good anaesthetic involves *the right kind* of forgetting.

### Outcomes Matter to Patients More Than Interventions

Before moving on to discuss what is forgotten, I will consider a key question about the 'good anaesthetic': what do patients want? This was first addressed in my study in the pre-operative encounters with patients in which I tried to gauge their hopes, concerns and expectations about their forthcoming anaesthetic. It should be noted that at this point they had not yet undergone their pre-operative consultation with their anaesthetist and therefore had not been made aware of any potential complications of anaesthesia, a body of knowledge from which, as described in Chapter 5 patients are often 'alienated'. It should also be noted that, amongst hip fracture anaesthesia research, this context of my study is somewhat unique; other studies have consulted patients only once they have recovered from their injury (e.g. O'Donnell et al 2019, Fernandez et al 2018). In my study however, patients were first encountered at a point when they were about to be asked to make a real-world decision in the midst of a painful injury, often in the absence of adequate analgesia.

Pain was a near-universal complaint amongst patients I spoke with pre-operatively; though some had received a fascia iliaca compartment block (FICB) at the time of their admission, their wait for surgery was usually long enough time for its effects to have worn off. This left them to rely on the analgesia offered by the nursing staff on the wards (limited to oral or intravenous agents, often dosed conservatively in order to attempt to avoid side-effects) in order to 'bridge the gap' between admission and surgery. Beatrice articulates the inadequacy of this strategy:

**Me:** '... so you've waited a day and a half already?'

**Bea:** 'Yeah.'

**Me:** 'What's it been like?'

**Bea:** 'Terrible, 'cause I'm in so much pain.'

**Me:** 'What's the pain like?'

**Bea:** 'Awful, they come to give me bed pans and turn me over on my back leg and it's absolutely... I scream in pain.'

**Me:** 'And have they given you painkillers? Have they helped at all?'

**Bea:** 'They have, and they've given me morphine as well.'

**Me:** 'What's that like?'

**Bea:** 'Shocking.'

**Me:** 'Why?'

**Bea:** 'Makes my lips all dry. I didn't have anything to eat until today when they said I'd be having it done tomorrow.'

**Me:** 'Yeah?'

**Bea:** 'But I couldn't eat it because I was so hungry... it just made me retch.'

**Beatrice, pre-operative, Beckfoot**

Beatrice's description of partial analgesia is typical of the accounts offered by respondents, their drugs titrated so their pain was tolerable at rest but still agonising on movement. Here, the staff on the ward have used morphine, a strong opioid analgesic with a side effect profile that may explain Beatrice's gastro-intestinal symptoms of dry mouth and retching (e.g. White et al 1999), which in turn have affected her ability to eat and drink. This combination of pain and side-effects is the unfortunate reality for hip fracture patients awaiting surgery and is the context in which they are 'consented.'<sup>188</sup> It is not surprising therefore that the first priority articulated by patients was simply to be able to promptly proceed with surgery. The possibility that surgery would end the torment of their current situation meant that the significance of any risks appeared minimal<sup>189</sup>, even when those risks were obviously severe:

**Me:** 'you mentioned the concern about being aware... Do you have any other concerns about your anaesthetic, or...?'

**Har:** 'No.'

**Me:** 'Ok...'

**Har:** 'I know that they told me there is possibilities, you know, you might die through it.'

**Me:** *I am taken aback by the bluntness of her response* - 'Ok, who told you that?'

**Har:** 'Well when you signed the forms, they say it on there.'

**Me:** 'Ok, the consent form that the surgeon asks you to sign?'

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<sup>188</sup> 'Consented' is often used as a passive verb in medicine – as in 'have you consented the patient in bed three?'

<sup>189</sup> There were no instances in which surgery was offered that patients declined to consent.

**Har:** 'Yeah, I think there's all sorts of things on a list, I think you can have another stroke.'

*Harriet suffered a stroke five years previously.*

**Me:** 'Ok, did they...'

**Har:** *Cuts me off* – 'Well, I'd rather have the operation than go through this pain!'

**Harriet, pre-operative, Longside**

Hip fracture patients' unwavering eagerness to proceed is notable in the context of previous research. Working with patients with a 'limited life expectancy',<sup>190</sup> Fried et al (2002) conducted an interview-based study which assessed patients' willingness to proceed with hypothetical treatments that were stated to be able to save their life and restore their 'current level of health', but with different levels of 'burden' and different probabilities of complications. This study demonstrated that as the risk of complications increases, patients' willingness to undergo treatment diminishes, with cognitive disability perceived as a greater disincentive than physical disability, which in-turn was a greater disincentive than death.

However, Fried's work was conducted in participants' own homes, indicating that participants were relatively well at the time of the study. Hip fracture patients have more immediate benefit to gain – due to the acute pain and disability associated with the fracture, the prospect of a successful treatment is not restorative but transformative. Surgery offers the possibility of removing the pain, and the prospect of remobilising and regaining independence. This reinstatement of prior capabilities was an important expectation:

**Me:** 'Is there anything you're particularly worried about with regards to this injury...?'

**Alb:** 'No, I just hope when it's all done and dusted, I'll be able to get around as I did before.'

**Albert, pre-operative, Beckfoot**

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<sup>190</sup> Fried's participants (2002) all had a diagnosis of either malignancy, cardiac failure or chronic obstructive pulmonary disease.

Here, Albert phrases his concern optimistically: hoping that he will be able to ‘get around as [he] did before.’ However, hip fracture patients rarely reach the level of physical function that they possessed prior to injury. According to the 2017 report from the NHFD (Boulton et al) only 10% of patients described themselves as ‘freely mobile without aids’ 120 days following hip fracture, whereas 37% possessed this level of mobility pre-injury. Similarly, 9% of patients stated that they were ‘completely immobile’ 120 days post fracture, compared with 1.3% pre. Amongst the patients in my study however, Albert is atypical – aged 64, he was one of only three to be in paid employment at the time of his injury and displayed no overt features of frailty. He was therefore in a relatively advantageous position recover from his injury.

A more typical case is that of Gail, a 98-year-old woman who slipped and fell at home whilst rushing to answer the telephone. When I first met Gail, she was lying in a hospital bed in a shared bay of the hip fracture admissions ward at Longside hospital. She was evidently frail and almost skeletally thin – I estimated her weight at around 40kg – but she was engaging to talk with and answered my questions with a wry sense of humour. When I enquired as to her usual function, she explained that she had been ‘housebound for years’, reliant on carers, her son, and a neighbour for support. Though her baseline state of health was markedly different from that of Albert, her ambitions for her recovery were much the same – as she put it, to ‘get it over with and then to go home’; her expectations for her recovery were presented as if her pre-injury function limited the scope for further deterioration:

**Me:** ‘...what do you expect your recovery will be like? Do you think it will be...?’

**Gail:** *Cuts me off* - ‘I’ll still be housebound.’

**Gail, pre-operative, Longside**

When I talked with Albert six months after injury he had managed to return to his work as a truck driver and therefore possessed a reasonable level of general health<sup>191</sup>, however he was limited to working short days and was experiencing serious pain in his upper leg whilst sitting at the wheel. He summarised what his recovery had involved:

**Alb:** 'Well, initially, not being able to sleep. I was downstairs in the front room, downstairs toilet, most of the night I was awake. Mobilising yourself, getting yourself up in the morning. A lot of discomfort just literally just trying to get yourself up because after the operation there was a lot of discomfort. Your muscles were aching because there was a lot of bruising. I suppose, yes, where the operation was in itself. Then as time went on, a lot of muscle wastage, so you've got to try and build your body back up. A lot of it you've got to do for yourself. Recently I've been to a gym where I've had a few sessions where you're pushing yourself in the gym so as I could actually get back to work. It's down to you to make your recovery. It's certainly not 100% but if I hadn't done what I'd done, I don't think I'd be back at work just yet.'

**Albert, follow-up (operation at Beckfoot)**

What Albert articulates is typical of respondents in my study and consistent with the findings of the NHFD: his function had declined. In his case he had attempted to mitigate this deterioration through 'try[ing] to build [his] body back up', though this required a level of dedication which may be unattainable for frailer patients. Through this self-directed rehabilitation, Albert was able return to work but on restricted duties. For less independent patients however, a proportionally similar degree of deterioration could mean the difference between living in their own home and institutional care. The importance of this was emphasised by Tabitha who was mindful of the precarious nature of her pre-fracture state:

**Tab:** '... that's all I'm worried about, coming through it. The doctor laughed when I said it... Coming through it and, more, you know, that it doesn't slow my activity down 'cause it's only a little bit now and I don't want it to slow down any more, that's all I'm worried about.'

**Tabitha, pre-operative, Beckfoot**

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<sup>191</sup> Heavy goods vehicle drivers are required by law to be certified as being in 'reasonably good health' by a doctor (see <https://www.hgvtraining.co.uk/hgv-medical/>).

Does anaesthesia play a role in regaining prior function? Major complications of anaesthesia (e.g. stroke, as mentioned by Harriet) certainly have enduring negative consequences, but for anaesthesia that proceeds as intended there is less certainty. Restoration of mobility may be seen as being predominantly dependent on surgical outcome and rehabilitation, and therefore peripheral to the practice of the anaesthetist. There is however an indirect connection: ‘minor’ anaesthetic-related complications such as inadequate pain relief, nausea and vomiting, prevent early mobilisation, engagement with physiotherapy, and adequate nutrition, all of which are associated with an improved functional recovery and reduced mortality (e.g. Siu et al 2006, Malafarina et al 2018).

Regarding cognitive function there is building evidence that the subtleties of anaesthetic technique may play a role in the development of delirium and long-term cognitive dysfunction (e.g. Radtke et al 2013, Miller et al 2018). Acknowledging this, the *International Fracture Fragility Network Delphi Consensus Statement on the Principles of Anaesthesia for Patients with Hip Fracture* (White et al 2018), based on the opinions of ‘expert’ hip fracture anaesthetists,<sup>192</sup> stated (p870) that the maintenance of pre-operative cognitive trajectory and the facilitation of early re-mobilisation constituted ‘the two fundamental aims of conducting anaesthesia for hip fracture patients.’

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<sup>192</sup> I was one of 27 contributors to this work.

## Patient Perceptions of Anaesthetic Mode

Patients' priorities, to have a prompt operation and return to their pre-injury level of function, are *outcomes*. Achieving these outcomes relies on undergoing an anaesthetic *intervention*; either spinal or GA, one of the many interventions that constitutes a course of treatment (including surgery, physiotherapy, ward-based care and so-on). The important differences between *outcomes* and *interventions* are discussed in Fried's study (2002) in which she concludes that patients' willingness to proceed with a treatment relies primarily on the *outcomes* that it may produce, not on the *interventions* that it involves; without knowing the likely *outcome*, patients are unable to decide if the risks and burdens of *interventions* are worthwhile. And yet, she contends, consent processes are often limited to discussing only the *intervention* in hand.

In my pre-operative encounters, I discussed patients' hopes and expectations about anaesthesia. Here, patients tended to describe a desire to be unaware of the sensations of surgery (an outcome). However, the anaesthetic technique by which this should be achieved (an intervention) was very rarely mentioned. Instead, analogies tended to be used:

**Gail:** 'If I go out far, that would suit me very well....'

**Gail, pre-operative, Longside**

**Alb:** 'Well I suppose it's to go under and basically when everything's done and dusted, not really know a lot about it and just move forward.'

**Albert, pre-operative, Beckfoot**

In common with most other patients, Gail and Albert were clear about their desired *outcomes*, not to experience the painful sensations of surgery. The language used to convey this desire for unawareness, to 'go out' or 'go under' could reasonably be

interpreted to represent a wish for GA, but likewise may refer to sedation, analgesia, or simply being able to fall asleep. Indeed, Albert makes it clear that his expectations of unawareness are modest, hoping to 'not *really* know *a lot* about it' (emphasis added), leaving room for multiple interpretations of his preference.

Ambiguous descriptions related to consciousness are recognised as an important issue in anaesthetic practice. For example, one-third of reported cases of accidental awareness under general anaesthesia (AAGA) in the American Society of Anaesthesiologists database (Kent et al 2013), and one-quarter of cases reported to NAP5 were actually experienced during sedation, a state in which the complete abolition of awareness is not the intention. Cook and colleagues explore this problem in their 2014 report of the NAP5 results, identifying a 'lack of managed expectations' as the principal reason for the occurrence of this phenomenon. They contend that imprecise language used during the consent process for sedation is in part responsible for this, with terminology such as 'asleep' being easily misinterpreted by patients as being synonymous with general anaesthesia. Smith et al's analysis of the communication in anaesthesia (2005) reveals a similar use of language during the induction of GA; sleep appears to be frequently invoked by anaesthetists as a means of providing an accessible explanation of the unfamiliar sensation of transitioning to pharmacologically-induced unconsciousness. Anaesthetists and patients therefore demonstrate similar linguistic flexibility pertaining to awareness, and this accommodates variation in anaesthetic technique. Returning to Gail and Albert, their anaesthetics were undertaken using the modes typically employed at their respective institutions: a GA for Gail at Longside, and a spinal for Albert at Beckfoot. Despite the

difference in mode however, their desire to be spared the pain of surgery was accommodated.

### Forgetting the Anaesthetic

'... If you forget something or forget to do it, you fail to think about it or fail to remember to do it, for example because you are thinking about other things...'

**Collins Dictionary (2019)**

As may be expected, patients did not share anaesthetists' appreciation of detail pertaining to anaesthetic technique. However, the extent to which different anaesthetic modes appeared to homogenise was remarkable. In the below excerpt, I interviewed Albert two days following his spinal anaesthetic:

**Me:** '...So can you talk me through your anaesthetic, what do you remember about it?'

**Alb:** 'I remember going, the anaesthetic taking over. I remember the warmth going into my... below my hip area. But of course, I asked to sleep through the operation.'

**Me:** 'Yeah.'

**Alb:** 'So it was very nice to wake up and basically it was done.'

**Me:** 'Okay.'

**Alb:** 'Quite a nice experience you know.'

**Me:** 'So you don't remember anything during the operation at all?'

**Alb:** 'No.'

**Albert, post-operative, Beckfoot**

In the interview above I was surprised about the lack of detail recalled by Albert, hence my double-checking of his memories. Albert was the first patient whom I had observed at Beckfoot, and I was struck that his account was remarkably similar to those of the patients who had experienced GA during my prior experience at Longside. This may have been a reflection of Albert receiving a small dose<sup>193</sup> of midazolam, which has amnesic properties, though this was not administered until the surgical field was draped and the start of surgery was imminent, and at this point Albert had fallen

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<sup>193</sup> Albert received 2mg of midazolam; the *British National Formulary* (2018) states that 3-3.5 mg is a 'typical' dose for an adult.

asleep without receiving any sedatives. The experiences of Jean, who did not receive any sedative medications was more striking:

**Me:** 'So was it what you expected, your anaesthetic?'

**Jean:** 'No.'

**Me:** 'What were you expecting?'

**Jean:** 'I was expecting a lot worse.'

**Me:** 'Okay, what did you think would be bad about it?'

**Jean:** 'I was going to wake up and really panic you know, but I didn't.'

**Me:** 'So were you expecting to go off to sleep?'

**Jean:** 'Oh yeah.'

**Me:** 'Yeah...' *I double-check my notes – Jean had a spinal without sedation – 'And so they didn't do that... So how did you feel then you learnt that you were going to be awake for the operation?'*

**Jean:** 'I wasn't awake.'

**Me:** 'Okay. But they were going to put a needle in your back instead of sending you off to sleep?'

**Jean:** 'Is that what they did?'

**Me:** 'Yeah.'

**Jean:** 'Oh I didn't know.'

**Me:** 'I think you just fell asleep.'

**Jean:** 'Oh I thought I went to sleep!'

**Pre-op interview with Jean, Beckfoot Hospital**

In the above discussion, Jean and I talk at cross purposes: in my role as observer it was obvious to me that she had been administered a spinal anaesthetic without sedation. However, it quickly became apparent to me in the course of the discussion that Jean did not make a distinction between induced unconsciousness and physiological sleep. As an anaesthetist I struggled with this lack of understanding and felt the need to correct Jean and inform her of my observations (though notably, I use the same problematically-imprecise language that I discuss above!). On reflection however, Jean's assumption that her unconsciousness must have been induced seems entirely reasonable when I consider events from her point of view: she was taken to the anaesthetic room, a series of unfamiliar procedures were performed which had the effect of removing her pain; she fell asleep and was unaware of the operation. My understanding that peripheral nerve blocks and spinal anaesthesia don't induce

unconsciousness<sup>194</sup> is based on knowledge acquired over nearly two decades of medical training, knowledge that most patients do not possess. When I interviewed Albert again by telephone six months later, his spinal had metamorphosed yet further into what sounded like a general anaesthetic:

**Me:** ‘... what do you remember about the anaesthetic that you had then?’

**Alb:** ‘It worked well. Basically I just, I felt as if I’d gone into a deep sleep. I remember coming out of it, I remember people talking in relation to what was going on, or maybe that was prior to going under gas, I don’t really know, I can’t remember that well. Must have been because I’d either come round from anaesthetic in the ward I guess. So, it must have been a little bit before I went under the gas, I don’t know.’

**Albert, follow-up (operation at Beckfoot)**

In his more distant recollection, Albert describes being ‘under the gas’, which appears to be a reference to inhaled anaesthesia. As with Jean, this sense-making allows Albert’s memory to fit logically with his experience. It may be that he is recalling the oxygen mask that he wore for some of the procedure, attributed as the source of his somnolence.

The recollections of patients who had experienced spinal anaesthesia were frequently consistent with those of Albert and Jean, closely resembling the memories of those who had experienced GA. The lack of distinction in experience between anaesthetic modes challenges the suggestion made by NICE in their Hip Fracture guideline (2011; p88) that qualitative research would be ‘helpful to study patient preference for type of anaesthesia’. On the same basis it is legitimate to question the usefulness of the process by which patients are consented. My findings suggest that in terms of patients’

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<sup>194</sup> There is evidence that spinal anaesthesia mildly depresses the excitability of reticular formation (an area of the brain concerned with sleep and alertness) by blocking somatosensory transmission via the spinal cord (e.g. Antognini et al 2003). Therefore, although spinal anaesthesia does not induce unconsciousness, it may make sleep more likely.

experiences the two modes of anaesthesia appear equivalent; both *interventions* have the capacity to achieve a form of unawareness and mitigate pain. This is in marked contrast to the perspective of the anaesthetist, for whom a change in *intervention* involves a markedly different way of working. Who then is the discussion of anaesthetic mode really for? Should spinal versus general be the principal choice that, when offered, patients are invited to make?

### **Forget the Options, Forget the Complications**

‘... If you forget something or someone, you deliberately put them out of your mind and do not think about them any more...’

**Collins Dictionary (2019)**

If a GA is indistinguishable from a spinal from the perspective of the patient, what is the purpose of defining anaesthesia in those terms during the consent process? One answer to this question is that it is perceived as a legal requirement; in the aftermath of the *Montgomery v Lanarkshire Health Board* case (2015)<sup>195</sup>, doctors are advised to ensure that patients are made aware of all ‘reasonable alternatives’ during the consent process (e.g. Medical Defence Union 2017); from the perspective of the anaesthetist this is most obviously enacted as a discussion of anaesthetic modes (*mode* of childbirth was, after all, the focus of *Montgomery*). It is notable therefore that, as described in Chapter 5, many consent conversations that I observed involved some endeavour to influence the patient’s decision, either by omitting choices, by

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<sup>195</sup> This landmark legal case concerns the obstetric management of Mrs Montgomery, who has diabetes mellitus and is small in stature. Shoulder dystocia occurred during the delivery of her baby, who developed cerebral palsy as a result. Antenatal scans indicated that the baby was large-for-dates and clinicians informed Mrs Montgomery that the risk of shoulder dystocia was approximately 10%. However, despite expressing concerns to her consultant, she was not warned that shoulder dystocia could have serious consequences or informed that an elective caesarean section may have mitigated these risks.

‘pushing’ one mode or another, or as in the below excerpt, by weighing choices on the patient’s behalf:

**CA:** ‘We can put you off to sleep or freeze you from the waist down... [the surgeons] can put a nail in these or replace the whole hip. You’ve got to lie on your side for about an hour and a half, it’s a bit much to ask. I think we should do a general anaesthetic. Doctor’s going to talk you through a general anaesthetic.’ *He pulls Erica to one side and explains, quietly:* ‘I don’t think she should have a spinal under these circumstances, lying on her side, on her good side, for one and a half hours. Turning her to put a spinal in, the pain of doing that... I don’t see the benefit in doing that, I don’t see the benefit in this situation. So, if you talk to her about general anaesthesia, give her informed consent...’

**Consultant anaesthetist Charlton Achilles and anaesthetic registrar Erica Kitchens, talking to Trudy, Mellbreak**

In the above case Charlton Achilles ‘thinks out loud’ about the modes of anaesthesia for Trudy’s total hip replacement then settles, without discussion, on GA. In doing this, he allows Trudy to know that choices exist whilst simultaneously dictating what the choice will be. This is clearly a paternalistic approach, but the decision was not made without patient-centredness, Charlton’s stated concerns were humanitarian; he did not ‘see the benefit’ of causing Trudy pain in order to provide spinal anaesthesia. This assessment of the balance of risks to benefits was however reserved until he was able to see Trudy for himself. As Charlton explained to me on our way to her bedside, Trudy was suspected to have developed a chest infection whilst awaiting a suitably-qualified surgeon,<sup>196</sup> and there may have been a clinical imperative to avoid general anaesthesia. Therefore, Charlton made use of ‘the end of the bed test’<sup>197</sup> (see Chapter 5) to allow him to make a decision on humanitarian grounds alone.

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<sup>196</sup> Total hip replacements, unlike hemiarthroplasties, DHSs and intramedullary nails, are specialist operations and therefore tend to be done by specialist lower-limb surgeons even if this leads to a delay in treatment.

<sup>197</sup> Charlton had sent his registrar Erica ahead to assess Trudy but made the decision for a GA after briefly looking at Trudy from the bedside, without asking Erica about any of her assessment findings first.

Such paternalism seems to contradict professional guidelines (e.g. General Medical Council (GMC) 2008), which in common with Larsson and Holmstrom's definition of patient-centredness (2013; p119, see Chapter 1) emphasises 'common ground, agreement on treatment, and shared decision-making.' Despite highlighting the importance of alternatives however, neither *Montgomery* nor the GMC specify how the practitioner should determine what should be included in the options presented to the patient: the GMC does not address the issue, referring simply to 'the options', whereas *Montgomery* requires 'reasonable' alternatives to be presented without explaining how 'reasonableness' is to be determined.

When viewed at the macro level through the medical literature it would appear that spinal and general anaesthesia are entirely reasonable alternatives: they are performed with approximately equal frequency nationwide (Boulton et al 2014) and appear to be equivalent in terms of morbidity and mortality (e.g. White et al 2014a, Guay et al 2016). However, on the institutional level is it 'reasonable' to offer to perform a technique which is rarely provided in the hospital in question? And to an individual (expert) practitioner is it 'reasonable' to offer a technique which has benefits that appear to be outweighed by its risks when considering the patient in question? This seems to be Charlton's assessment of spinal anaesthesia in Trudy's case: it would involve an additional burden of pain without any clear benefit. He may therefore be justified in omitting to mention spinal anaesthesia as a possibility. However, *Montgomery* cautions against the doctor determining the significance of any risk or benefit on the behalf of the patient, pointing out that 'all material risks' should be disclosed. Here, 'material' is defined not by what matters to the doctor, but by the

significance of the risk to the individual patient (*Montgomery v Lanarkshire Health Board* 2015)

Before he leaves the ward, Charlton instructs his registrar Erica to 'give her informed consent' about GA, a rather contradictory instruction. Responding to this, Erica begins to deliver the most comprehensive description of anaesthetic risk that I recorded in any of my observations. However, on noticing that her detailed explanation is beginning to trouble Trudy, she abruptly changes her strategy:

**EK:** '... in-between we need to put a metal instrument into your mouth, to put in a breathing tube. So, there's a chance of dental damage, but in your case [*Trudy has no teeth*] maybe a little soft tissue damage, a scratch. Also because you have high blood pressure, diabetes, there's a chance you may have a funny heart rhythm. It's a controlled environment, as our bodies get older they work a bit less well. And you've got a good heart... There is also a tiny chance of awareness...'

**Tr:** *Starts to look perturbed.*

**EK:** 'I have to tell you these, just listen and forget it. These things don't happen.'

**Anaesthetic registrar Erica Kitchens, talking to Trudy, Mellbreak**

In the above interaction Erica, an experienced registrar who until recently had practiced overseas and is still familiarising herself with UK medical practice, is following a path that I suspect many of the consultant anaesthetists in my study have trodden: she is discovering that hip fracture patients tend to believe that anaesthesia is trivial compared to surgery, and struggle to separate the two; one cannot occur without the other after all. As a result, patients do not seem to appreciate suggestions that anaesthesia may confer additional and distinctive risks. Erica's quick-thinking if rather awkward method for dealing with this as she senses Trudy's discomfort is to terminate the discussion by re-framing her list of complications as a mere administrative task that can be ignored once it has been accomplished. My impression was that this was minimally successful in reassuring Trudy; the list could not be un-said.

The struggle to find an appropriate balance between risk and reassurance during the consent process was commonplace amongst the trainee anaesthetists in my study, who were aware that proceeding with surgery was lower-risk than not doing so, but that in order to consent to their anaesthetic the patient should, according to law, be informed of the risks.<sup>198</sup> The consultants however seldom presented anything more than a cursory and rather nebulous acknowledgement of risks, and those that were mentioned were quickly justified with a focus on the benefits that ‘cracking on’ would confer, as in the below interaction with Florence, a 77-year-old with a number of cancer diagnoses and severe ischaemic heart disease:

**JV:** ‘When you’ve got medical problems with your chest and heart it’s a bit higher risk but all we can do is be as gentle as possible. It needs to be done one way or another.’

**Flo:** *Seems to accept this but doesn’t say anything back.*

**JV:** ‘There’s a small risk of damage to your nerve [*he points to the top of Florence’s left leg*] but if it makes your leg nice and numb it’s usually worth it.’

**Consultant anaesthetist Joshua Varnham talking to Florence, Longside**

Consent, when obtained by consultants, tended to be further from the *Montgomery* model, and yet without the difficulty of balancing disclosure and anxiety, their approach appeared more satisfactory to patients. My pre-operative discussions with patients offered an explanation for this; their focus was on getting the operation done:

**Me:** ‘Do you have any concerns about your anaesthetic?’

**Bal:** ‘No, they know what they’re doing.’

**Me:** ‘Do you perceive anaesthetics as risky or safe, what do you think in terms of...?’

**Bal:** *He cuts me off:* ‘Well, if you’re walking across the road you can get knocked down.’ *He stops, as if this settles the matter.*

**Me:** ‘Yeah? Any worries?’

**Bal:** ‘No. What’s the point of worrying? Worrying never does you any good.’

**Baldwin, pre-operative, Longside**

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<sup>198</sup> The fact that, according to *Montgomery*, patients should also be informed of the risks of doing nothing, did not seem to have gained as much traction, possibly because at the time of the anaesthetic review the patient has typically already consented to surgery.

In the above conversation with Baldwin, an 83-year-old gentleman who had broken his hip as a result of falling whilst already in hospital for the treatment of a chest infection, I was struck by his refusal to entertain any specific discussion of risk, a finding that would become routine as the study progressed. Here, how he sees such information as purposeless by pointing out that many 'everyday' activities carry risk. He subsequently implies that knowledge of risk is unwanted and may actually be harmful – rather than allowing him to make a nuanced decision about his treatment, it would provoke anxiety about a procedure that he was already committed to undergo. Patients, like their anaesthetists, wish to 'crack on', but perhaps for different reasons.

Risk is a matter of perspective for hip fracture patients, who have injury and pain as the starting point for the consent process. Presenting their *Relational Theory of Risk*, Social anthropologist Åsa Boholm and organisational theorist Hervé Corvellec (2011) describe, with reference to the work of Hilgartner (1992), that different individuals and groups perceive the risks posed by the same technologies in different ways. This, they contend, is due to risk being socially constructed, thereby drawing its meaning from its relationships rather than some intrinsic value. The key relationship in their theory is that between a *risk object* (their prototypical example is a dangerous dog) and an *object at risk* (e.g. a child). In order for a risk to be perceived, there must be a possibility that the risk object can cause an undesired effect to the object at risk.

To Boholm and Corvellec, both risk objects and objects at risk are social constructs. In order to be deemed to be 'at risk', an object (which they point out (p177) is 'not to be understood in the mere material sense') must have value, and be something that

'ought to be allowed to last'. Applying this theory to the pre-operative situation of the hip fracture patient offers an explanation as to why the risks of anaesthesia seem to be so eagerly dismissed. To the patient, their pre-operative experience dominated by pain, anxiety and narcosis, the situation they find themselves in, is not valuable, nor do they wish it to continue. As a result, patients have less basis on which to perceive themselves as what Boholm and Corvellec would describe as 'risk objects' until their operation is complete and their pain is controlled.

A further consideration is implicit within Boholm and Corvellec's argument (2011). Citing the actor-network theory approach of Latour (2005) and Mol (2002), they explain (p176) that social life can 'be regarded as a texture of connective relationships, practices and symbols' and, drawing on the linguistic work of Saussure (1916) as an example, point out that 'words partly derive their meaning from being positioned in relationship to other words.' What they don't make explicit, but can be seen clearly in my findings, is that risks partly derive their meaning from being positioned in relation to *other risks*. This is clearly an important consideration in the hip fracture context in which the situation of the patient already lacks 'value', and unlike in the context of elective surgery, it is unstable; without surgical fixation a hip fracture is the starting point on a trajectory involving the persistence of pain, an increasing burden complications and in many cases, death in hospital<sup>199</sup>. In comparison, the risks of proceeding with anaesthesia and surgery, however high, seem relatively insignificant.

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<sup>199</sup> The NHFD study by Johansen et al (2017) indicated that 48.6% of patients who did not undergo surgical fixation died in-hospital.

Boholm and Corvellec's *Relational Theory of Risk* (2011) offers an explanation of hip fracture patients' approach to complications. But what about their engagement with different anaesthetic options? In his reflection on his own episode of critical illness, medical sociologist David Rier (2000; p75) describes his own shift from a 'consumerist' stance as formalised in *Montgomery* (2015), to embracing a more paternalistic model of consent as shown by the patients (and consultant anaesthetists) in my study:

'...despite my deep commitment to disclosure, negotiation, and patient participation, the reactionary truth is that I was too sick to know certain details of my case, too weak to be a partner in decision-making. Coyle (1999: 115) has also noted that patients facing critical illness reject full disclosure and avoid assuming responsibility for their care. As Haug and Lavin observed a patient when critically ill may "abandon a consumerist stance and accept the doctor's control in a desperate need to get well" (1981: 223). In this sense, one might say that I had travelled back in time, that I had a '1950s-model' illness - one which turned me into a 1950s-style patient - which is more amenable to interpretation by Parsons' 1950s model than by theories of more recent vintage.'

In Rier's case, he was a fit 34-year-old who became critically unwell as a result of pneumonia. His treatment began with admission to the intensive care unit, which was followed by a sudden deterioration after two days, necessitating positive pressure ventilation, his reliance on which persisted for a further 15 days. At first glance these circumstances have little in common with those of the patients in my study, however there are several important similarities: like the 'critically ill', hip fracture patients have experienced a sudden deterioration in their functional state, face a substantial risk of mortality<sup>200</sup>, require invasive procedures as part of their treatment, and are vulnerable to many similar complications<sup>201</sup>. Drawing on his own experiences and citing the work

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<sup>200</sup> Mortality is recorded differently for hip fractures and critical illness, but it is a substantial risk in both cases: in 2017 the '30 day mortality' following hip fracture was 6.9% (Bunning et al 2018); in 2016-2017 the 'critical care unit mortality' following critical care admission (i.e. deaths occurring whilst still on the critical care unit) was 13.7% (ICNARC 2017).

<sup>201</sup> For example, Rier (2000) experienced an episode of delirium during his admission, as do 24.9% of hip fracture patients (Bunning et al 2018).

of Coyle (1999) and Haug and Lavin (1981), Rier contends that these circumstances may render such patients unable to engage in 'consumerist' interactions with their doctors. Coyle (1999), in her study of the role of the 'personal identity threat' in NHS complaints, largely upholds the view of patient-centred care espoused by the *Montgomery* ruling (2015). However, she explains that in some conditions, patients tend to reject responsibility (p115):

'... there were situations in which respondents implied that they did not want to be informed, or have responsibility in treatment decisions. These included: initial consultations; situations where respondents were uncertain about the seriousness of symptoms or where they were seen as unusual; if the condition was perceived as life-threatening; or where the respondent felt they had little expertise or knowledge about the treatment of the condition. In particular, respondents wanted doctors to assume responsibility and act decisively in situations where they felt vulnerable or frightened.'

Reflecting on his own case, Rier (2000) describes that his situation caused him to reject his usual participatory approach and assume a role that he identified as being consistent with a '1950's-style' patient, as described in the work of Talcott Parsons.

Though Parsons' sick role as outlined in *The Social System* (1951) is undoubtedly outmoded in the general context, my findings indicate that, like Rier (2000), hip fracture patients tend to conform to its 'obligations'. These comprise being prepared to 'work' to get better, as explained by Albert (above), and demonstrated by Patricia in enduring the discomfort of positioning for spinal anaesthesia (Chapter 6), and a tendency to 'cooperate' with the doctor without debate; the only exception to this being Ivan (Chapter 5, revisited below). Both 'obligations' are evident in my discussion with Edith:

**Me:** 'Do you have any concerns about your anaesthetic at all?'

**Ed:** 'Well no, not really. [Anaesthetists] only do it because [they] think it will work.'

**Me:** 'Yeah.'

**Ed:** 'So as far as I'm concerned, I couldn't go 'round like this.'

**Me:** 'Yeah.'

**Ed:** 'I've just got to accept that if I'm going to have this, well, I'm lucky and just have it and that's it.'

**Me:** 'Do you think there will be any risks? Do you see [the anaesthetic] as a risky thing?'

**Ed:** 'There's always going to be a risk. I mean there is never going to be a time when you don't have any risk about any operation and you've just got to keep your hands open and wide and accept that it could fail, perhaps I might not come through, but on the other hand it's no good not making an effort and getting the thing done, rather than you know, sort of, messing about.'

**Edith, pre-operative, Longside**

The above interaction, in which Edith displays an approach to risk and choice typical of the patients in my study, takes place before she has met her anaesthetist. She has little idea about what an anaesthetic may involve and draws no distinction between it and the surgery (though I refer to the 'anaesthetic', she refers to the 'operation'), but despite this she is already committed to cooperation. It is notable here that although her appreciation of risk is non-specific, she is aware of the risk of mortality, pragmatically acknowledging that she 'might not come through.' However, she perceives that accepting this and other risks is intrinsic to 'making an effort', or working to get better, dismissing other options as 'messing about.'

There are a number of contributory factors that may explain why these patients appeared to prefer the paternalistic approach to consent adopted by the consultants. These include the relational nature of risk as explained by Boholm and Corvellec (2011), the serious nature of their injury as explored by Rier (2000), Coyle (1999) and Haug and Lavin (1986), patients' relative alienation from 'expertise or knowledge' (Coyle 1999) about anaesthesia, and the propensity for older people to be more deferential to medical opinion (e.g. Calnan 1988, Lupton 1997). Counter to the stipulations of *Montgomery* (2015), the consultants in my study tended to present information to patients in a manner which emphasised reassurance and minimised detail. Such dialogue emphasises the benefits of proceeding, provides assurances of

safety and comfort, and makes it easy for the patient to 'cooperate' rather than forcing them to make decisions.

As explained by Boholm and Corvellec (2011; p187) successful risk communication 'depends on a common understanding of what constitutes a threat, a value, a contingency, and a causal relationship.' Consultants, apparently aware of the 'value' of patients' current situation and their tendency to prefer a guiding hand to a menu of choices, often therefore present information in a fashion that, whilst paternalistic, is sensitive to the needs of patients who, as a result of their injury tend to become more '1950s-style' (Rier 2000).

### **Choice About Choice?**

Anaesthetists in my study tended to opt for what may be seen as a patient-centred but legally precarious strategy of providing minimal information during consent. Though this appears to be acceptable to patients in the majority of cases, there are always exceptions. In my study, the only patient to resist the suggestion of the anaesthetist was Ivan, the 89-year-old patient who had studied applied chemistry and had an interest in anaesthetic agents. To Ivan, detail was vitally important, and he had considered his options in advance as a result of a combination of his recent experience of undergoing a hernia repair and his prior studies. When consultant anaesthetist Elroy Ashworth visited him pre-operatively, this unexpectedly narrow 'competence gap' (Haug and Lavin 1981), resulted in Ivan gaining control of the conversation:

**EA:** 'We can do this under a spinal anaesthetic. It might be better for you. As people get older, they get confused after a general anaesthetic. A spinal tends to make people less confused.'

**Iv:** 'I wasn't confused after my last general anaesthetic.'

**EA:** 'That was six years ago and life changes. They are both safe.'

**Iv:** 'I'd rather have a general.'

**EA:** 'It's just that they can make you confused.'

**Iv:** 'Well, people die under general anaesthetic. I'll take my chance!'

**EA:** 'O-kay...' *A prolonged 'ok' – he wasn't expecting that.* 'Well, if that's what you want.' *He goes on to check Ivan's dentition, mouth opening and allergies.* 'What job did you do when you worked?' *I think he suspects something allied to medicine – Ivan seems to have a good knowledge of anaesthesia and is assertive with his choices.*

**Consultant anaesthetist Elroy Ashworth, talking with Ivan, Mellbreak.**

In the above conversation, Elroy is taken aback by Ivan's determination to have a general anaesthetic, and with good reason – such overruling the anaesthetist was unique amongst my observations. He struggles to regain control of the discussion and in the end, concedes. Following this episode, Elroy reflects on his approach to consent during the walk to the operating theatre, acknowledging that he was unable to legitimately assert a 'safety' argument in favour of spinal anaesthesia, and that his stated preference in this case may in-fact not be reflective of the evidence:

**EA:** 'So he was clear, he wants a GA. I think we need to be careful saying "oh, a spinal is so much safer," you'll know more about this than me because I don't do these lists too often. But there's not evidence that it is, is there?'

**Me:** *I don't think he's after an in-depth analysis of the literature, in essence he's correct - 'No.'*

**EA:** 'I've had patients his age with spinals drop their BP, get confused on the table, get respiratory difficulties due to the height of the block. If he wants a general, I'll give him a general.'

**Consultant anaesthetist Elroy Ashworth, discussing Ivan, Mellbreak.**

It is notable here that Ivan was successful in achieving his preference despite Elroy's one-sided presentation of a perceived benefit of spinal anaesthesia: the avoidance of post-operative confusion. Ivan effectively 'trumped' this argument by indicating without provocation that that he was aware and accepting of the fact that general anaesthesia may even result in his death.<sup>202</sup> This conversation, like Erica's discussion with Trudy, ended uncomfortably. Both discussions were mis-judged in terms of the degree of information that the patient wished to receive. A common-sense solution to this variation in information requirements is to simply ask patients what they want to

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<sup>202</sup> There is no convincing evidence that mode of anaesthesia *per se* is associated with an increased risk of either confusion or death (Chapter 3).

know about risk at the beginning of the discussion; the implications of this are discussed in *Montgomery* (2015; p27):

‘A person can of course decide that she does not wish to be informed of risks of injury (just as a person may choose to ignore the information leaflet enclosed with her medicine); and a doctor is not obliged to discuss the risks inherent in treatment with a person who makes it clear that she would prefer not to discuss the matter.’

Given that the above approach appears to address many of the problems posed by reconciling disclosure and reassurance, it is notable that at no point did I observe anaesthetists offering patients the opportunity to choose how much they wanted to be told. One possible explanation for this is that by offering choices regarding the extent to which information and alternatives are offered, control of the discussion can be relinquished, and the amount of time taken to conduct the conversation may be extended. This is a concern for anaesthetists who feel pressurised to conduct pre-operative visits rapidly in order to start the list on-time:

**JS:** ‘... we have a very, very limited amount of time as the anaesthetist on the day to go and see the patient, sort out any medical issues, find out about their medical history, maybe speak to the relatives if you need to, and to have a proper conversation with the patient, if they can. This takes time and it is not easy and on these lists there's a huge amount of pressure in forty-five minutes or less to see all the patients for the entire list which could be as many as six or seven on some days in disparate locations around this hospital, not always in the same place, and then be ready to start your list at nine o'clock. It's really, really difficult and that is one of the reasons why I do not do the trauma list regularly, because it is a huge amount of pressure and I don't feel that we have enough time to really get to grips with the patient and to explain to them properly and their relatives even the risk or the type of anaesthetic they're having and allow them choice, if they can make that choice.’

**Consultant anaesthetist Jacqueline Studwick, introductory interview, Longside**

In the above monologue, Jacqueline is frank about the compromises that she and her colleagues have to make in order to prioritise the efficiency of the list, admitting that ‘I don't feel that we have enough time to... allow them choice...’

### **Forgetting How To Do the Little Things**

‘...If you forget something or forget how to do something, you cannot think of it or think how to do it, although you knew it or knew how to do it in the past...’

**Collins Dictionary (2019)**

If patients do not remember the mode of anaesthesia, what do they remember? Consistent with Fried (2002), *outcomes* rather than *interventions* predominate in patients' recollections of their care in my study. I found that these reflections followed a predictable, recurring pattern: early post-operative interviews were almost exclusively positive; patients were glad to have their hip repaired and their pain relieved. This was the case even when the anaesthetic was problematic, as in the case of Patricia, whose spinal had started to wear off prior to the end of the operation, leading her anaesthetist Vernon Rowntree to perceive the anaesthetic as a failure (Chapter 6):

**Me:** 'So in terms of your anaesthetic then, was it a good experience or not so good? How would you describe it?'

**Pat:** 'I think it was perfect actually, because it did do as [Vernon] said.'

**Patricia, post-operative, Beckfoot**

Such positivity immediately following a healthcare encounter is a well-recognised phenomenon. Studies of patient satisfaction comparing 'in-visit' assessment with 'follow-up' assessment tend to indicate that patients are better disposed to their healthcare experience at an earlier point in time (e.g. Bjertnaes 2012, Jensen et al 2010). A number of theories have been advanced to explain this, including patients needing sufficient time to consider their feelings (Jackson et al 2001), a wish to maintain good relationships with staff whilst in-hospital (e.g. Sitzia and Wood 1997), and those with negative experiences being more motivated to engage with subsequent follow-up (Stevens et al 2006). In the case of the patients in my study, whose starting point was an acute and painful injury, their surgery, facilitated by anaesthesia, provided perhaps the most significant leap towards the *outcomes* that

were important to them: their painful wait for surgery was now over, and they now had a structurally restored femur on which to re-gain their mobility.

The post-operative interview, typically conducted before the patient had attempted to walk, was therefore a time of optimism and represented something of a 'high point' in patients' trajectories. In contrast however, the follow-up interviews, conducted approximately six months post-operatively, were overwhelmingly negative in tone. They were characterised by a loss of function, both in terms of abilities and confidence, and although it is unlikely that many of these experiences are directly or exclusively attributable to anaesthesia, patients did not compartmentalise their treatment in the way that healthcare professionals do. Though the specifics of anaesthetic technique were rarely mentioned, in cases in which complications had occurred, these were often vividly recalled and perceived as contributory factors to hampering recovery. Complications therefore appear to be the part of the anaesthetic that is most important to patients, not only in terms of their recollection, but also in allowing them to achieve their desired *outcomes*.

Though I discussed several complications with patients, post-operative cognitive disturbances were most prominent in these discussions due to their persistence and distressing nature. Cognition formed the focus of my follow-up discussion with Carmel, whose story was outlined at the beginning of this chapter. I commenced by asking how she was feeling:

**Ca:** '... Terrible. I have been very, very disappointed.'

**Me:** 'Okay, and why is that?'

**Ca:** 'Well I still can't walk without holding onto anything. I mean I know I've got osteoporosis, this is the trouble, in my back. I suppose it might be to do with that. But it's definitely affected my memory.'

**Me:** 'Right. There's two things there... Can you explain about your memory? How things have changed?'

**Ca:** 'Well I get terribly muddled up now and I can't get words out. I do think it's definitely affected my memory'.

**Me:** 'And... how has that affected you?'

**Ca:** 'Well, I mean, I don't really know what to say. It's very difficult really but my daughter she's abroad and she rings me up and sometimes I can't get words out and she sort of has to finish a sentence off for me, you know, things like that. And I wasn't like that.'

**Carmel, follow-up (operation at Longside)**

She goes on to summarise her current cognitive state:

**Ca:** '... I just feel as if I don't think the same. I can't get words out. I'm trying to get my mobile phone working and I don't know why but I just can't get round to doing it. And this just gets me down, you know. I think well "I could do that before," you know.'

**Carmel, follow-up (operation at Longside)**

In the above discussion, in addition to describing her now limited mobility, Carmel articulates her frustration with a deterioration in her memory, ability to find words and undertake simple tasks. These relatively subtle symptoms are indicative of what until recently has been termed postoperative cognitive decline (POCD) which lacks a universally-agreed definition and is increasingly deemed (e.g. Evered et al 2018) to be a form of what the Diagnostic and Statistical Manual (American Psychiatric Association, 2013) refers to as 'mild neurocognitive disorder'<sup>203</sup>: a state between normal cognition and dementia. When compared to other more obvious complications such as mortality or major medical comorbidity this 'mild' disorder may appear trivial, but to Carmel, her now-chronic cognitive decline represents what Charmaz (1983) terms *loss of self*; she finds that her abilities no longer keep up with societal expectations, manifested her daughter's recent tendency to speak on her behalf. Together with a diminished physical function, hip fracture patients with POCD

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<sup>203</sup> The formal diagnostic distinction between 'mild' and 'major' neurocognitive disorder relies on testing; see the supplementary materials from Evered et al 2018: <https://bjanaesthesia.org/cms/10.1016/j.bja.2017.11.087/attachment/e04a9c91-e0a1-406b-b229-a8d916ee7202/mmc2.pdf>

undergo ‘a crumbling away of their former self-images without simultaneous development of equally valued new ones’ (Charmaz 1983; p168).

### Forgetting Reality

‘... If you forget yourself, you behave in an uncontrolled or unacceptable way, which is not the way in which you usually behave...’

**Collins Dictionary (2019)**

In Carmel’s case, as with many patients with POCD, her chronic symptoms were preceded by an acute phase of delirium which she went on to describe:

**Ca:** ‘... I mean, the weekend after the operation, I thought that was a terrible thing that I had. I mean I was just in this room. It was an awful experience and that keeps coming back to me all the time.’

**Me:** ‘When you say you were in this room, can you explain a bit more about, if you don’t mind?’

**Ca:** ‘Well, it was a great big room, and funnily enough they were all seated with a big crowd of people and there was a lady that came up as a picture on the screen. And funnily enough this friend of mine, she’s here today with me as a matter of fact, she’d been to see me in the afternoon, and she rambled on to say something about my daughter was not coming back from Spain and she treated me like a bit of rubbish really. And then after that, you know, I thought, oh I’m not in the right place, I want to go home. And I tried to get my phone to ring my son up. I thought if only my son could take me home to my own house, you know, but of course the phone wasn’t working, the phone was no good. And then all of a sudden I wanted to go to the loo and I managed to get there, I don’t know how because I had a job to find my ... you know, walker, and then all of a sudden I saw three cots and the third one had a load of babies in it, and all I could think of was, “oh is that my baby?!” You know, and I got all flustered...’

**Carmel, follow-up (operation at Longside)**

In contrast to POCD, delirium is a well-defined condition, characterised by an acute change in mental status including ‘a reduced awareness of the environment and a disturbance in attention’ (Deiner and Silverstein 2009). This may be accompanied by perceptual or cognitive symptoms including hallucinations, and patients may express hyperactive or hypoactive psychomotor behaviours<sup>204</sup>, or a combination of the two.

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<sup>204</sup> Hyperactive delirium is characterised by restlessness and agitation; Hypoactive delirium is characterised by lethargy and sedation and patients interact slowly, if at all. The hypoactive form is more common and is frequently overlooked by clinical staff (e.g. Fong et al 2009), as explained by Beckfoot Geriatrician Erik Abrams:

**EA:** ‘The hypoactive delirium [patient] is compliant, so it’s very easy to... for all practical purposes there is nothing wrong with the patient other than a quiet patient not doing much.’

Carmel's recurrent memory is clearly hallucinatory; Longside Hospital provides neither maternity nor paediatric services, precluding the possibility that cots or babies could have been encountered in the hospital. It may also include delusional elements; her suspicions about her mistreatment by her daughter, her friend and the hospital are unlikely to be true though I cannot be certain on the basis of my data.

Aware and distressed that she had undergone a delirious episode, Carmel subsequently sought an explanation of her memories from another patient on the ward:

**Ca:** '... a couple of days went by and I said to the lady opposite in the bed, I said "What happened to me on the other Saturday night when I, because I'd been, I went somewhere?" And she said "No, what you did, you walked over to my bed. We don't know how you did it!" 'Cause I mean I couldn't walk, but I nearly fell on her bed!'

**Carmel, follow-up (operation at Longside)**

Carmel's experience illustrates some of the risks presented by postoperative cognitive complications, including further falls, breakdown of relationships with relatives and friends, and perhaps most importantly to Carmel, the distressing nature of delirium itself. Both qualitative (e.g. Schofield 1997) and quantitative studies (e.g. Breitbart et al 2002) have indicated that the majority of patients are able to recall memories formed during delirious episodes. According to Breitbart, whose study was set in the oncology context, patients with hyperactive delirium have a higher risk of recall than those with the hypoactive form, and amongst those who do remember their experiences, 80% find such memories to be 'highly distressing'. This high incidence of emotional distress, he suggests, makes delirium as important as pain in terms of its prevention, recognition and aggressive treatment. In the hip fracture setting, as Deiner and Silverstein (2009) point out, delirium is 'far from benign', and is associated with an increased risk of death, permanent cognitive impairment and the need for

institutional care. It may therefore be a yet more pressing problem than pain, especially considering its rate of incidence.

According to the 2018 NHFD report (Bunning et al), 24.9% of hip fracture patients have 'possible delirium +/- cognitive impairment'<sup>205</sup> when assessed postoperatively. Discussing this data at the 2018 *Fragility Fracture Network Global Congress*, geriatrician and NHFD lead clinician Anthony Johansen styled delirium 'the commonest complication of hip fracture surgery' and highlighted its association with poor outcomes: patients who experienced delirium were four times as likely to die as hospital inpatients, and eight times as likely to require long-term nursing home care than those who did not. As an attendee of this meeting seated in the audience, these facts were not the most memorable messages, however. To me, the most striking element of Johansen's presentation was the question that he posed during his introduction. He asked an audience composed predominantly of clinicians to raise their hands if they routinely consented patients for the possibility of delirium following hip fracture surgery; very few hands were raised. This 'straw poll' was consistent with the findings of my study, in which anaesthetists restricted the discussion of delirium or cognitive decline to the somewhat spurious context of trying to illustrate the disadvantages of GA, as in the above discussion between Elroy Ashworth and Ivan.

Why then do anaesthetists fail to mention cognitive outcomes when they are commonplace, associated with serious morbidity and mortality, and of profound

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<sup>205</sup> Measured using the 4A Test (Bellelli et al 2013), a rapid screening tool for delirium and cognitive impairment which comprises four components, all beginning with the letter A: an assessment of alertness, attention, and acute fluctuations in conscious level, and the four-point abbreviated mental test. See [www.the4at.com](http://www.the4at.com).

importance to patients? One possibility is that the relationship between anaesthesia and cognition remains an uncertain one. As implied by the prefix 'postoperative-', there is evidence that the composite intervention of undergoing an operation (including anaesthesia and surgery) can provoke cognitive problems, and although giving (inappropriately) high doses of anaesthetic agents appears to be associated with delirium (Radtke et al 2013), because it almost always accompanies surgery there little evidence that anaesthesia *per se* is a causative factor (Evered et al 2018). The complexity inherent in the development of postoperative cognitive complications is illustrated by the number of contributory factors that have been identified. For example, in their non-exhaustive summary Deiner and Silverstein (2009) identify 13 'risk factors'<sup>206</sup> and eight 'triggers'<sup>207</sup> for delirium, and five 'risk factors'<sup>208</sup> for POCD, of which delirium itself is one. Of these considerations, none are exclusively the domain of the anaesthetist though several (e.g. the presence of acute pain, use of narcotic or benzodiazepine medications, fluid and electrolyte status) are subject to the anaesthetist's influence. Importantly however, there are also several factors related to ward-based and surgical management (e.g. blood loss, urinary catheterisation, addition of medications) and non-modifiable factors (e.g. older patient age). This creates the conditions for postoperative cognitive complications to be 'orphaned';

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<sup>206</sup> These comprise: dementia, depression, age>70, preoperative narcotic or benzodiazepine use, alcohol use, previous delirium, visual impairment, severe illness, an increased urea:creatinine ratio, smoking, vascular surgery, depressive symptoms, and attentional deficits.

<sup>207</sup> Acute pain, use of physical restraints, malnutrition, addition of three or more medications in 24-48hrs, urinary catheterization, anaemia, electrolyte and fluid abnormalities, and greater surgical blood loss / transfusion.

<sup>208</sup> Older age, preoperative cognitive impairment, preoperative physical impairment, cognitive impairment during hospitalization, and delirium.

situated somewhere between the patient, surgery, anaesthesia and orthogeriatrics, with no specialty taking overall responsibility.

To what extent do postoperative cognitive complications 'belong' to anaesthesia? That anaesthesia may influence their development was universally acknowledged. However, amongst anaesthetists the precise role played by anaesthetic practice seemed to be difficult to crystallise. In the absence of suggestions that any mode or technique of anaesthesia was in any way 'protective', anaesthetists' engagement with cognitive outcomes was limited to avoiding negative influences. For proponents of spinal anaesthesia such as Elroy Ashworth, this often manifested as a criticism of GA, whereas proponents of GA tended to de-emphasise the mode as a contributory factor:

**DB:** 'I don't think there's a huge amount of evidence for anaesthesia, well I suppose, I don't know, I think it's a bit variable whether delirium as such is affected by anaesthesia. I know there's someone called Richard Griffiths in Peterborough who's very keen on not using GAs for people with hip fractures, thinks they get a better outcome [with spinal anaesthesia] but I've not read data that's truly supportive of that.'

**Orthogeriatrician Dustin Bellamy, introductory interview, Longside**

Amongst anaesthetists there was more notably an emphasis placed on the way in which anaesthesia (of any mode) is done. This was of particular importance to those who tended to deliver GA, which was recognised as having a particular potential for complications if done without appropriate thought. Considering this, Longside clinical director Sam Stone described 'giving a bad anaesthetic' as 'the cardinal sin':

**SS:** '... I don't really think it matters which technique you use, it's more a question of the finesse that you use with that technique. It's just not being heavy handed, making sure you attend to the basics well. I don't really, unless you deliver a technique really badly, I don't really see that one technique sticks out as being much more favourable than another.'

**Clinical director of anaesthesia Sam Stone, introductory interview, Longside**

Anaesthetists' lack of discussion of cognitive outcomes during the consent process relates to their understanding of how anaesthesia and cognitive outcomes relate to

one another: if 'bad' anaesthesia causes confusion, but 'good' anaesthesia does not, perhaps confusion does not need to be mentioned providing that a good anaesthetic is provided? Logical as this may be, the disowning of this profoundly important and commonplace complication by all specialties fails to serve patients by concealing their trajectories.

### **Outcomes, Experiences and the Good Anaesthetic**

To patients then, mode of anaesthesia appears to be of little relevance, yet where any form of shared decision-making occurs, *mode* tends to be its focus. By contrast, *outcomes* are of great importance but are often neglected, leading to perhaps unrealistic expectations on behalf of the patient and an almost unavoidable sense of disappointment when restoration of prior function, assumed to be the objective of their treatment, is not achieved. Based on patients' concerns, priorities for practice and research can be identified. In terms of research, understanding the relationship between anaesthesia and the outcomes that are important to patients is of vital importance. Likewise, although my study provides an insight into what it is to have POCD, this was not my primary aim and in-depth understanding of what this profoundly distressing condition means to patients, and how they can live with and mitigate its impacts is a pressing need. In terms of practice, consent discussion should be primarily concerned with the outcomes that are relevant to the patient, in order to define what *Montgomery* refers to as 'material risks', rather than focusing on *interventions* which are of more concern to the anaesthetist. It is striking that to many patients, *interventions* are indistinguishable from one another and seldom remembered in detail, but negative *outcomes* are what make an anaesthetic

memorable. An anaesthetic should not interfere with memory, but a memorable anaesthetic is not the aim. In short, a good anaesthetic is easily forgotten.

## Part III: Recovery

## **Conclusion: Enacting the Good Anaesthetic**

Inspired by the ‘scandalous’ variation in hip fracture anaesthesia practice in the UK, and by calls to find the ‘best methods’ of hip fracture anaesthesia (White et al 2014a), I have made the journey from clinical anaesthetist to ethnographer of anaesthesia. My findings have been generated by following the controversies that run through the UK anaesthesia literature, observing and talking with anaesthetist colleagues as they work, encounters with frail patients at a time of vulnerability, and through reflexive considerations as the study progressed. In my analysis, I have blended clinical and social sciences, drawing on the traditions of both EBM and science and technology studies (STS). In doing so, my aim has been to make connections between academic anaesthesia and STS in order to move beyond the impasse that has resulted from research comparing GA and spinal. My findings, I hope, will influence practice and inspire future clinical research whilst also advancing our understanding of how boundaries, uncertainty, standards, and differences work in this increasingly important clinical context.

In this concluding chapter, I shall consider to what extent I have been able to define the ‘good anaesthetic’ for hip fracture repair, outline the main contributions to knowledge that this study has made, identify the implications of my findings for research and practice, and reflect on how this study has led me to develop as a clinician and a researcher. I will also consider more broadly the role that ethnographic research has in anaesthetic practice and identify how it may be used to improve anaesthesia for both patients and clinicians.

### The 'Evidence Base' for Hip Fracture Anaesthesia

My examination of the 'good anaesthetic' for hip fracture repair began with an analysis of current and historical evidence and debate in the UK anaesthesia literature. In these sources, a duality is evident: on one hand, there was a methodological assumption anchored in the EBM movement that anaesthesia could be made simple and treated as a single intervention by defining it by *mode* for the purpose of research, but there was also an acknowledgement that anaesthesia was complex and that the subtleties of *technique* may be more important than *mode*. Of particular note is that these views are not mutually exclusive. Though high-profile experts such as White, Griffiths and Moppett arguably derive much of their expert status from involvement with comparative studies of *mode*, as practicing clinicians they are manifestly aware that, as explained by Moreira and Will (2010), 'forms of exclusion' go hand-in-hand with quantitative methodologies.

Writing in 2016, White et al suggested that a solution to the problem of the complexity of anaesthesia lies in standardisation. This, they contend, has the potential to address inequalities inherent in the variation of practice and provide a stable basis from which much-needed research could be carried-out. However, this suggestion proved to be controversial, with concerns about autonomy and professionalism, analogous to 'McDonaldization' as described by Ritzer (2000) being articulated by some, and scepticism of the basis upon which standards could be defined being cited by others.

Two conclusions can be drawn by following these controversies: first, despite sporadic calls for ever larger trials (e.g. NICE 2011), it appears that the established models of clinical research, as endorsed by the EBM movement, may have run their course in

informing anaesthetic practice. Neither RCTs nor cohort studies appear to be able to tell us if mode of anaesthesia affects outcome. Second, despite the lack of evidence in favour of mode, or any of the many possible anaesthetic approaches, anaesthetists appear to hold strong views about their hip fracture practice and promulgate their preferred techniques through establishing guidelines, responding to academic papers and engaging with controversy on social media. This, combined with the variation in practice between institutions, as demonstrated by the ASAP (Boulton et al 2014) creates an imperative to use ethnographic methods in order to 'get beneath the skin' of anaesthesia, and investigate what makes a 'good anaesthetic' to those who must decide what to do in the absence of evidence, and those who experience the results.

### **A Good Anaesthetic... Gets Done Today**

Hip fracture patients are frail, in pain, and their trajectory following injury is one of almost inevitable deterioration; a hip fracture patient cannot sit up, breathe deeply, cough effectively, or move about in bed. These factors predispose to the development of complications such as chest infections and pressure sores. Early surgery can redirect this trajectory for the better; hip fixation provides analgesia, and the ability to sit up and mobilise. However, due to the immutable connections between hip fracture, frailty and medical comorbidity, patients are rarely 'fit' for anaesthesia and surgery in the conventional sense.

Meeting this need to expedite surgery despite patients' frailty and medical illness requires an approach known as 'cracking on.' Here, anaesthetists perceive attempts at improving the patient's medical fitness prior to surgery as largely futile due to the trajectory imposed by the injury, and instead opt to cope with problems either through

amendments in their anaesthetic approach, or by treating them as they arise. This nuanced (and as surgeon Sid Fletcher put it, also somewhat 'brave') approach to risk is perceived as a defining quality of expertise in hip fracture anaesthesia.

Cracking on is not always done however: 'catastrophic' medical morbidity may make it too risky to proceed with anaesthesia, and in this circumstance, most agree that some 'optimisation' may be warranted. More commonly however, anaesthetists whose expertise lies elsewhere find themselves assigned to trauma; unable to fully embrace the approach to risk adopted by their more 'expert' colleagues, they order investigations to address the uncertainties presented by hip fracture patients. Though notionally these investigations aim to reduce risk by elucidating information about the patient, this apparent double-standard is a perennial source of frustration for their surgical and anaesthetic colleagues.

Enabling expedited surgery for frail, complex patients is a cooperative endeavour, which I have explored using Lave and Wenger's concept of *Communities of Practice* (1991). Unlike Wenger's perception of the 'medical operating team' as a single coherent *community* (1998), my analysis indicates that it can be more accurately conceptualised as members of multiple professionally-situated *communities* (anaesthetists, surgeons, etc) who interact in the context of the trauma list, which acts as a 'nexus of perspectives' around which a second-order *community* can form. Here, patients, linguistically *reified* into broken bones, joints or implants, act as 'boundary objects' (Star and Griesemer 1989). For patients to act in this way, contingent on their passive participation in the negotiations that form the trauma list, builds on the work of Zdunczyk (2006) in exploring the notion of 'human boundary object'.

At its most effective, the joint enterprise of the operating theatre community involves 'brokering' (Wenger 1998), where practices that are traditionally the domain of one community are introduced to another, blurring the boundaries between professions. This brokering, described by surgeon Sylvester Brams as 'morphing' runs counter to the modernist (Latour 1991) tendency for ever greater specialisation in healthcare, but in the hip fracture context it allows healthcare teams to address the uncertainties which must be accommodated if anaesthesia and surgery are to 'happen today'.

### **A Good Anaesthetic... Withstands Uncertainty**

Anaesthesia for hip fracture repair is characterised by uncertainty. As identified by Renée Fox (1957), to some extent this arises from an 'evidence base' that fails to definitively address questions about anaesthetic mode, and anaesthetists' incomplete knowledge of what evidence has been produced. However, there are more specific forms of uncertainty that relate to hip fracture patients; due to the cumulative effects of frailty, comorbidity and clinical urgency, unknowns are commonplace in the hip fracture context. Manifestations include the 'disappearance' of established diagnoses, which may become lost due to patients' cognitive impairment or the unavailability of medical notes, and the discovery of previously uninvestigated signs and symptoms which may have implications for anaesthesia but have to remain uninvestigated if 'cracking on' is to occur.

Anaesthetists employ a number of strategies to cope with patient-based uncertainties. The most notable of these was Hiram Niles' 'universal' anaesthetic, a technique which he claims dispenses with the need for in-depth preoperative assessment. More commonly however, these comprised minor amendments to the usual anaesthetic

technique such as the deployment of enhanced monitoring, or discussing a plan with a colleague in order to build a consensus about how to deal with an uncertain situation.

Anaesthetists also describe the 'end of the bed test', a tacit assessment of a specific type of frailty pertaining to patients' ability to withstand the stresses of anaesthesia and surgery. This test, hitherto undescribed in relation to hip fracture anaesthesia, has the capacity to reassure an anaesthetist that it will be safe to proceed with an operation, or to lead to the cancellation of surgery. The decision to manage a hip fracture non-operatively was not taken lightly; anaesthetists were aware that this would often lead to a palliative course. Such an approach was therefore reserved for patients who were felt to be dying, or were deemed to be so frail that they would die 'on the table' if anaesthesia was attempted.

Though the occurrence of perioperative deaths amongst high-risk hip fracture patients was accepted to a certain extent, it was apparent that deaths that occurred very close to the time of surgery could lead to a 'recalibration' of the degree of risk which was deemed to be acceptable, and this could potentially lead to the decisions to cancel patients who may otherwise have been seen as suitable for surgery. This capacity to recalibrate risk indicates that much of hip fracture anaesthesia exists in-between what is universally deemed to be safe, and what is universally deemed to be forbidden. Proceeding with anaesthesia therefore depends more on the approach to risk adopted by the anaesthetist than formal structures such as institutional guidelines.

Finally, there is uncertainty arising from the unpredictability of the surgical procedures which the anaesthetic is intended to facilitate. Though the 'surgical time' is discussed

at the team brief, anaesthetists are often sceptical about their surgical colleagues' ability to complete the operation in the stated time. This arises from a combination of the inherent unpredictability of trauma, the disinclination to 'count' positioning and preparation time by either anaesthetists or surgeons, the need for trainee surgeons to gain experience, and the variable practices of different surgeons. Anaesthetists have to plan their anaesthetics to accommodate this, potentially giving a greater dose than if the duration of surgery was more consistent. The consistency of operating time is a central assumption of the 'Peterborough and the real world' argument, in which many anaesthetists dismiss low-dose spinal anaesthesia on the basis that it is only practical in places where, apparently, hip fracture surgery is consistently rapid.

These cumulative uncertainties mean that anaesthetists are manifestly wary of the potential problems that are inherent in hip fracture anaesthesia and their descriptions of the 'good anaesthetic' are therefore laden with qualifiers and contingencies. However, their surgical colleagues are less preoccupied with such anxieties and tend to take an assured view 'a quick GA' is what is required to facilitate surgery. This appreciation of uncertainty amongst anaesthetists, and its dismissal amongst surgeons, maps in useful ways to Donald MacKenzie's *Certainty Trough* (1990) which indicates that uncertainty is higher amongst the producers of knowledge than its users, and highest of all amongst those who are 'alienated'. In the context of hip fracture, this maps to patients, alienated not because of deliberate exclusion, but because the distinction between anaesthesia and surgery which seems so clear to me as an anaesthetist, is rarely apparent to patients who have therefore given anaesthesia little consideration prior to being faced with an imminent operation.

On an institutional level, anaesthetists withstand uncertainty by ‘adopting a “school” of professional work’ (Light 1979); at Beckfoot this means providing spinal anaesthesia as a default option, at Longside it means providing general anaesthesia, and at Mellbreak, it means to individualise anaesthesia on the basis of patient-centredness. To anaesthetists at Beckfoot and Longside, this ‘predominant mode’ approach, with an associated ‘claiming’ of the benefits pursuant to that mode, provided some certainty in an otherwise uncertain context, and the mode was often made to fit the patient through employing controls and workarounds (Berlinger 2016). At Mellbreak however, adopting an individualised approach served the same purpose; colleagues would respect one another’s autonomy in forming individualised plans, even if this led to uncomfortable situations on occasion. But mode of anaesthesia is only one part of the way that anaesthetists think about their practice; perhaps more important in directing anaesthetic *technique* are the goals that are situated within it.

### **A Good Anaesthetic... Treads Lightly**

Inspired by influential documents supported by the AAGBI (2011) and the NHFD (Boulton et al 2014), many anaesthetists adopt a ‘minimally invasive’ approach to anaesthesia. Superficially this could be deemed to represent little more than ‘compliance’ with criteria specified by the above authorities. However, my findings suggest that beneath the guidelines there lies a belief system to which anaesthetists subscribe to a greater or lesser degree. This is founded on a predominant concern that the drugs used in anaesthesia, whilst useful facilitators of surgery, are toxins with persistent effects and therefore their use should be minimised in terms of dose and duration, avoiding the need for the use of additional measures to treat side effects and complications.

Minimally-invasive anaesthesia is *transient* in terms of its effects on the central nervous system, and 'light' anaesthesia affords the patient some additional 'agency' (Goodwin 2008) when compared to more conventional approaches. By interpreting the patient's movement and respiratory rate, for example, anaesthetists can keep a check on the performance of their interventions. Achieving this makes anaesthesia and analgesia more complex; using techniques that are elegant but potentially less reliable confers a sense of fragility. Minimally invasive anaesthesia can be easily upset by unanticipated occurrences such as prolonged surgery. This introduces a constant jeopardy to minimally invasive practice: in attempting to tread lightly, an *invasiveness paradox* may occur, whereby the anaesthetist may unintentionally deliver an inadequate technique with only limited and more invasive options for mitigation.

At the other end of a continuum lies 'comprehensive' anaesthesia. Though perceived by influential proponents of minimally invasive practice as the unthinking transfer of 'standards' learned in other contexts, the decision to adopt a comprehensive approach appears to be underpinned by a legitimate and considered set of concerns. Often these concerns are situated within the institutional practices with which the anaesthetist works, for example the duration of surgery at Mellbreak appears to be a barrier to adopting a minimally invasive approach. Where this was the case, anaesthetists tended to express regret that they felt compelled to practice in a way that was dictated not by what they believed was best for the patient, but by what could accommodate their surgical colleagues' practices. Importantly however this was not the only justification – as the debate surrounding airway management at Longside illustrates, many anaesthetists were prepared to knowingly expose their patient to

what they deemed to be a minor harm in order to offset the risk of a catastrophic complication such as pulmonary aspiration.

In hip fracture anaesthesia there is a paucity of evidence with which to justify adopting either GA or spinal anaesthesia - trials persistently report that there is no difference in terms of outcome. In this study, I have developed an alternative way of viewing anaesthetic technique: rather than focussing on the mode of anaesthesia, we should consider why and how it is done. Classifying the anaesthetic approach on the basis of the situated goals of the anaesthetist offers a new avenue for outcomes-focused research; by comparing minimally-invasive and comprehensive anaesthesia we have an opportunity to advance patient care by reflecting a choice that, as I have shown, exists in clinical practice but has not yet been represented in research.

What do different anaesthetic approaches mean to patients? Proponents of a comprehensive approach caution against minimally-invasive practice due to the increased risk of pain and discomfort to which patients are exposed owing to minimised doses and the avoidance of centrally-acting agents. On the basis of my research, I suggest that although anaesthetists are profoundly concerned about anaesthesia wearing off prematurely, patients may be more philosophical about this, perceiving it as a necessary step on their road to recovery. This has more in common with the way anaesthetists' approach 'expected' pain, for example on positioning for a spinal, and one may therefore question the aggressive pharmacological treatment of intra-operative discomfort, the perceived need for which may be borne out of the anaesthetist's embarrassment rather than the patient's wishes.

### **A Good Anaesthetic... is Easily Forgotten**

Forgetting is important to patients' experiences of hip fracture anaesthesia and has both positive and negative impacts depending on what is forgotten. The most distressing accounts from the patients in my study related to postoperative cognitive outcomes; delirium is commonplace (Bunning et al 2018) and is often remembered by patients (e.g. Breitbart 2002), as in Carmel's account of her experiences. Likewise, postoperative cognitive decline, despite often being classified as 'mild' disorder when mapped to the Diagnostic and Statistical Manual criteria (American Psychiatric Association 2013), has effects that are anything but mild for patients in terms of their recovery and quality of life.

The positive form of forgetting relates to the experience of the anaesthetic itself, which patients typically remembered in only the vaguest of detail, to the extent that it was often difficult to determine if a patient had undergone general or spinal anaesthesia based on their postoperative recollections alone. To some extent this is likely to be due to the use of narcotic and sedative drugs in the perioperative period, but this does not fully explain this phenomenon. The capacity of anaesthetic interventions to remove pain also has an important role. Patients did not perceive this forgetting as a problem but as an asset. Drawing on the work of James Reason (2000), Schnittker and Marshall (2015; p644) describe patient safety in anaesthesia as a 'dynamic non-event'; pointing out that successful outcomes 'rarely call attention to themselves', but nonetheless depend on constant vigilance and adjustment by the anaesthetist. My analysis indicates that the quality of patient experience works on much the same basis, the anaesthetist putting a great deal of care into a practice that, if done well, should be unmemorable.

Outcomes are of greater significance to patients than interventions. Amongst those who have suffered complications in the perioperative period, these are of profound importance, particularly when they impact negatively on an already dwindling level of function. However, at the time of consent, patients are in a state of fear, pain and distress, and have little awareness of their likely trajectory of recovery or the role played by surgery and anaesthesia in provoking or avoiding post-operative cognitive complications. This renders patients less able, or perhaps less willing, to engage in a discussion of risks and benefits; at the time of consent they simply want to get their hip fixed as soon as possible. It is therefore the responsibility of the anaesthetist to consider the importance of outcomes to the patient, and to attempt to account for them in the anaesthetic that they provide.

In terms of facilitating prompt surgery, anaesthetists are usually able to meet patients' needs. However, by failing to engage in any discussion related to the 'orphaned' complications connected to the restoration (or otherwise) of physical and mental function, anaesthetists are complicit in generating the typical pattern that I observed: initial optimism, followed by subsequent and persistent negativity. This illustrates the importance of further research in understanding the interaction between anaesthesia and recovery. At present, anaesthetists are uncertain about what constitutes 'a good anaesthetic' for optimising cognitive outcomes; they are however clearer about what makes a bad one.

One possible solution to the problem anaesthetists face in identifying anything other than immediate outcomes is to make time to follow up patients post-operatively. This simple strategy was only routinely implemented by one anaesthetist in my study,

Duncan Myers, who made a point of following-up all of his hip fracture patients on the ward the day after their operation. Follow-up at an early point in the postoperative period, however, yields little information about patients' long-term prospects. My concern about this strategy is that Duncan, like me when conducting my postoperative interviews, is seeing patients at their best, before the reality of their recovery has set in. A more useful time-point may be to follow patients up several months later, as I did in my study. However, I found that this presents significant logistical challenges, and though it may therefore be impractical for the clinician to accomplish on an ad-hoc basis, it would be a valuable avenue for further research.

A more achievable suggestion perhaps is to reconsider the consent process to better represent patients' needs. At present it is focused on interventions such as mode of anaesthesia; complications, where mentioned, are either trivialised or presented as a barrage of unwanted information, likely to provoke anxiety without serving any purpose beyond meeting perceived legal requirements. Furthermore, the decision of how the anaesthetic will be done tends to precede the discussion of its implications. This is the inverse of what my findings suggest should be done. By engaging patients in a discussion about what outcomes matter to them, and by understanding what complications they would most wish to avoid, anaesthetists could offer techniques that are tailored to patients' needs. For example, a patient who was most concerned about a rapid recovery could be offered a *transient* minimally invasive anaesthetic.

Mode of anaesthesia, whilst central to the technical steps an anaesthetist must take, should perhaps also be de-emphasised in consent. Contrary to the presumptions of the NICE guideline (2011), many patients in my study seemed to care little for *what*

anaesthetic they had, but *how* they had their anaesthetic, particularly if it related to complications, was of profound importance. Therefore, it may be better to talk with patients using the concepts of minimally invasive and comprehensive anaesthesia; and make mode a secondary consideration.

### **Strengths and Limitations**

The strengths and limitations of this study represent a combination of the methodological decisions that underpin my approach, the constraints of undertaking doctoral research, my position as a clinician researching my own field of expertise, and the nature of trauma work. All of these factors present advantages as well as disadvantages, and considering them is an important output from this study.

As a qualitative study based on an ethnographic approach, my study is limited in its scope of interest to hip fracture anaesthesia in three apparently differing institutions. This was a necessary decision to make the study achievable with the resources available, and to appropriately direct its focus on a problem of clinical importance. However, the specific nature of my study potentially limits its applicability outside the context in which it was undertaken. I do not believe, for instance, that my findings are 'generalisable' to all of anaesthetic practice; anaesthetics that 'get done today' may actually be harmful in the setting of a complex but stable condition, for example.

So, what are the limits of my findings? The similarity of much of my data between the three participating institutions suggest that my study is likely to be transferrable within the context of hip fracture anaesthesia in the UK, and possibly across similar healthcare systems. Likewise, as a clinician I believe that the principles that I have elucidated may be useful in other settings that have much in common with hip

fracture; for example, other fragility fractures of the femur or acute lower limb ischaemia, both of which are painful conditions which are amenable to surgical treatment and share the common threads of frailty, comorbidity, immobility and clinical urgency. However, as clinical practice becomes more distant from the hip fracture setting my study becomes less relevant, and it is difficult to know when its transferability becomes inappropriate. One solution to this may be to conduct further studies of anaesthesia in other challenging circumstances, and my study may be a useful starting point or comparison for such future work.

The consistency of data across all three institutions is notable in my study – only rarely in this thesis have I needed to stratify my findings according to hospital. This is useful as a form of ‘triangulation’, but raises the question of whether collecting so much data was actually required. On reflection, I believe that I may have made similar conclusions if I had remained in one hospital rather than visiting three, and this would have resulted in a more efficient study. It may, therefore, be reasonable to design future studies in such a way that additional institutions can be visited only if this is deemed necessary. However, by committing to study three organisations from the outset of my study, I feel reassured that my findings are not particular to only one setting.

As a doctoral project, this study had to be my own work and it therefore represents my perspective as a clinician to a significant extent. I have tried to take account of this by maintaining a reflexive approach, and through regularly reflecting on my developing findings together with my supervisors, who have different professional backgrounds to my own. Though my data has been systematically collected and analysed, it is possible that a different ethnographer would have made alternative

findings, or framed the same findings differently. My study should therefore not be viewed not only as an ethnography of hip fracture anaesthesia, but as an ethnography of hip fracture anaesthesia *by a hip fracture anaesthetist*. My intimate knowledge of the technical field clearly lends many strengths to my work, but if this study had been conducted in different (and much more highly resourced!) circumstances it may have been beneficial to include patients, the public, and other healthcare professionals not only as study participants and advisors, but as co-investigators.

The nature of trauma practice produced a number of challenges in data collection in this study. As a clinician familiar with the context, I was able to anticipate many of these but my aspirational study 'protocol' (Figure 10) was far from perfect. Many of my 'datasets' are incomplete (Appendix 1), evidence of the unpredictable nature of the context of the study, the frailty of the patients, and the limitations of my own ability to collect data in the way that was specified in the protocol: as a clinician, a husband, and a father, as well as a researcher, I was not able to be present in the hospitals on a continuous basis, and some data was therefore missed. Though this is potentially a weakness of my study, and one which may have been mitigated by making use of a larger study team, I do not believe that it affected the conclusions that I was able to reach. Likewise, it quickly became apparent that my initial aspiration to hold a patient focus group was unfeasible due to patients' inability to travel short distances, even several months after discharge. This incomplete data is somewhat frustrating to me, but this mirrors the frustrations of trauma and recovery for both patients and clinicians. My data is perhaps messy, but no more 'messy' (e.g. Law and Singleton 2005) than the circumstances that I set out to investigate.

### **Ethnography, Practice, and the 'Good Anaesthetic'**

By adopting an ethnographic approach to variation in anaesthetic mode in three hospitals, I have radically reconceptualised how hip fracture anaesthesia is described, what it consists of, and what is important about it. The apparently consistent *modes* of anaesthesia presented in 'big data' conceal variation and nuance of *technique* which becomes clear through taking an in-depth view. Likewise, apparently disparate practices can be more aligned than they first appear when viewed through the lens of the minimally invasive – comprehensive continuum; both spinal and general anaesthesia can be performed in a way that emphasises control of uncertainty, transience of effect, or elements from both of these approaches. The themes that I have generated offer an alternative view of anaesthetic practice, one that I hope will find acceptance within the conceptualisation of anaesthesia adopted by clinical colleagues and those who study how medicine works.

My ethnography is, to my knowledge, the first such study of anaesthesia undertaken by an anaesthetist-ethnographer. By researching a context of central importance to my clinical practice, I believe that I have advanced my training as a clinician in parallel with my development as a researcher. Since undertaking this study, I have found myself adopting some of the practices that I have observed, discussed, and analysed, and enacting the suggestions that I have made concerning the role of brokering, morphing, and the approach that anaesthetists take to consent in the context of hip fracture. Furthermore, I believe that the approach that I have adopted to this ethnography is already making impacts in the broader anaesthetic community: I have been invited to present my findings at national and international anaesthesia conferences, and contribute to the development of strategic documents concerning

hip fracture management in the UK and worldwide. Honoured as I am to have been invited to share my findings and contribute to guidelines, I believe that it is more important that this represents validation of the importance of ethnographic research from the perspective of the anaesthetic community. Reflecting on the educational implications of their study on 'the problem of expertise in anaesthesia', Pope et al (2003) proposed that 'the type of detailed, systematic observation and data recording used in [their] study could be beneficial in the training... of anaesthetists.' My experience supports this suggestion; by enacting the themes that I have derived from my research, I believe that, in a small way, I have demonstrated the translational potential of my findings, and enhanced the quality of care that I am able to provide for this important and under-represented patient group.

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## Appendices

## Appendix 1: Introductory Interviews

### Key Informant Interview Topic Guide

Key Informant Interview version 1.1, 24/2/16

Health & Medicine

Lancaster University



Topic Guide: Introductory 'Key Informant' Interview

The purpose of these interviews is to gain an understanding of the institution, its culture and approach to anaesthesia for the fractured neck of femur patient. Other key informants (eg surgeons, ortho-geriatricians, nurses, physiotherapists) and clinicians for observation will be identified through snowball sampling.

This is a topic guide – questions will not be asked verbatim, but will be integrated into the conversation in an unintrusive fashion. The order in which topic areas are discussed will be determined by the development of the conversation. Topic areas plus additional cues offered by the participant will be explored and expanded through open questioning.

- 1) Open with introductions, ensure participants name and position recorded. Ask about their personal role in the care of fractured neck of femur patients (clinical, organizational, research etc..)
- 2) Discuss that individual's opinion about anaesthesia for fractured neck of femur. Do they have a preferred technique or set of principles? What is a good anaesthetic for such patients in their opinion?
- 3) Ask if the institution promotes a particular way of anaesthetising hip fracture patients. Find out how they do this (protocol, guidelines, education). If literature available, ask if it can be seen. How was the policy arrived-at? Does everyone comply with institutional policy? If not, why?
- 4) Discuss about risk in hip fracture anaesthesia – does the institution do anything to make hip fracture anaesthesia safer? Has it been successful?
- 5) How are patients told about their anaesthetic? Leaflets? In person? If examples are available of any literature can they be seen?
- 6) Ask about training / experience in providing hip fracture anaesthesia – how are registrars trained to provide this service? Do they provide hip fracture anaesthesia on their own, or is it a consultant-delivered service?
- 7) Can any 'expert' hip fracture anaesthetists be identified? What defines expertise? Are there any anaesthetists with unusual practice?
- 8) Try to identify other key informants – anaesthetists / surgeons / ODPs / nurses etc..

## Data Collection Record

Date	Location	Participants
5/5/16	Beckfoot	Vernon Rowntree (lead hip fracture anaesthetist)
23/5/16	Longside	Joshua Varnham (lead hip fracture anaesthetist)
25/5/16	Beckfoot	Phoebe Isaacson (clinical director of anaesthesia)
29/5/16	Beckfoot	Sid Fletcher (hip fracture lead surgeon)
21/7/16	Longside	Gertie Brook (acute pain specialist nurse)
21/7/16	Longside	Dustin Bellamy (orthogeriatrician)
22/7/16	Longside	Sylvester Brams (trauma lead surgeon)
25/7/16	Mellbreak	Linette Payne (lead hip fracture anaesthetist)
3/8/16	Beckfoot	Morris Booner (orthogeriatrician)
5/8/15	Mellbreak	Emmet Foster (manager anaesthetist)
11/8/16	Longside	Corinna Lund (orthogeriatrician)
23/8/16	Longside	Sam Stone (clinical director of anaesthesia)
1/9/16	Longside	Tiffany Kelsey (hip fracture specialist nurse)
7/9/16	Longside	Oswald Walton (ward manager)
7/9/16	Longside	Wayne Ecclestone (researcher)
14/9/16	Longside	Lucy Ayers (therapies manager)
16/9/16	Mellbreak	Eleanor Tobias (hip fracture specialist nurse)
16/9/16	Longside	Al Styles (pharmacist)
20/9/16	Longside	Jaqueline Studwick (consultant in anaesthesia and pain )
30/9/16	Mellbreak	Martie Winter (former lead hip fracture anaesthetist)
30/9/16	Beckfoot	Erik Abrams (orthogeriatrician)
11/10/16	Mellbreak	Bert Pond (lead hip fracture surgeon)
11/10/16	Mellbreak	Benedict Bennet (orthogeriatrician)
9/11/16	Mellbreak	Forrest Abel (orthopaedic surgeon)
16/11/16	Mellbreak	Kiera Thacker (geriatrician)
25/11/16	Mellbreak	Petra payton (specialist nurse – orthogeriatrics)
2/12/16	Mellbreak	Shelly Fisher (physiotherapist)
6/12/16	Beckfoot	Krystal Timothyson (anaesthetic registrar)
14/12/16	Beckfoot	Willie Baldwin (medical director)
14/12/16	Beckfoot	Kathy Jones (sister – trauma ward)
15/12/16	Beckfoot	Jaqui Haley (specialist nurse – trauma)
20/12/16	Mellbreak	Gideon Rogers (emergency medicine consultant)

## Sample Interview Data

### Interview with Dustin Bellamy, Consultant Orthogeriatrician, Longside Hospital

**Duration:** 39 mins 02 seconds

**Location:** Dustin Bellamy's office, Longside Hospital

**Date recorded:** 21/7/16

**Participants:** Cliff Shelton (interviewer), Dustin Bellamy (respondent).

#### Key

CS: Cliff Shelton

DB: Dustin Bellamy

*Dustin was nominated by Joshua Varham. His office is in the same building as the orthopaedic trauma ward. He welcomes me and makes me a cup of coffee whilst he explains his early career in research to me. It turns out that he used to work for a professor who taught me at medical school, who has always been something of a hero of mine but Dustin had a hard time working for him. When I take a seat in his office I get the impression that Dustin has made it his own – piles of books and papers relating to geriatrics cover every surface and I have to move a heap of assorted documents off the chair to sit. As we talk I get the distinct impression that Dustin really cares for his patient cohort and enjoys his work, but I think he feels like something of an outsider amongst the orthopaedic surgeons and anaesthetists who are his colleagues.*

CS: 'Okay, so could you introduce yourself then please, for the benefit of the...?'

DB: 'I'm Dustin Bellamy, I'm a consultant geriatrician at Longside, where I've worked since 2000, October 2000. Part of my job is involved in orthogeriatric care, previously I was a lecturer in geriatrics [at a local university], and again was involved in orthogeriatric care, and did some orthogeriatric care in [a local hospital] before that as well. So I've been doing orthogeriatrics since about 1993.'

CS: 'Okay, as you know this is a study primarily concerned with anaesthesia for hip fractures, I would imagine although please correct me if this is not the case, that you mainly see patients postoperatively?'

DB: 'No I think I see about, I would say that of the patients that I see so currently there's myself and another orthogeriatrician, and I do two days a week and she does three. And I would say that of the hip fracture patients that I see I see them all preoperatively, maybe one or two I don't go to see preoperatively, but most of them I see preoperatively.'

CS: 'And presumably you continue postoperatively potentially for some time?'

DB: 'Yeah well our system here is that all hip fractures are admitted under joint care of Dr Lund because she is now the lead for it, but either myself or her will see them Monday to Friday every day, we don't have a weekend service there.'

CS: 'Well thank you very much for clearing that up. So with regards to anaesthesia then do you think from your prospective there's a set of principles, or techniques, or ways of delivering anaesthesia that you would consider to be optimal for the patient group that you deal with?'

DB: 'I don't think there's an optimal anaesthetic as such, I think there are things that might be optimal in the care of people with hip fractures, a sort of preoperative pain control, medication used during procedures, and pain relief given during procedures, and a hangover effect of that. I think what anaesthetic is given is largely determined by the patient really as to their parameters, whether it's safe to, what procedure is safe to do with them. I should check in with our data collection here, we think about at the minute that 50% of people are getting fascia iliaca blocks.

I think probably use of more nerve blocks generally for pain relief would be helpful for patients with hip fractures so we're less dependent on opiates. I don't think there are any optimal pain protocols for people with hip fracture. I don't think we really know.

Often problems with anaesthesia I mean there aren't, the relatively small number of patients that have problem with anaesthesia so some people got to ICU postoperative are difficult to wake up, had some respiratory problems where people have probably had too much opiates because of their comorbidities. And I don't think there's a huge amount of evidence for anaesthesia, well I suppose, I don't know, I think it's a bit variable whether delirium as such is affected by anaesthesia. I know there's someone called Richard Griffiths in Peterborough who's very keen on not using GAs for people with hip fractures, thinks they get a better outcome but I've not read data that truly supportive of that.'

CS: 'Okay, and so as a set of principles then you've talked about analgesia and sparing of opiates, is there anything else that you think that is important in the delivery?'

DB: 'I think acknowledging comorbidity, so an anaesthetic preoperative assessment I think is quite important. I think it always tends to be a bit of a rush because you have to get them to theatre, so everyone's rushing around and probably skimping a little bit to get them to theatre, you see the surgeons are at... There's usually a queue, me, the anaesthetist, and the surgeon queueing up to see the patient and everyone's rushing about and there probably isn't a need for quite so much rush.'

## Appendix 2: Patient Encounters and Observations

### Patient Encounter Topic Guides

Preoperative interview version 1.0, 9/2/16

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Topic Guide: Patient preoperative interview

The purpose of these interviews is to gain an understanding of the patient's ideas, concerns and expectations regarding their forthcoming anaesthetic.

This is a topic guide – questions will not be asked verbatim, but will be integrated into the conversation in an unintrusive fashion. The order in which topic areas are discussed will be determined by the development of the conversation. Topic areas plus additional cues offered by the participant will be explored and expanded through open questioning.

- 1) Open with introductions, ensure participants name and contact details recorded. Ask about the circumstances of their injury and past medical history.
- 2) Ask about how they view their injury and the forthcoming treatment – how serious is their injury? What are their expectations of their recovery? Where are these views from? (eg information already given, friends / relatives who have undergone similar trauma etc)
- 3) What are they expecting from their anaesthetic (eg regional, general, sedation etc). What is the source of these expectations?
- 4) Do they have any concerns about their anaesthetic? Do they think their anaesthetic will be risky? What do they think the risks are? What are they most worried about?
- 5) Do they have any hopes / expectations from their anaesthetic? Why do they have these hopes and expectations? What do they think a good anaesthetic would involve?

Topic Guide: Patient early postoperative interview

Time / place: on the ward, once returned from theatre and capacity regained. Same day if possible, or the day after surgery. Ensure appropriately analgesed and not due for any nursing care or physiotherapy during the interview.

The purpose of these interviews is to review the experience of the anaesthetic that they have just undergone.

This is a topic guide – questions will not be asked verbatim, but will be integrated into the conversation in an unintrusive fashion. The order in which topic areas are discussed will be determined by the development of the conversation. Topic areas plus additional cues offered by the participant will be explored and expanded through open questioning.

- 1) Open with introductions, ensure participants name and contact details recorded.
- 2) Ask how the participant feels now. Ask what they have been able to do – sit up/out? Mobilise?
- 3) Ask about the presence of and management of pain post-operatively
- 4) Ask about the presence of and management of nausea and vomiting post-operatively
- 5) Ask the participant to talk through their anaesthetic as they remember it. Starting in the anaesthetic room and concluding with their transfer to recovery.
- 6) Ask how they would describe their anaesthetic experience (how good was it? Could it be improved?)
- 7) Was the anaesthetic what you expected? If not, what was different?
- 8) Did the anaesthetist offer you a choice of anaesthetic techniques? How was this presented?
- 9) Were the concerns articulated in the pre-operative interview justified? Were they taken account of / mitigated?
- 10) Were the hopes articulated in the pre-operative interview met (or exceeded)?
- 11) What was the best thing about their anaesthetic? Why?
- 12) What was the worst thing? Why? How could this be improved for other patients?

**Topic Guide: Patient follow-up postoperative interview**

**Time / place:** 2-3 months following fixation of fractured neck of femur. By telephone or in hospital, if patient prefers. This should ideally be at the time of a clinic appointment.

The purpose of these interviews is to reflect on the experience of the anaesthetic that they underwent for fixation of their fractured neck of femur. The order in which topic areas are discussed will be determined by the development of the conversation. The topic areas are similar to the early postoperative interview, simplified to remove some of the detailed topics.

This is a topic guide – questions will not be asked verbatim, but will be integrated into the conversation in an unintrusive fashion. Topic areas plus additional cues offered by the participant will be explored and expanded through open questioning.

- 1) Open with introductions, ensure participants name and contact details recorded.
- 2) Ask how the participant feels now.
- 3) Ask about their postoperative course, what has happened since the time of their anaesthetic – length of hospital stay? rehab? Change of living circumstances? Other illnesses?
- 4) Ask the participant to talk through their anaesthetic as they remember it. Starting in the anaesthetic room and concluding with their transfer to recovery.
- 5) Ask how they would describe their anaesthetic experience (how good was it? Could it be improved?)
- 6) What was the best thing about their anaesthetic? Why?
- 7) What was the worst thing? Why? How could this be improved for other patients?
- 8) If a friend had sustained a hip fracture, what would you tell them about their anaesthetic?

## Observation Topic Guide

Observation Topic Guide version 1.0, 9/2/16

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Topic Guide: Observation of Practice

Time / place: Ward / Anaesthetic Room / Recovery Room. On trauma list.

The purpose of the observation is to observe and discuss the anaesthetic management of the fractured neck of femur patient. As this is participant observation, questions and mini-interviews will take place; they will be timed to avoid interference with clinical care.

The purpose of this topic guide is to focus the observations onto areas of practice that are relevant to the study objectives. It is not intended to restrict the observation and other areas of practice may also be observed.

Pre-operative:

1. What questions does the anaesthetist ask of the patient, what assessments / physical examinations are made? How does the anaesthetist decide what assessments to make?
2. What anaesthetic options are presented to the patient? How are they presented? How are they described? Is one option promoted / preferred? How is the decision to offer a 'preferred' technique made?
3. How is risk presented to the patient? What risks are articulated? Are any omitted? How does the anaesthetist decide how to present risk?
4. What questions does the patient ask the anaesthetist? How are these responded-to.
5. If a trauma meeting takes place, how is the patient presented to the team? What issues are identified? How are they to be addressed? How is the trauma list constructed?
6. If a team brief takes place, how is the patient described to the team? What issues are identified? How are they to be addressed?

Intra-operative

7. Observe and record specifics of anaesthetic technique (include details of drugs/doses/timing of administration/regional techniques/methods of regional/monitoring/response to monitoring). Ask about justification of these actions, particularly when the anaesthetist acts in a way that is not typical of others observed in the project.
8. If a cemented femoral implant used, observe for signs of bone cement implantation syndrome. Does the anaesthetist anticipate this? If it occurs how do they respond to it?
9. How does the anaesthetic team interact with other members of the theatre team.
10. How does the anaesthetic team interact with the patient?
11. Does the patient express any opinions / feelings about their anaesthetic management? Do they appear relaxed, anxious etc..
12. Ask if the anaesthetist feels that their anaesthetic was 'good', and if so, why? Or why not?
13. Ask if / how the anaesthetist will know how the patient has done post-operatively – visits? Phone calls? Casual conversations?
14. Ask projective questions about other patient types (in particular, about patients with severe dementia – who are not included in the observations if they lack capacity).

Post-operative

15. Document handover to the recovery staff. What questions are asked and how are they addressed?

16. Does the recovery nurse / ODP consider the anaesthetic to have been 'good'? Why/why not? What would they consider to be 'good'?

## Data Collection Record

Notes on tables:

### Date:

- This is the date of consent / consultee declaration

### Capacity:

- Y = patient had mental capacity to consent,
- N = patient did not have mental capacity to consent.

### Anaesthetist:

- @ anaesthetists Identified as 'experts' in hip fracture anaesthesia by one or more key informants.
- \* trainee anaesthetists.
- + speciality doctors, staff grades, and associate specialists (SAS).

### Anaesthetic:

- GA = general anaesthesia,
  - ETT = endotracheal tube, LMA = laryngeal mask airway.
  - IPPV = intermittent positive pressure ventilation, SV = spontaneous ventilation.
  - IV = intravenous induction, INH = inhalational induction, Co = co-induction, RSI = rapid sequence induction.
  - DoA = depth of anaesthesia monitor (EEG based).
- Sp = spinal anaesthesia, LD = low dose ( $\leq 10\text{mg}$  bupivacaine), HD = high-dose ( $> 10\text{mg}$  bupivacaine),
  - Sed = sedation, Un = unседated
- FNB = femoral nerve block, 3-in-1 = FNB with distal pressure, FIB = fascia iliaca block.
- A-line = arterial line, CVC = central venous catheter
- An arrow (->) indicates an attempted procedure which was converted to another.

### Surgery:

- THR = total hip replacement, DHS = dynamic hip screw, Hemi = hemiarthroplasty, IM Nail= intramedullary nail.
- An arrow (->) indicates an attempted procedure which was converted to another.

### Encounters:

- Pr = pre-operative interview (Y = yes, N = No)
- O = observation (Y = yes, N = No)
- PO = post-operative interview (Y = yes, N = No)
- FU = follow-up (Y = yes, D = died prior to follow up, L = uncontactable, lost to follow-up, O = other)

Appendix 2

Longside:

Date	Patient	Capacity	Anaesthetist	Anaesthetic	Surgery	Pr	O	PO	FU
12/1/17	Aaron	Y	?	?	THR	Y	N	Y	L
12/1/17	Baldwin	Y	?	?	DHS	Y	N	Y	L
12/1/17	Carmel	Y	Arlo Holme	<b>GA</b> , IV, LMA, SV, 3-in-1.	DHS	N	Y	Y	Y
12/1/17	Diedre	N	Arlo Holme	<b>GA</b> , IV, ETT, IPPV, 3-in-1.	Hemi	N	Y	N	D
15/1/17	Edith	N	Louis Tyrell	<b>GA</b> , Co, ETT, IPPV, FIB.	IM Nail	Y	Y	Y	L
19/1/17	Florence	Y	Joshua Varnham <sup>®</sup>	<b>GA</b> , INH, LMA, SV, FNB	DHS	Y	Y	Y	Y
21/1/17	Gail	Y	Pamela Lynton <sup>®</sup>	<b>GA</b> , RSI, ETT, IPPV, FIB, DoA.	Hemi	Y	Y	Y	D
21/1/17	Harriet	Y	Pamela Lynton <sup>®</sup>	<b>GA</b> , IV, ETT, IPPV, FIB, DoA.	Hemi	Y	Y	Y	L
22/1/17	Imogen	Y	?	?	IM Nail	Y	N	N	Y
24/1/17	Keith	Y	Granville Long, Makayla Richards*	<b>GA</b> , IV, ETT, IPPV, FIB, DoA.	DHS -> IM Nail	Y	Y	N	Y
28/1/17	Leonard	Y	Betsy Fox	<b>Sp</b> (HD), sed	IM Nail	Y	Y	Y	Y
29/1/17	Maria	Y	Betsy Fox	Sp -> <b>GA</b> , LMA, SV, FNB	IM Nail	Y	Y	Y	Y
31/1/17	Nancy	Y	Conor Paris <sup>®</sup> , Bernice Gray*	<b>GA</b> , IV, ETT, IPPV, FIB.	Hemi	N	Y	N	L
2/2/17	Olga	Y	Vaughn Bates	<b>GA</b> , Co, ETT, IPPV, FIB.	Cannulated Screws	Y	Y	N	Y
5/2/17	Percy	N	Hyrarn Niles <sup>®</sup>	<b>GA</b> , IV, ETT, IPPV, FIB.	DHS	N	Y	N	L
9/2/17	Quentin	N	Arlo Holme	<b>GA</b> , IV, LMA, SV, 3-in-1.	DHS	Y	Y	Y	L
9/2/17	Renee	Y	Arlo Holme, Joshua Varnham <sup>®</sup>	<b>GA</b> , IV, LMA, SV, 3-in-1.	DHS	N	Y	Y	L
11/2/17	Sally	Y	Duncan Myers <sup>®</sup>	<b>GA</b> , IV, ETT, SV, FIB.	DHS	Y	Y	Y	Y
12/2/17	Tabitha	Y	Duncan Myers <sup>®</sup>	<b>GA</b> , IV, ETT, SV, FIB.	IM Nail	Y	Y	Y	Y
<b>Totals</b>	<b>20</b>	<b>Y=16 N=4</b>	<b>Cons = 11 Trainee = 2</b>	<b>Sp = 1 GA = 15 Unkn = 4</b>		<b>14</b>	<b>16</b>	<b>13</b>	<b>9</b>

## Beckfoot:

Date	Patient	Capacity	Anaesthetist	Anaesthetic	Surgery	Pr	O	PO	FU
24/2/17	Albert	Y	Tyrell Fishman	FIB, <b>Sp</b> (LD),	DHS	Y	Y	Y	Y
26/2/17	Beatrice	Y	Catherine Harris	FIB, <b>Sp</b> (LD), UnSed	DHS	Y	Y	N	Y
26/2/17	Cecil	N	Catherine Harris	FIB, <b>Sp</b> (LD), UnSed	Hemi	N	Y	Y	D
3/3/17	Daisy	Y	Langdon Sims	FIB, <b>Sp</b> (HD), Sed.	Hemi	N	Y	Y	L
7/3/17	Edna	Y	Gloria Foster <sup>@</sup>	FIB, <b>Sp</b>	Hemi	Y	Y	Y	L
8/3/17	Flora	Y	Vernon Rowntree <sup>@</sup> , Brendon Mericks <sup>*</sup>	FIB, <b>Sp</b> (LD), Sed	DHS	Y	Y	Y	L
9/3/17	Gaynor	Y	N/A	N/A	?	Y	N	N	Y
16/3/17	Heather	Y	Brent Dabney	<b>GA</b> , Co, ETT, IPPV, FIB.	DHS	Y	Y	Y	L
21/3/17	Iris	N	Knox Walter <sup>+</sup>	FIB, <b>Sp</b> (HD), Sed.	DHS	N	Y	N	L
24/3/17	Jean	Y	Nathan Samuelson, Nicholas Steele <sup>*</sup>	FIB, <b>Sp</b> (LD), Sed.	DHS	Y	Y	Y	D
24/3/17	Kenneth	N	Nathan Samuelson, Nicholas Steele <sup>*</sup>	FIB, <b>Sp</b> (LD), Sed.	Hemi	N	Y	N	L
25/3/17	Linda	Y	Tobias Clifford <sup>+</sup>	FIB, <b>Sp</b> (LD), Sed	DHS	Y	Y	Y	L
27/3/17	Maurice	Y	?	?	?	Y	N	N	O <sup>1</sup>
28/3/17	Nelly	N	Andre Underhill, Nicholas Steele <sup>*</sup>	FIB, <b>Sp</b> (LD), Sed.	Hemi	N	Y	N	L
29/3/17	Olwen	N	Langdon Sims, Nicholas Steele <sup>*</sup>	FIB, <b>Sp</b> (HD), Sed.	Hemi	Y	Y	N	L
29/3/17	Patricia	Y	Joshua Varnham	FIB, <b>Sp</b> (HD), Sed.	IM Nail	Y	Y	Y	L
3/4/17	Queenie	Y	Brendon Mericks <sup>*</sup> , Ash Keys <sup>*</sup>	FIB, <b>Sp</b> (HD), Sed	DHS	Y	Y	Y	L
8/4/17	Ralph	Y	Tobias Clifford <sup>+</sup>	FIB, <b>GA</b> , IV, ETT, IPPV.	Hemi	N	Y	N	L
10/4/17	Seymour	Y	Andre Underhill	FIB, <b>Sp</b> (LD), Sed.	Hemi	Y	Y	N	Y
23/04/17	Tess	Y	Nick Raines <sup>@</sup>	?	?	Y	N	N	L
<b>Totals:</b>	<b>20</b>	<b>Y = 15</b> <b>N = 5</b>	<b>Cons = 10</b> <b>Trainee = 3</b> <b>SASG = 2</b>	<b>Sp = 15</b> <b>GA = 2</b> <b>Unkn = 2</b>		<b>14</b>	<b>18</b>	<b>10</b>	<b>4</b>

<sup>1</sup>surgeon asked me not to follow-up.

## Mellbreak:

Date	Patient	Capacity	Anaesthetist	Anaesthetic	Surgery	Pr	O	PO	FU
18/6/17	Arthur	Y	Briar Bonner <sup>@</sup>	<u>Sp</u> (HD), UnSed	DHS		Y		L
20/6/17	Brigid	N	Martie Winter <sup>@</sup>	<u>Sp</u> (HD), FIB, UnSed	Hemi		Y		D
21/6/17	Cyril	N	Linette Payne <sup>@</sup>	N/A	No surgery - palliated	Y <sup>1</sup>	N/A	N/A	D
24/6/17	Delia	Y	Briar Bonner <sup>@</sup>	<u>Sp</u> (HD), sed	Hemi		Y		D
3/7/17	Elaine	N	Ulysses Shine	<u>GA</u> , IV, ETT	Hemi	Y <sup>1</sup>	Y	-	-
	Elaine	-	Linette Payne <sup>@</sup>	<u>GA</u> , IV, LMA	Reduction	-	Y	-	-
	Elaine	-	Stafford Wickham	?	Revision	-	N	Y <sup>1</sup>	Y <sup>1</sup>
3/7/17	Flora	Y	Linette Payne <sup>@</sup> , Davey Bristow <sup>*</sup>	<u>GA</u> , IV, ETT, IPPV, FIB, A-Line, CVC	Hemi		Y		L
6/7/18	Gloria	Y	Elroy Ashworth, Darin Garnet <sup>*</sup>	<u>GA</u> , IV, ETT, IPPV, FIB, DoA	Hemi		Y		L
8/7/17	Ivan	Y	Elroy Ashworth	<u>GA</u> , IV, ETT, IPPV, FIB	DHS		Y		D
11/7/17	Joy	Y	Jonathan Sidney <sup>@</sup>	<u>Sp</u> (LD), FIB, A-Line, CVC	DHS		Y		O <sup>2</sup>
19/7/17	Molly	Y	Linette Payne <sup>@</sup>	<u>GA</u> , IV, ETT, IPPV, FIB	IM Nail		Y		L
19/7/17	Nicola	Y	Thad Pearson	<u>GA</u> , IV, ETT, IPPV, FNB	IM Nail		Y		L
20/7/17	Oscar	Y		?					Y
3/8/17	Peggy	Y	Sophie Jewel	<u>GA</u> , RSI, ETT, IPPV, FNB.	IM Nail		Y		Y
4/8/17	Quintin	Y	Stafford Wickham, Briar Bonner <sup>@</sup>	N/A	No surgery - palliated	Y	N/A	N/A	D
11/8/17	Rose	Y	Allen Southers, Cooper Read <sup>*</sup>	?	?	Y	N	N	Y
15/8/17	Sheila	Y	Martie Winter <sup>@</sup>	?	?	N	N	N	Y
21/8/17	Trudy	Y	Charlton Achilles, Erica Kitchens <sup>*</sup>	<u>GA</u> , IV, IPPV	THR	Y	Y		Y
<b>Totals:</b>		<b>Y = 14 N = 3</b>	<b>Cons = 11 Trainee = 4</b>	<b>Sp = 4 GA = 9 Unkn = 4 Pall = 2</b>			<b>13</b>		<b>6</b>

<sup>1</sup> Recorded with patients' next of kin.<sup>2</sup> Unable to arrange translator for follow-up.

## Sample Data from Patient Encounter

### Edna Pre-Op Interview

Bay of Hip Fracture Ward, Beckfoot Hospital.

7<sup>th</sup> March 2017, 07:50

**Me:** Okay, so could you introduce yourself please for the recording?

Edna: Pardon, I speak?

**Me:** Yes.

Edna: What do you want me to say?

**Me:** Just to introduce yourself so I've recorded your name.

Edna: Oh right.

**Me:** So it's [Edna]?

Edna: Yeah.

**Me:** Yeah, what's your date of birth?

Edna: [dd/mm/]33.

**Me:** Okay, and how did you injure your hip?

Edna: I just went down on floor, banged my face on wall.

**Me:** Yeah.

Edna: And down I went.

**Me:** And what were you doing at the time?

Edna: I were going to turn my central heating off.

**Me:** So this was at home?

Edna: The sun had all come in and it were getting too hot.

**Me:** And do you live on your own at home?

Edna: Yeah.

**Me:** Yeah. And you mentioned earlier on that you walk with a stick.

Edna: I have two sticks.

**Me:** Yeah. One of them is a normal stick is it?

Edna: One's a walking stick, I walk like a spider.

**Me:** Yeah.

Edna: It's no good on the carpet they say.

**Me:** Okay.

Edna: It wobbles about.

**Me: So do you use the sticks around the house then?**

Edna: No not really. It waggles a lot.

**Me: Okay so what do you do to get about?**

Edna: I walk the wall. *She mimes – using the wall to keep her steady.*

**Me: Okay, okay. Do you live with anyone or is it...?**

Edna: No I'm on my own.

**Me: And do you have any help coming in?**

Edna: No.

**Me: No, okay. What about family or anything like that...?**

Edna: Yes my daughter's only up the road.

**Me: Okay. And so when you fell was it like a trip and fall or do you know why you ended up falling over?**

Edna: I'm know... I'm going down.

**Me: Yeah.**

Edna: And I just let one yell out and the man next door was in the garden.

**Me: So he heard you?**

Edna: No, I rung for daughter to come and help. I have one of them panic buttons.

**Me: I see. Okay.**

Edna: Her and son-in-law came. I want a wee.

**Me: Okay. Do you want me to find...?**

Edna: A nurse.

**Me: A nurse yeah. Let me...**

*I turn off the recorder and go to find a member of nursing staff. We resume the interview after Edna has used the bed-pan.*

**Me: Okay so could you tell me if you have any medical problems?**

Edna: Apart from the cancer?

**Me: What sort of cancer do you have?**

Edna: I don't know. I never asked him. On the 4<sup>th</sup>, Tuesday, did chemo.

**Me: Right.**

## Sample Data from Observation

### **Observation - Delia**

Location: Mellbreak Hospital, Trauma Ward and Operating Theatres.

Date: 24/06/2017

Time: 08:08 – 10:34

Anaesthetist: Briar Bonner (consultant)

Surgeons: Samuel Boothman (consultant)

ODP: Rhett Ramsey

*Delia is 88 years old and registered blind. She has fractured her right hip and is listed for a hemiarthroplasty. She is in a side ward because she has previously had a positive culture for carbapenem resistance enterobacteriaceae (CPE) – a hospital acquired infection. I explain the participant information sheet to her, and with the help of one of the ward nurses acting as a witness, we consent her for the study. We record a pre-operative interview and I make my way to the trauma meeting. At 08:08 the surgical SHO presents the case:*

### **Trauma Meeting**

Surg SHO: 'Delia, eighty-eight. She has CPE, she's blind – macular degeneration, she has CKD and osteoporosis.' *The SHO brings up the x-ray – it shows a fractured right NOF, and a left hemiarthroplasty. 'Previous left hemiarthroplasty, looks like she's had a periprosthetic fracture. Bloods in-range, ECG ok, so from a surgical point-of-view she's marked and consented, ready to go.'*

Samuel: 'Ok, put her first.'

### **Assessment**

*Briar and I go to see Deila on the ward. The SHO walks with us. We bump into one of the nurses on the way:*

Nurse: 'She's CPE, and she's got dementia.'

Briar: 'So she's on a form four?'

Surg SHO: 'No, she's an AMT nine out of ten.'

Briar: 'That's pretty good!'

Surg SHO: 'She seems like she's got dementia because she talks a lot, repeats herself...'

*We put on gloves and aprons, and enter the side ward.*

Briar: 'Hello Delia, how are you this morning?'

Delia: 'Not so good, I've got this pain.'

Briar: 'In the hip?'

Delia: 'No, that's not bothering me... I can't wee.'

Briar: 'I'm Briar Bonner, I'm the consultant anaesthetist. You'll be coming to theatre soon. Let me take your pulse.' *He palpates her left radial pulse.*

Delia: 'My waterworks...'

Briar: 'We're thinking of doing a spinal.'

Delia: 'I had one of those, and one in the front.'  
Briar: 'Oh, that's for pain relief, for the hip. Did it work?'  
Delia: 'What do you mean "do I work?"'  
Briar: 'I mean the injection...'  
Delia: *No response.*  
Briar: 'So, you happy with the spinal?'  
Deila: *No response.*  
Briar: 'We'll put it in your back, your legs will go heavy, we'll get you down to theatre in a few minutes.'  
Delia: 'Well get on with it then! I can't even walk.'  
Briar: 'No, the porter will come for you. We'll do everything on the bed. See you later.'

*We remove our PPE and wash our hands, then make our way to the notes trolley.*

Briar: *Leafs through the clerking. 'So... bloods look ok, sodium's a bit low [it is 130 mmol/L], creatinine's ninety, ECG looks fine. Right.' He puts the notes back in the suspension file and heads off to see the next patient.*

*I make my way to theatre – I get to the anaesthetic room at 08:40. I find that it is full of equipment: tourniquets, the plaster trolley, and some equipment trolleys. I guess that they've moved everything non-essential out of theatre because Delia has CPE. I bump into Rhett, the ODP. I explain the project and he signs the consent form.*

*At 08:46 Briar enters the anaesthetic room:*

Briar: *Looks at all the equipment – 'Oh! CPE is it?'*  
Rhett: *'Yes.'*  
Briar: *'So we're going straight into theatre?'*  
Rhett: *'Yes.'*  
Briar: *'We'll do a spinal.'*  
Rhett: *'Diamorph?'*  
Briar: *'Just plain, I don't put opiates in spinals. I'll have some fentanyl to position her.'*

*We go through into theatre. Briar and Rhett start to discuss the cases with the scrub team. They get to discussing Delia:*

Scrub N: *'So she's blind? I think that's what they said.'*  
Briar: *'She seems ok.'*  
Scrub N: *'Does she need blood?'*  
Briar: *'The biggest risk is that when they put the cement in she'll have a cardiac arrest.'*

*They go on to talk about the rest of the list.*

## Appendix 3: Focus Groups

### Focus Group Topic Guide

Anaesthetists focus group version 1.0, 9/2/16



Topic Guide: Anaesthetists Focus Group

Time / place: at the end of the project (after all observations completed). In hospital.

The purpose of this focus group is to investigate the cultural norms within the group of anaesthetists in each institution.

This is a topic guide – questions will not be asked verbatim, but will be integrated into the conversation in an unintrusive fashion. The order in which topic areas are discussed will be determined by the development of the conversation. Topic areas plus additional cues offered by the participant will be explored and expanded through open questioning.

- 1) Open with introductions, ensure participants name and position recorded. Ask about their personal role in the care of fractured neck of femur patients (clinical, organizational, research etc..)
- 2) Discuss techniques for anaesthesia for fractured neck of femur. Do any individuals have a preferred technique or set of principles? What is a good anaesthetic for such patients? Is there a group consensus?
- 3) Are there any patient groups who should have specific considerations? (ensure dementia is discussed here).
- 4) Refer to institutional guidelines on provision of anaesthesia for fractured neck of femur patients (if this exists). Does everyone comply with institutional policy? If not, why?
- 5) Discuss about risk in hip fracture anaesthesia – does the institution do anything to make hip fracture anaesthesia safer? Has it been successful? Do any group members have particular key points regarding safety?
- 6) What are the challenges of explaining anaesthesia to patients?
- 7) Ask about training / experience in providing hip fracture anaesthesia – how are registrars trained to provide this service?
- 8) What defines expertise in hip fracture anaesthesia?

**Data Collection Record**

<b>Date</b>	<b>Location</b>	<b>Participants</b>
2/3/18	Beckfoot	Vernon Rowntree, consultant anaesthetist / hip fracture lead Tobias Clifford, associate specialist in anaesthesia Nathan Samuelson, consultant anaesthetist Nick Raines, consultant anaesthetist Gloria Foster, consultant anaesthetist Tyrell Fishman, consultant anaesthetist Phoebe Isaacson, consultant anaesthetist / clinical director
14/3/18	Longside	Joshua Varnham, consultant anaesthetist / hip fracture lead Vaughn Bates, consultant anaesthetist / intensivist Conor Paris, consultant anaesthetist Duncan Myers, consultant anaesthetist Joshua Varnham, consultant anaesthetist Lewis Tyrell, consultant anaesthetist Pamela Lynton, consultant anaesthetist Jacqueline Studwick, consultant anaesthetist / pain physician
19/4/18	Mellbreak	Linette Payne, consultant anaesthetist / hip fracture lead Sophie Jewel, consultant anaesthetist Martie Winter, consultant anaesthetist Stafford Wickham, consultant anaesthetist Darin Garnet, registrar in anaesthesia Elroy Ashworth, consultant anaesthetist Briar Bonner, consultant anaesthetist Emmet Foster, consultant anaesthetist / clinical director

## Sample Focus Group Data

### Longside Focus Group

Room in the education centre, Longside Hospital

14<sup>th</sup> March 2018

Duration 1:05:55

CS: Cliff Shelton  
 R: Respondent (not identifiable)  
 VB: Vaughn Bates  
 CP: Conor Paris  
 DM: Duncan Myers  
 JV: Joshua Varnham  
 LT: Lewis Tyrell  
 PL: Pamela Lynton  
 JS: Jacqueline Studwick

*[0:00:00- 0.00.17 background chatter]*

CS: Yeah, shall we get cracking? So, thank you very much for making the time to come along. Hi there.

JS: *[enters]* Sorry.

CS: That's okay. We're just, literally just started. So as you all know, I was here last year to talk to some of you and observe some of you doing some anaesthesia for hip fracture patients. And I've now completed the rest of the observational bits of the study. This was the first hospital I was in. I've been to two other hospitals where they do things a bit differently, followed the patients up and now I'm coming back just to tie up some loose ends and talk about some stuff that maybe we didn't get to talk about or didn't get to talk about with more than one person in the room.

So, I don't know how many of you have done focus group type things before, but this is a recorded conversation between colleagues basically. I've got a guideline which I kind of go through and try and lead the conversation on from one thing to the next. But the best focus groups have very little of me talking and quite a lot of you talking. Nobody wants to be here until midnight however, so once I think I've got *[general laughter]* enough stuff or the points start to repeat themselves I'll just kind of move us on.

As with the rest of the study this is you know, as confidential as it can be. Obviously, there's some, you know, there's only so many hospitals in the country, there's so many anaesthetists in the North West of England and so on and although you will have a pseudonym and the institution will be anonymised and so on, just bear in mind it's probably not completely feasible to make this kind of completely watertight in terms of confidentiality. But I've not picked up anything that I would deem controversial so far in the study and I don't think there's going to be anything, you know, particularly controversial here but just bear that in mind. And then in terms of what happens to the recording, I will send it off for it to be transcribed and when it's transcribed and checked it will disappear and be deleted from these two devices which are just backing each other up and are both encrypted. Is that okay with everyone?

R: Yes (x7)

CS: Okay. Super so, just before we crack on would you mind just introducing yourselves, so the transcribing person has a fair chance of tagging your voice to who you are? Do you want to start off?

VB: So I'm Vaughn Bates, do you need any more than that?

CS: Well you could tell me a little bit about your involvement with hip fracture anaesthesia and what you do for a job as well?

VB: So I was doing anaesthetics but I've recently stopped doing anaesthetics to concentrate on critical care and research. So my anaesthetic list before January tended to be trauma and it was once a week on Wednesdays and I was probably doing hip fracture surgery, I don't know, one in three times.

CS: Okay, thank you.

CP: Hello. Conor Paris. I'm a consultant at Longside. I have a regular fortnightly sort of community trauma list, which is where I met you Cliff, doing the hip fractures. I have a background of, I've got one more month to go in the [armed forces], I would have done 20 years and I've been away to [overseas combat zones] and done a lot of trauma there and I have a regular emergency list and I'm on the first tier of the on-call rota.

CS: Thank you.

DM: I'm, just to confuse the transcriber, I'm Duncan Myers, *[he makes a joke about how his name sounds similar to that one of his colleagues - which doesn't translate with his pseudonym - this gets general laughter from the group]* eh, for a long time I've done orthopaedic trauma at weekends and elective orthopaedics and regularly been bounced sideways to cover orthopaedic community, orthopaedic trauma on weekdays. And I recently erm, am making some changes to my sessions but I would anticipate continuing to do some orthopaedic trauma.

CS: Okay, thank you.

JV: I'm Joshua Varnham, I'm a consultant here, I have a weekly trauma list so it's one of my main interests. I'm also the department's orthopaedic trauma lead.

CS: Okay, thank you.

LT: My name is Louis Tyrell, I'm a consultant anaesthetist here at Longside and I do a weekly like Joshua, a weekly trauma list on Monday as part of my regular job plan. There's two trauma theatres so I alternate between trauma theatre 1 and trauma theatre 2.

CS: Okay.

LT: I'm, I guess on average there's probably a hip fracture every week, some weeks there's none but obviously some weeks there's more than one so it probably averages out at about one a week.

CS: Okay, thank you.

PL: I'm Pamela Lynton, also a consultant anaesthetist here at Longside and I've covered the Friday orthopaedic trauma lists since 2003.

CS: Thank you.

JS: Hi, I'm Jacqueline... oh, sorry, Jacqueline Studwick I'm known as now *[she married recently and changed her surname]*, consultant anaesthetist here at Longside and I am the, one of the lead consultants for the inpatient pain team so that's why I'm here. In terms of how many hip fractures do I anaesthetise? I do that sporadically as flexible cover and I'm also on the on-call rota for emergency theatre as well.

CS: Okay. So thank you very much everybody for your introductions. If we could start off by talking about anaesthetic technique for hip fractures. As you know, one of the reasons I

came to observe your practice at this hospital is that the predominant technique is general anaesthesia but if we can expand upon, you know, just not the mode of anaesthesia but the technique as to how it's done. Do you have a set of principles that you follow or a way you think it should be done? I'll just kind of throw that open and see what happens.

VB: I was fairly didactic actually, unusually for me in a way, I did my neck of femur anaesthetics, kind of learnt it over the years as a trainee. So I used to give a very, very, very gentle anaesthetic and I always used to intubate my patients and that was because of experiences at [a local town], where there was incidences of aspiration and death on LMAs. So I felt that either the patient should be either general or they should have a spinal and they shouldn't really have been in between for these patients was my view. Because obviously, if it's a long bone fracture etcetera, etcetera, and I gave them a fascia iliaca block, and a touch of morphine, and a gentle anaesthetic and they seemed to do quite well in my hands. So I was, it was kind of fairly standard in my hands that used to happen.

DM: Did you paralyse them?

VB: For the intubation, yes but after that, no.

DM: I'd like to just follow that on. So the transcriber won't be getting the bald and silver beard that I provide to this group [*general laughter*]. I always, if I'm doing a GA, I always intubate but I never paralyse to ventilate. So I... homeopathic doses of drugs, slip the tube down as I chase the patient down the bed because they're still wriggling,

LT: yep

JS: Mmm hmm [*agreement*]

*The others are nodding too*

DM: Spontaneous breathing, very low, very low concentration of volatile and regional block.

CS: There seems to be quite a lot of agreement...

DM: Only between us two...[*indicates JS*]

[*general laughter/over speaking*]

PL: I would follow the same principles...

LT: What you would say would describe the principles of mine as well.

CP: And mine as well.

VB: Yes, yeah, I used to do a half and half, so I'd give them maybe 2 or 3mls of Propofol and two per cent sevo and they'd be wriggling, and then the tube goes down as Duncan says, they got a half-induction as well.

LT: It's funny because what you described, it's kind of what I do now. Having had conversations with people about the GA technique I kind of, having moved to Longside fairly recently where, from a hospital where we predominantly did spinals, I kind of learned the Longside way, because it works well. I mean, I've witnessed as well, a lot of spinals that would be ineffective or wear off where patients then get a laryngeal mask and would aspirate and I would be the consultant called into the patient that has aspirated.

PL: I'm curious as to how how these people, centres, where they do a lot of spinals actually technically get the spinal in. I was saying to Duncan on the way up here, I'm pretty good at doing spinals in elective patients when they're sitting and they flex their spine, give me a

## Appendix 4: Sample Participant Information Sheets

### Patient Participant Information Sheet

	Patients PIS Version 1.3, 1/4/16
<div style="border: 1px solid blue; padding: 5px; display: inline-block;">Hospital name and logo here.</div>	
<p><b>Participant Information Sheet: Patients</b></p>	
<p>Study Title: What is a good anaesthetic for a hip fracture?</p>	
<p>We would like to invite you to participate in the above study. The study aims to investigate the features of good anaesthetic management for patients who need surgery to fix a fractured hip.</p>	
<p><b>Explanation.</b></p>	
<p>The study involves discussions with patients and staff, and observation of the process of providing anaesthesia. The care that you will be provided is not influenced by your decision regarding participation in the study.</p>	
<p>A number of anaesthetic techniques exist to facilitate hip fracture surgery. At present, there is not much strong evidence to suggest which technique is best. In order to investigate this, we would like to observe the practice of your anaesthetist. We are interested to know about your views on the anaesthetic that you experience, and we will ask the anaesthetist and other members of the healthcare team about their views as well.</p>	
<p>This study is based in three hospitals in the North West of England. We anticipate that about 40 anaesthetists and 80 patients will take part.</p>	
<p><b>What would taking part involve?</b></p>	
<p>Taking part in the study would involve a number of interviews with a researcher, the observation of your anaesthetic care by a researcher, and a focus group (a group discussion) with other patients who have had hip fracture surgery.</p>	
<ul style="list-style-type: none"> <li>• The interviews will last about 30 minutes, will be recorded on a digital audio recorder, and will be undertaken at the following times:             <ul style="list-style-type: none"> <li>○ Before you are seen by your anaesthetist.</li> <li>○ Shortly after your operation.</li> <li>○ Three months after your operation (this interview can be done over the telephone if this is easier for you.)</li> </ul> </li> <li>• The observation will take place from when you are seen by your anaesthetist to when you are transferred back to the ward. Depending on what type of anaesthetic you have, you may be asleep during your</li> </ul>	

operation and drowsy or confused afterwards. The observation will continue during this time.

- The focus group will last about an hour and will take place after the interviews have concluded (around 3-4 months after your operation).
- If you have to travel for the interviews or focus groups your travel expenses will be reimbursed up to £10.

Once the preliminary analysis of the data has been undertaken (this will take several months) you will be invited to a meeting where you can offer feedback on what we have found.

Prior to the follow-up elements of the study (three-month interview, focus group and feedback meeting) we will contact your general practitioner (GP) to ensure that you are still able to participate in the study. If the GP does not believe that participation would be possible, you will not be contacted.

The researchers are trained healthcare professionals and are used to working in the operating theatre environment. Whether or not you decide to participate in the study your care will not be affected.

**What are the possible benefits of taking part?**

Your care will not be affected by taking part in the study, however we hope that there will be wider benefits to other patients with broken hips who can benefit from the findings of this research.

### What are the possible disadvantages and risks of taking part?

Your care will not be affected by taking part in the study, however there is some time commitment required in order to participate in interviews and the focus group. It is possible that you may find the topics of discussion upsetting or the presence of the researcher intrusive, though we will try to ensure that this is not the case.

### Further supporting information

#### How will my information be kept confidential?

- Forms, notes and recordings will be transcribed (typed) and during this process your name and any other personal details will be removed. Fingertips Typing Ltd, a company with experience of working on similar projects, will undertake the transcription. They will keep your information secure. You will be identified in the study by a pseudonym (a name unrelated to your own). During the study the research team will maintain a 'key' document to link your pseudonym to your real name, but once all the observations, focus groups and interviews are completed this will be destroyed. Whilst awaiting transcription, recordings will be kept as a password-protected file on a secure computer, and documents will be stored in a locked filing cabinet in a secure building. Anonymised information will be stored securely for ten years, and may be used in subsequent research by the same research team, or shared with other researchers, subject to authorisation by the appropriate authorities.

#### What will happen if I don't want to carry on with the study?

- You can withdraw from the study at any time by notifying the research team. You do not need to explain your reasons for doing this and your clinical care will not be affected. You can request that your information be removed from the study, and this request will be honoured until the information becomes fully anonymised at which point we will be unable to identify individuals. We will retain the 'key' document for two weeks after the last pieces of information are collected and therefore if you wish to withdraw your information please contact the research team within two weeks of your participation.

**What will happen to the results of this study?**

- The results of this study will be used by Dr Shelton in writing his Doctorate of Philosophy degree, which he is studying at Lancaster University. They will also be used in the writing of academic papers and presentations at conferences and public events. Quotations from the study will be reproduced in these documents and presentations, however they will be anonymised by use of a pseudonym as described above.

**Who is organising and funding this study?**

- The study is organised by Lancaster University and funded by the National Institute of Health Research and Health Education England.

**How have patients and the public been involved in this study?**

- A group from Age-UK have been involved in designing the study and producing this information leaflet. They will continue to be involved in the study by producing outputs such as information leaflets for patients with broken hips.

**Who has reviewed this study?**

- The study was reviewed by the National Institute for Health Research, three independent expert reviewers, and the NHS Health Research Authority.

Hospital name and logo here.

Further information and contact details.

- Principal Investigator: Dr Clifford Shelton  
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LA14YW

[telephone no & email address]

In case of any concerns or complaints:

- Project Supervisor Dr Dawn Goodwin  
Lancaster Medical School  
Furness College  
Lancaster University  
LA14YW

[telephone no & email address]

For impartial information about participating in research:

- Research and development [insert details of local R&D dept]

What to expect during the consent process

- You will be offered the opportunity to ask any questions, and asked some simple questions to confirm that you understand what taking part in the study will involve. If you want to take some time to consider whether to take part you will be welcome to take as long as you need. If you would like a relative, carer or healthcare professional (e.g. the nurse who has been looking after you) to be present this can be arranged. If you wish to take part in the study you will be asked to sign a consent form (patient consent form v1.0, 9/2/16) and complete a form with your contact details on it so you can be contacted to arrange follow-up interviews and focus groups (contact details form v1.0, 9/2/16).

## Consultee Information Sheet (Patient Without Mental Capacity)

	Carers PIS Version 1.3, 1/4/16
<div style="border: 1px solid black; padding: 5px; background-color: #e0e0e0;">Hospital name and logo here.</div>	
<p><b>Participant Information Sheet: Relatives / Carers of Patients who lack capacity.</b></p>	
<p><b>Study Title:</b> Evaluation of patient experience of hip fracture anaesthesia.</p>	
<p>We would like to invite you to participate in the above study. The study aims to investigate the features of good anaesthetic management for patients who need surgery to fix a fractured hip.</p>	
<p><b>Explanation.</b></p>	
<p>The study involves discussions with patients and their carers or relatives and staff, and observation of the process of providing anaesthesia. The care that the patient will be provided is not influenced by your decision regarding participation in the study.</p>	
<p>You have been approached because the patient lacks capacity to decide if they wish to participate in the study. We would like you to consider whether the patient would want to participate in the study. We would also like to invite you to participate in some parts of the study.</p>	
<p>A number of anaesthetic techniques exist to facilitate hip fracture surgery. At present, there is not much strong evidence to suggest which technique is best. In order to investigate this, we would like to observe the practice of the patient's anaesthetist. We are interested to know about the patient's views on the anaesthetic that they experience, and we would also like to know your views on the patient's experience and recovery. We will also ask the anaesthetist and other members of the healthcare team about their views as well.</p>	
<p>This study is based in three hospitals in the North West of England. We anticipate that about 40 anaesthetists and 80 patients will take part.</p>	
<p><b>What would taking part involve?</b></p>	
<p>For the patient:</p>	
<p>Taking part in the study will involve the observation of the patient's anaesthetic care by a researcher, and may also involve a number of interviews with a researcher and a focus group (a group discussion) with other patients who have had hip fracture surgery. Participation in interviews and the focus group will depend on what the patient is able to do.</p>	
<ul style="list-style-type: none"> <li>• The observation will take place from when the patient is seen by your anaesthetist to when they are transferred back to the ward. Depending on what type of anaesthetic they have, they may be asleep during your operation and drowsy or confused afterwards. The observation will continue during this time.</li> <li>• The interviews will last about 30 minutes, will be recorded on a digital audio recorder, and will be undertaken at the following times:             <ul style="list-style-type: none"> <li>○ Before the patient is seen by their anaesthetist.</li> <li>○ Shortly after the operation.</li> <li>○ Three months after the operation (this interview can be done over the telephone if this is easier for the patient.)</li> </ul> </li> <li>• The focus group will last about an hour and will take place after the interviews have concluded (around 3-4 months after your operation).</li> <li>• If the patient has to travel for the interviews or focus groups their travel expenses will be reimbursed.</li> </ul>	

The researchers are trained healthcare professionals and are used to working in the operating theatre environment.

For you:

Taking part in the study will involve a number of interviews with a researcher and a focus group (a group discussion) with patients and other relatives / carers of patients who have had hip fracture surgery. It may also involve supporting the patient in taking part in interviews or focus groups in which case you would be interviewed together.

- The interviews will last about 30 minutes, will be recorded on a digital audio recorder, and will be undertaken at the following times:
  - Shortly after the operation.
  - Three months after the operation (this interview can be done over the telephone if this is easier for you.)
- The focus group will last about an hour and will take place after the interviews have concluded (around 3-4 months after your operation).
- If you have to travel for the interviews or focus groups your travel expenses will be reimbursed.

Once the preliminary analysis of the data has been undertaken (this will take several months) you will both be invited to a meeting where you can offer feedback on what we have found.

Regardless of your decision regarding participation in the study, the patient's care will not be affected.

Prior to the follow-up elements of the study (three-month interview, focus group and feedback meeting) we will contact the patient's general practitioner (GP) to ensure that they are still able to participate in the study. If the GP does not believe that participation would be possible, you and the patient will not be contacted.

#### What are the possible benefits of taking part?

The patient's care will not be affected by taking part in the study, however we hope that there will be wider benefits to other patients with broken hips who can benefit from the findings of this research.

#### What are the possible disadvantages and risks of taking part?

The patient's care will not be affected by taking part in the study, however there is some time commitment required in order to participate in interviews and the focus group. It is possible that you or the patient may find the topics of discussion upsetting or the presence of the researcher intrusive, though we will try to ensure that this is not the case.

#### Further supporting information

How will information be kept confidential?

- Forms, notes and recordings will be transcribed (typed) and during this process your name, the patient's name and any other personal details will be removed. Fingertips Typing Ltd, a company with experience of working on similar projects, will undertake the transcription. They will keep the patient's information secure. You and the patient will be identified in the study by a pseudonym (a false name). During the study the research team will maintain a 'key' document to link pseudonyms to real names, but once all the observations, focus groups and interviews are completed this will be destroyed. Whilst awaiting transcription, recordings will be kept as a password-protected file on a

secure computer, and documents will be stored in a locked filing cabinet in a secure building. Anonymised information will be stored securely for ten years, and may be used in subsequent research by the same research team, or shared with other researchers, subject to authorisation by the appropriate authorities.

What will happen if I don't want to carry on with the study?

- You can withdraw from the study, or withdraw the patient from the study at any time by notifying the research team. You do not need to explain your reasons for doing this and the patient's clinical care will not be affected. You can request that your information and/or the patient's information be removed from the study, and this request will be honoured until the information becomes fully anonymised (once the 'key' document described above has been destroyed.) at which point we will be unable to identify individuals. We will retain the 'key' document for two weeks after the last pieces of information are collected and therefore if you wish to withdraw the patient's information please contact the research team within two weeks of their participation.

What will happen to the results of this study?

- The results of this study will be used by Dr Shelton in writing his Doctorate of Philosophy degree, which he is studying at Lancaster University. They will also be used in the writing of academic papers and presentations at conferences and public events. Quotations from the study will be reproduced in these documents and presentations, however they will be anonymised by use of a pseudonym as described above.

Who is organising and funding this study?

- The study is organised by Lancaster University and funded by the National Institute of Health Research and Health Education England.

How have patients and the public been involved in this study?

- A group from Age-UK have been involved in designing the study and producing this information leaflet. They will continue to be involved in the study by producing outputs such as information leaflets for patients with broken hips.

Who has reviewed this study?

- The study was reviewed by the National Institute for Health Research, three independent expert reviewers, and the NHS Health Research Authority.



Hospital name and logo here.

Further information and contact details.

- Principal Investigator: Dr Clifford Shelton  
Lancaster Medical School  
Furness College  
Lancaster University  
LA14YW

[telephone no & email address]

In case of any concerns or complaints:

- Project Supervisor: Dr Dawn Goodwin  
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For impartial information about participating in research:

- Research and development [insert details of local R&D dept]

What to expect during the consent process

- You will be offered the opportunity to ask any questions. If you want to take some time to consider whether you and the patient should participate you will be welcome to take as long as you need. If you wish for you and the patient to take part in the study you will be asked to sign a consent form for you (relative/carer consent form v1.0, 9/2/16), a form declaring that you believe that the patient would wish to participate (consultee declaration form v1.0, 9/2/16), and complete a form with your contact details so you can be contacted to arrange follow-up interviews and focus groups (contact details form v1.0, 9/2/16).

## Anaesthetic Practitioner Participant Information Sheet

Health & Medicine	<b>Lancaster University</b> 	Anaesthetic Practitioners PIS Version 1.2, 24/2/16
		Hospital name and logo here.
<b>Participant Information Sheet: Anaesthetic Practitioners</b>		
Study Title: What is a good anaesthetic for a hip fracture?		
We would like to invite you to participate in the above study. The study aims to investigate the features of good anaesthetic management for patients who need surgery for fixation of a fractured neck of femur.		
Explanation.		
The study involves discussions with patients and staff, and observation of the process of providing anaesthesia. It is an observational study so the care patients receive will not be altered as part of the study.		
A number of anaesthetic techniques are used in hip fracture surgery. At present, there is little strong evidence to suggest which technique is best. In order to investigate this, we would like to observe anaesthetic practice in hip fracture surgery. We are interested to know about your views on the anaesthetic that you provide, and we will ask the patient and other members of the healthcare team about their views as well.		
This study is based in three hospitals in the North West of England. We anticipate that about 40 anaesthetists and 80 patients will take part.		
What would taking part involve?		
Taking part in the study would involve some observations of your anaesthetic practice by a researcher, and a focus group (a group discussion) with other anaesthetic practitioners. It may also involve an interview.		
<ul style="list-style-type: none"> <li>• The interviews will last about 30 minutes, and will be recorded on a digital audio recorder. They will be used to gain an overview about the anaesthetic service in the hospital where you work.</li> <li>• The observations will take place from when you first assess the patient to when they are transferred back to the ward. It is anticipated that two anaesthetic episodes will be observed per participating anaesthetic practitioner, though more or less may be observed as dictated by the progress of the study and clinical circumstances.</li> <li>• The focus group will last about an hour and will take place at the end of the data collection period.</li> </ul>		
Once the preliminary analysis of the data has been undertaken (this will take several months) you will be invited to a meeting where you can offer feedback on what we have found.		
The researchers are healthcare professionals and are used to working in the operating theatre environment.		
What are the possible benefits of taking part?		
We hope that there will be indirect benefits to patients with fractured neck of femur and the healthcare professionals who care for them arising from the findings of this research.		
What are the possible disadvantages and risks of taking part?		
There is some time commitment required in order to participate in interviews and the focus group. It is possible that you may find the topics of discussion difficult or the presence of the researcher intrusive, though we will try to ensure that this is not the case.		
Further supporting information		
How will my information be kept confidential?		

- Forms, notes and recordings will be transcribed and during this process your name and any other personal details will be removed. Fingertips Typing Ltd, a company with experience of working on similar projects, will undertake the transcription. They will keep the patient's information secure. You will be identified in the study by a pseudonym. During the study the research team will maintain a 'key' document to link your pseudonym to your real name, but once all the observations, focus groups and interviews are completed this will be destroyed. Whilst awaiting transcription, recordings will be kept as a password-protected file on a secure computer, and documents will be stored in a locked filing cabinet in a secure building. Anonymised information will be stored securely for ten years, and may be used in subsequent research by the same research team, or shared with other researchers, subject to authorisation by the appropriate authorities.

What will happen if I don't want to carry on with the study?

- You can withdraw from the study at any time by notifying the research team. You do not need to explain your reasons for doing this. You can request that your information be removed from the study, and this request will be honoured until the information becomes fully anonymised (once the 'key' document described above has been destroyed.) at which point we will be unable to identify individuals. We will retain the 'key' document for two weeks after the last pieces of information are collected and therefore if you wish to withdraw your information please contact the research team within two weeks of your participation.

What will happen to the results of this study?

- The results of this study will be used by Dr Shelton in writing his Doctorate of Philosophy degree, which he is studying at Lancaster University. They will also be used in the writing of academic papers and presentations at conferences and public events. Quotations from the study will be reproduced in these documents and presentations, however they will be anonymised by use of a pseudonym as described above.

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Who has reviewed this study?

- The study was reviewed by the National Institute for Health Research, three independent expert reviewers, and the NHS Health Research Authority.

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Further information and contact details.

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- Research and development [insert details of local R&D dept]

What to expect during the consent process

- You will be offered the opportunity to ask any questions. If you want to take some time to consider whether to take part you will be welcome to take as long as you need. If you wish to take part in the study you will be asked to sign a consent form (anaesthetic practitioners consent form v1.0, 9/2./16) and complete a form with your contact details on it so you can be contacted to arrange observations and focus groups (contact details form v1.0, 9/2/16).

## Appendix 5: Training Courses Attended

### Lancaster University:

- FASS 510: Qualitative Methods in the Social Sciences (Oct 2015 – Dec 2015)
- Further and Advanced Approaches to Using NVivo (Dec 2015)
- FASS 506: Designing, Undertaking and Surviving Doctoral Research (Jan 2016)
- The Social Life of Science and Technologies: Theories and Debates (Oct 2016 – Mar 2017)

### External:

- Managing Challenging Interviews, National Centre for Social Research (October 2015)
- Moderating Focus Groups, National Centre for Social Research (November 2015)
- Ethnographic Methods, Social Research Association (November 2015)
- Researching Vulnerable Populations, Kings College London (May 2016)
- Mastering NVivo with the Five-Level QDA method (January 2018)