



**Hidden in Plain Sight: A scoping review of 'dark kitchens'
and the potential implications for the English planning
system**

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Abstract

Over the past decade, the food environment has changed dramatically. One significant change has been the evolution of online delivery which has increasingly become associated with so-called 'dark kitchens' – catering operations that only offer food for home delivery. These come in many different guises.

This paper reviews existing evidence and the potential impacts for local communities and planning. Like much of the gig economy, the jobs created are low-skilled and precarious, and their operations may generate nuisance and add to the decline of the High Street. However, currently impacts are under-researched.

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Introduction

This paper focuses on understanding the phenomenon referred to as 'dark kitchens'. In essence these are businesses which offer delivery-only hot and/or cold food for immediate consumption. In other words, they operate rather like the kind of delivery service offered by cafes, restaurants and other eateries, but involve no direct customer-facing operations. The business models of dark kitchens come in a variety of modes. They also come under a number of different names, including 'ghost' kitchens and 'cloud' kitchens; confusingly, while some authors proffer differentiated definitions, others use the terminology interchangeably. In this paper, we begin by using dark kitchens as an umbrella term and then, as discussed later, suggest subcategories which we believe help clarify the debates around them. Finally, it should be noted that dark kitchens are a relatively new phenomenon, emerging around 2016 (da Cunha *et al.*, 2024); and in the UK – as elsewhere – the demand for premises suitable to house dark kitchens underwent rapid growth during the COVID19 pandemic (Fern, 2023). However, it is important to see them in the context of the wider and rapidly changing foodscape of the past few decades.

Twenty-five years ago, Michael Hebbert wrote a prescient paper in this journal, which called for a fresh appreciation of the mutual interests of public health and urban planning (1999). Over the intervening period this has – in some respects – happened. National planning policy now calls for the creation of healthy and sustainable communities (DLUCH, 2024), and some major new planning projects have public health firmly embedded as a key aspiration (Townshend, 2022). One area of significant concern to public health that planning has struggled to engage with, however, is the food environment. The links between urban planning and the food environment have been highlighted for some time, including implications for the global obesity crisis (Lake and Townshend, 2006). In particular, the proliferation of outlets selling energy-dense, nutritionally poor takeaway food – sometimes referred to as 'fast food' or 'junk food' – that is high in salt, fat and sugar is of particular concern. Poor diet and excess weight are leading contributors to overall ill health and premature mortality (GBD 2019 Risk Factors Collaborators, 2020). The economic cost of poor diet and obesity is well documented (OECD, 2019). There is also evidence of complex

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3 interactions between the environment and individual factors, with hot food takeaways (HFTs)
4 being found clustered in more deprived neighbourhoods and links between educational
5 attainment and fast food consumption potentially exacerbating health inequalities (Burgoine
6 *et al.*, 2016; Lake, 2018; Eskandari *et al.*, 2022). Moreover, an association has been made
7 between takeaway proliferation and increased consumption less healthy foods in older
8 children, due to increased autonomy in self-provisioning in this age group (Smith *et al.*, 2013;
9 Turbutt, Richardson and Pettinger, 2019; Jiang *et al.*, 2023).

11 Home delivery of restaurant-cooked food has a long history. Records reveal examples in the
12 19th century, although the exact date of commencement is unknown (Roberts, Young and
13 Johanson, 2022). Regular consumption of takeaway-style foods delivered directly to the
14 home began in the USA in the 1950s with pizza delivery. The popularity of home delivery
15 grew rapidly. Customers perceived it as convenient and relatively affordable, and suppliers
16 were attracted by lower operational costs than those associated with traditional sit-in
17 restaurants. The attractiveness of home delivery was further advanced by the introduction of
18 *online* delivery providers (ODPs.) The first of these was created in 1995 when two Stanford
19 graduates developed Waiter.com (Giousmpasoglou, Ladkin and Marinakou, 2024). In the
20 UK, as more and more homes had online access – via home PCs, smartphones and so on –
21 the online delivery market took off in the mid-2000s with the ODP Just Eat. Today the UK
22 online delivery market is the third largest in the world behind China and the USA and is
23 estimated to be worth £38 billion annually (Statista, 2024).

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27 Until relatively recently, the urban planning system in England has engaged only lightly with
28 the takeaway food environment. In a suite of legislation introduced after World War II, Use
29 Class Orders (UCOs) were introduced to group all land uses into ‘classes’, and to define
30 which categories of development required planning permission. As a general rule, changes
31 of use between these classes have required planning permission – although there are
32 exceptions to this, referred to as ‘permitted development’. Requiring planning permission for
33 change of use has provided an opportunity to control the future proliferation of certain types
34 of development through the planning system. Because the introduction of use classes
35 predates the widespread consumption of takeaway food in the UK, early versions had no
36 specific provision for this kind of land use. Moreover, despite undergoing periodic review,
37 UCOs have proved generally unprepared and inadequate to cope with a rapidly changing
38 food and beverage environment. For example, when UCOs were introduced, public houses
39 (pubs) were classed in the same category as restaurants. As the nature of city centre
40 entertainment changed, restaurants could be changed into night-time ‘vertical’ (i.e. mostly
41 standing, loud music and dimmed lighting) drinking establishments, despite potential
42 impacts, such as increasing anti-social behaviour and their proliferation being associated
43 with binge drinking. Conversely, away from night-time hotspots, a decline in traditional pub
44 use meant many were converted to HFTs, increasing the access and availability of this food
45 type (Hart, 2014).

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49 A review that was started in 2001 but did not report until 2005, subsequently introduced two
50 specific categories in order to address these issues – ‘A4’, pubs and bars, and ‘A5’, HFTs –
51 though arguably, this was too little too late. At about the same time, research was beginning
52 to draw connections between the food environment, the built environment, the proliferation of
53 fast-food outlets and the global obesity crisis (Lake and Townshend, 2006; Lake, O’Malley
54 and Moore, 2022; Lake *et al.*, 2023). The A5 classification enabled local authorities to
55 include specific policies in their local plan aimed at managing the further proliferation of
56 HFTs, and/or to issue supplementary planning documents (SPDs) on the topic. SPDs first
57 emerged circa 2009/10 (see, for example, Barking and Dagenham, 2010). They are
58 considered as accompaniments to Local Plans and although they bear less weight than
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3 policies contained in the plan, they must be taken into account by local authorities when
4 making decisions over whether to grant or refuse planning permission.
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6 Different approaches, therefore, have been taken by different English local authorities and
7 the policies/SPDs have set out varying approaches to the issue. These include: only allowing
8 takeaway outlets in specified areas; restricting concentration and clustering in specific
9 locations; restricting proximity to other uses, for example, by setting out buffer zones around
10 schools and children's centres; and clamping down on 'back door' applications – in other
11 words HFTs applying for other types of planning permission than the A5 category.
12 Additionally some authorities have charged a levy, with funds raised going to initiatives to
13 tackle childhood obesity (Lake, Townshend and Burgoine, 2017; Brown *et al.*, 2022).
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16 From 2020 – that is 15 years after the introduction of SPDs and planning policies to tackle
17 the proliferation of HFTs – A5 was reclassified as 'sui generis'; sui generis uses are those
18 not covered by other use classes. In practical terms, the change seems to have made little
19 impact, and there has been continued progress in the rollout of policy and guidance. A
20 census of local authorities in 2019 revealed that 164 (50.5%) of local planning authorities
21 (LPAs) had a policy that focused on controlling takeaway food outlet proliferation, while 56
22 (34.1%) had a policy on health with the potential to be applied to health (Keeble *et al.*, 2019).
23 Research on the introduction of management zone policies around schools has been
24 equivocal, with some research suggesting it is an effective control measure (Rahilly *et al.*,
25 2024), while others have found no evidence to support this (Xiang *et al.*, 2024).
26 Furthermore, it appears that those local authorities with robust, locally informed evidence
27 bases supporting their policies are most likely to have their decisions upheld when a refusal
28 for development goes to appeal¹ (O'Malley *et al.*, 2021, 2023). However, the picture for
29 planning control and hot food takeaways has become less clear since the COVID-19
30 pandemic when temporary measures were introduced for such operations – the full impact of
31 which have yet to be determined (Moore *et al.*, 2022; Bradford *et al.*, 2024). The emergence
32 of 'dark kitchens' has arguably added a significant layer of complexity.
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36 Dark kitchens are far from being just a UK phenomenon, with research into the phenomenon
37 in countries as diverse as India (Sarangdhar, Mohite and Kharde, 2021), Brazil (Hakim *et al.*,
38 2023) and Egypt (Anwar Elsaed, Kamal Eldin Zaki and Mahmoud Emam, 2022). European
39 countries have been taken unawares by the rapid growth of dark kitchens and have
40 struggled to assign them an administrative status (Sarriegui, 2023). In Paris, research has
41 emphasised the transport intensity of dark store delivery and how public space is being
42 consumed by related activity (Buldeo Rai *et al.*, 2023). In the USA, commentators have
43 observed whole neighbourhoods going 'dark' (Taparia, 2022): by this, they refer not only to
44 food premises but more generally to 'dark stores' that board up their shopfront and permit no
45 customer access. They suggest that this ultimately threatens community life in cities and
46 could lead to higher crime rates, when what Jane Jacobs conceptualised as 'natural
47 surveillance' is removed, resulting in greater inequalities and poorer mental health for those
48 left behind by the delivery-only world.
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51 The remainder of this paper sets out to examine the implications of the rise in dark kitchen
52 activities in relation to the (land-use based) planning system in England. It is hoped that the
53 broader insights arising from this examination will be of interest to an international audience,
54 in relation to how this issue is being tackled under different planning systems.
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59 ¹ In England (and other UK administrations) applicants refused planning permission have an
60 automatic right of appeal.

Scoping review of dark kitchens and planning

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5 An NIHR-funded research project (<https://fundingawards.nihr.ac.uk/award/NIHR160406>)
6 sought to evaluate and monitor the impact of dark kitchens on the food environment in the
7 UK. As an adjunct to this study, a scoping review of parallel implications for the planning
8 system was conducted. This review followed PRISMA protocols for scoping reviews
9 (<https://www.prisma-statement.org/scoping>). Three key sources of information were
10 combined for this scoping review: academic literature (as defined below); inspector's reports
11 from the National Planning Inspectorate (PINS); and focus group/interview material from the
12 qualitative research element of the NIHR-funded study. In addition, a search of 'grey'
13 materials was undertaken. Searches were conducted using the SCOPUS and Web of
14 Science databases in March 2024. Terms included were 'dark kitchen', 'cloud kitchen',
15 'ghost kitchen' (terms which have been used interchangeably by researchers, as noted
16 above) and 'delivery only'. These were cross-referenced with the terms 'urban', 'planning',
17 'community' and 'neighbourhood', as featured in titles, keywords and abstracts. This was
18 supplemented by searches for these terms in the individual search engines of top planning
19 journals, as identified using Clarivate journal citation records. There were 27 journals
20 included in Q1 and Q2 in the regional and urban planning category; all are international
21 journals. A date range of 2016 to 2024 was used, 2016 being the first recorded date for the
22 term dark kitchen (Merriam Webster, undated).
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26 From this primary search, a pool of 672 articles was initially identified. After sifting to remove
27 duplicates, foreign language papers, conference proceedings and abstract-only documents,
28 73 papers were selected for an initial review by abstract, based on whether this alluded to
29 city or neighbourhood scale issues. From these, 30 papers were determined to be eligible for
30 a full reading as having content of apparent relevance to urban planning. Google's
31 'advanced search' tool was used in an attempt to identify relevant grey material; 146
32 potential additional items were identified in this way. After the removal of duplicated papers
33 (ones already identified) and irrelevant items (such as advertisements for planning
34 consultancies), this left an additional 19 items, mostly consisting of articles from the media,
35 but also including two local government reports and a Master's level student thesis;
36 reference is made to these as appropriate in the sections that follow.
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39 In addition to academic and grey literature, inspectors' reports from PINS in England for
40 planning appeals related to dark kitchen operations were obtained and analysed in terms of
41 how they presented decision-making around the topic. These reports were identified through
42 the online platform 'appeal finder' (<https://appealfinder.co.uk/planning-resources.php>) using
43 the search terms 'dark', 'ghost', 'virtual' kitchen and 'delivery-only'. Five reports were
44 identified in PINS records, the earliest referring to enforcement action from 2018. In England,
45 anyone who is refused planning permission for a development by the LPA is able to appeal
46 to PINS at the national level. Thus far, only a handful of cases involving dark kitchens have
47 been dealt with as planning appeals, and these have generally resulted from enforcement
48 action – in other words, where the LPA are of the opinion that a development is operating
49 without the relevant planning permission (or where they think that conditions of a planning
50 permission are being flouted). LPAs have a range of enforcement actions at their disposal
51 requiring a developer to rectify a planning breach. Examples include requiring that an
52 operation cease, or removing a building from land.
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56 Finally, material from the qualitative element of the NIHR-funded research was added to the
57 above sources to gain additional insights. This material was gathered with the aim of (1)
58 understanding how local authority environmental health teams monitor and inspect dark
59 kitchens; (2) finding out what powers across planning/national policy can be enacted to
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3 regulate the proliferation of dark kitchens; and (3) investigating any on-going public health
4 concerns or impacts regarding the dark kitchen businesses model. To address these aims,
5 six semi-structured interviews were conducted with environmental health officers based
6 across Middlesbrough, Gateshead, Newcastle and Lancaster. Environmental health officers
7 were chosen out of all local authority functions because they were deemed by the research
8 team to be the most likely to have had first-hand experience of dark kitchen operation.
9 Additionally, a focus group was conducted with participants who held public health and
10 planning roles in local government. Transcripts were analysed thematically via template
11 analysis (King, 1998; Symon and Cassell, 2012), with relevant quotes extracted to
12 supplement the results from this review. Quotes are anonymised, with 'FG' indicating the
13 focus group and 'EHO' referring to an environmental health officer interview. Further details
14 of the qualitative work are published separately (forthcoming – **ref details removed for**
15 **anonymity**).
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20 **A changing food environment and the development of dark/cloud/ghost kitchens**

21
22 The concept of dark kitchens as a specific phenomenon emerged in the mid-2010s in
23 response to the rapid development of ODPs (Riviera, 2019). What is clear from the evidence
24 is that dark kitchens are run on various business models – for example, a single operator in
25 their own premises, or a single operator in premises shared with other businesses. They
26 may be operated as an independent business or as part of a franchise (Rout, Dawande and
27 Janakiraman, 2021) – this paper expands on these definitions below. Online food ordering
28 and delivery in the UK is generally through third-party ODPs such as Just Eat or Deliveroo,
29 but some dark kitchens also accept phone orders. Interestingly, since the food provider pays
30 the ODP for its service (through joining fees and/or as a percentage of sales), some
31 effectively take themselves 'off-line' at peak periods and accept only telephone orders,
32 thereby avoiding paying a percentage sale charge to the ODP – however, there is anecdotal
33 evidence that this results in such businesses being less prominently promoted by the ODP
34 concerned.
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38 Customers choose food and may pay for it through these online platforms, or pay the
39 company directly, for example, on delivery. Delivery is by conventional bicycle, electric
40 bicycles [E-bikes] moped, car or, in the future, even drones (Sidat, 2023). Different modes
41 of delivery are associated with different **levels** nuisance – a topic returned to later in the
42 paper. Research suggests that it is the perceived convenience and availability of online food
43 delivery that is associated with its increased use (Rinaldi, D'aguilar and Egan, 2022). In the
44 UK, as elsewhere, the use of dark kitchens increased sharply during the COVID-19
45 pandemic (Poelman, Thornton and Zenk, 2020). However, it is extremely unclear where,
46 within our public authorities, responsibility lies for understanding and potentially managing
47 the consequences of this phenomenon:
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49
50 *"I think it [home consumption] has sped up and it has increased more since COVID.*
51 *It's just this whole delivery takeaway culture that's having a lot of issues in a lot of*
52 *areas...we don't need to leave our houses anymore; we can just get it all from our sofa.*
53 *So, it's a very, very difficult and massive issue that needs addressing. [Researcher: By*
54 *who?] I don't know."* [FG1]
55

56
57 It is possible that temporary relaxation of planning measures to allow restaurants to deliver
58 food fuelled dark kitchen development during this period; however, there appears to be little
59 awareness of this business model and, therefore, no real appetite to investigate this issue
60

thoroughly by local authorities (Bradford *et al.*, 2024). There is also a lack of evidence on the influence of the rise of dark kitchens on diet, and on health and/or health inequalities.

Defining dark kitchens

As briefly outlined above, dark kitchens come in a number of guises, primarily linked to different business models, and yet they are grouped together in the literature – somewhat unhelpfully – simply as ‘dark kitchens’. These different modes of operation, however, arguably have different implications for public health and urban planning, as outlined below. This paper, therefore, proposes a classification of dark kitchens from a planning perspective (Fig 1). Importantly, this classification separates out those kitchens which are delivery-only, but which operate behind a different ‘front’ which has existing customer access; and those which operate as a secondary function within an entity whose primary function is not catering – for example, schools. This paper terms these operations, respectively, as ‘shadow’ dark kitchens – since they effectively shadow existing operations; and ‘ancillary’ dark kitchens – because they are supplementary to the core use. In the case of shadow dark kitchens in particular, there are complexities in ascertaining how many are in existence. For example, commercial kitchens require hygiene certificates to legally operate. However, these will generally be in the name of the principal operation – one with customer-facing facilities, for example – but may not include the names of other businesses operating out of the same kitchen. It is not often that such entities will be officially registered as separate companies at Companies House.

These complexities mean it is extremely difficult to identify how many dark kitchens exist operating under the various models in the delivery-only space, as explained by an environmental health officer:

“The programs that we use need to be modified so that we can add multiple business on to one business; we’re restricted a little bit into the number of characters that we use. We can put one or two down, but if it becomes four or five, we don’t have the character spaces within our program. The programs, they’re not designed for it.”
[EHO3]

Best estimates require the use of multiple data sets, for example, by cross-referencing the Food Standards Agency (FSA) Food Hygiene Rating Scheme with the address associated with each operator on ODPs. However, this is fraught with problems since businesses change their identity (sometimes frequently) – for example, after one or more poor reviews, a business may appear to shut down but then will then almost immediately reopen under a similar, though not identical, guise. Therefore, information on ODPs will, at best, provide a snapshot of operations at any one moment. The planning system, as already implied, is of little practical help in identifying how many dark kitchens exist, and yet, as these *are* unique operations that have a unique set of implications for urban planning, then it can be argued that the planning system should be modified and updated as required to support this need.

Planning considerations for dark kitchens

Use classes and controlling proliferation

The emergence of dark kitchens as a specific form of development was clearly not anticipated by the planning system and, as such, there has been confusion as to which use class such an operation falls under. Initially, the general view – at least among operators – was that these kitchens fell under use class B1(c) (or Class E, from 2020 onwards). This is

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3 defined as a light industrial process – one that can be carried out in a residential area
4 *‘without resulting in harm to the amenity of that area by reason of noise, vibration, smell,*
5 *fumes, smoke, soot, ash, dust or grit’*. As a result, a number of cloud or dark kitchens have
6 been created in existing Class E units, without any planning permission being sought.
7 However, planning application and appeal decisions have increasingly classified these
8 businesses as ‘sui generis’ – in other words, with the same term as HFTs are identified. For
9 example, in planning appeal APP/Z1775/C/23/3325810, where an operator appealed an
10 enforcement action taken by Portsmouth City Council against operating out of premises that
11 were classified as E, the inspector agreed with the local authority that sui generis was the
12 appropriate classification.
13
14

15 One issue for the planning system currently is that there is simply no way of knowing how
16 many kitchens are in operation under Class E. It is possible, for example, that on busy and
17 varied industrial estates where units are classed as E, as long as these businesses do not
18 cause disruption to their neighbours, they might effectively operate under the radar of
19 planning long into the future. As one participant noted, however:
20

21 *“Monitoring to prevent proliferation is essential. A proactive, rather than reactive,*
22 *approach could prevent proliferation becoming an issue in the first place.”* [FG –
23 Anonymous Comment]
24

25 In relation to shadow kitchen operations (those operating behind an existing restaurant),
26 then the primary business use class will stand – Class E. However, a time may come when
27 the delivery-only business operation outperforms the customer-facing restaurant operation.
28 Here, it could be argued that, again, the use class should be changed to sui generis, though
29 such decision-making would need to be tested at appeal. Finally, institutions (schools,
30 museums, galleries and so on) with commercial-grade kitchens may also offer dark kitchen
31 services – we have classified these as ancillary dark kitchens (Fig. 1). In this case, again, the
32 primary land use will provide the planning classification. In the case of schools (which are
33 already in operation), this is use class F1, that also covers institutions such as museums and
34 galleries, any of which may look to operate such services as a revenue-raising sideline. In
35 sum, dark kitchens already operate under three different planning use classes.
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39 Another complexity in relation to use class is raised by an appeal against Birmingham City
40 Council’s refusal of planning permission for a dark kitchen seeking to operate in a Core
41 Employment Area (CEA) APP/P4605/W/22/3296172. In this case, the inspector concluded
42 that the use was appropriate for an industrial area, stating that food preparation and cooking
43 could be described as an ‘industrial process’ as it would be similar to a commercial kitchen.
44 However, he also noted that the nature of the use did not fit into the designation of either
45 Class E(g) (formerly B1) or B2, due to a number of features of the specific use – including
46 the frequency of small-scale deliveries from the premises that would be generated. The
47 inspector agreed with the Council that this case was ‘sui generis’ but allowed the appeal
48 because he considered the operation was appropriate for an industrial area – though he did
49 note that if the use were to become a ‘traditional’ hot food takeaway – that is, one from which
50 customers could purchase food directly – then it would require a separate planning
51 application.
52
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54 The implication of the Birmingham case is that, so long as dark kitchens locate in areas such
55 as industrial estates, local authorities may have difficulty in refusing planning permission. In
56 some ways, this can be interpreted positively: since these operations are potentially ‘bad
57 neighbours’ due to noise, smell and so on, arguably, industrial estates are the most
58 appropriate location for them. However, they would not automatically be covered by
59 takeaway policies as they are deemed a different land use and yet ODPs have been shown
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3 to promote less healthy, takeaway-style food, with such items often prominently displayed in
4 menus (Bradshaw and Higham-Smith, 2024). ODPs and dark kitchens, therefore, effectively
5 increase the geographic reach and density of less healthy food options, offering food
6 otherwise not available in the local area (Rinaldi, D'aguilar and Egan, 2022). Since greater
7 access and availability of HFTs are associated with increased consumption (Keeble *et al.*,
8 2021), it seems plausible that dark kitchens could increase consumption of less healthy
9 foods with resultant negative health impacts. This could be significant: since some of the
10 clustering of takeaway food in more deprived communities has been shown to have negative
11 health consequences, further expanding access and availability could increase consumption
12 for these group, exacerbating health inequalities. Moreover, both dark and shadow kitchens
13 may have the potential to undermine planning and policy attempts to manage the further
14 proliferation of HFTs around schools and children's centres by increasing overall access and
15 availability of a seemingly diverse offer. Research participants, however, thought this
16 unlikely:
17
18

19 [Researcher: "Will this undermine policy to manage hot food takeaway proliferation?"]
20 *"Probably not, no, because the reason we tried to refuse hot food takeaways from a*
21 *planning point of view is the vitality and viability on a town centre. Its proximity and*
22 *locality towards children and schools. So in this respect, dark kitchens are probably*
23 *located in a better area than the ones that hot food takeaways are at the moment."*
24 [FG1]
25
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27 Since delivery-only food is actually often more expensive than takeaway alternatives and
28 requires digital access, it may be argued that it would be less attractive to lower-income
29 households (Cummins, 2024). However, evidence suggest that while higher income groups
30 make use of home delivery grocery services, online food delivery services are
31 disproportionately used by lower income households. The NIHR study suggests that in
32 making applications for the operation of dark kitchens, operators rarely – if ever – refer to
33 health impacts (ref removed for anonymity).
34
35

36 Rapid delivery services – sometimes referred to as 'dark grocers' – have also been shown to
37 promote the consumption of less healthy, and ultra-processed, food and alcoholic beverages
38 (Rinaldi, D'aguilar and Egan, 2022). As consumers are drawn to use online dark kitchens, it
39 is possible they will also use the same platforms for grocery delivery, for example ordering
40 alcoholic beverages at the same time as takeaway food; again exacerbating health
41 consequences. The rise of dark kitchens could, therefore, undermine efforts by local
42 authorities to curb the increase in numbers of HFTs by using planning policy levers, since
43 they do not fall under current restrictions (Keeble *et al.*, 2019). It may also undermine efforts
44 to manage alcohol consumption through licensing.
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47 While ostensibly improving employment and economic activity, working conditions in dark
48 kitchens have raised concerns for those in the industry. Evidence suggests dark kitchens,
49 with their focus on maximising profits, may barely meet industry standards
50 (Giousmpasoglou, Ladkin and Marinakou, 2024). Workers – kitchen staff and delivery riders
51 – are often part of the so-called 'gig economy', which has been called out across delivery
52 services for minimal training and other exploitative practices, with the cost to the worker far
53 outstripping the benefits of flexible working patterns (Puram *et al.*, 2022). As one focus group
54 member commented:
55
56

57 *"It's also in a way reducing skills within the workforce because we're getting rid of our*
58 *chefs, etcetera; and we're just having these microwave technicians, what is that*
59 *doing for our local workforce or local economy, those types of things? Is it not just*
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3 *attracting lower-paid, lower-skilled Jobs? Which then has an implication on health,*
4 *the community, the environment and all of that around us.” [FG4]*
5

6 Physical working conditions can also be poor in some cases. Kitchens are sometimes
7 located in windowless prefabricated structures, such as ex-shipping containers, which may
8 have poor thermal qualities. These can feel confined and incorporate insufficient ventilation
9 and lighting. This means heat and humidity can reach harmful levels during cooking periods;
10 alternatively, during food preparation, the structures can prove extremely cold (Puram, *et*
11 *al.*, 2022). Evidence suggests that spare equipment (mops in buckets, gas cylinders for the
12 stoves and large cans of cooking oil, etc.) is often piled up outside these cramped units
13 (Butler, 2017).
14

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16 In a desperate attempt to speed up delivery times, riders may also be tempted to illegal
17 manoeuvres, such as riding on pavements and ignoring traffic signals. Illegally modify
18 electric bikes, increasing their maximum speed from 15-25mph up to 70mph and in effect
19 turning them into electric mopeds, is a particular problem. It is dangerous not least because
20 the bicycle brakes are usually ineffective at high speeds. While such illegal modifications are
21 part of growing trend associated with reckless cycling and anti-social behaviour (Shrubsall,
22 2024) the vast majority of such vehicles seized by police are owned by delivery riders (*Most*
23 *illegally modified e-bikes in City of London used by delivery riders*, 2024). Moreover, while
24 evidence shows that working conditions and associated behaviours are particularly bad
25 within countries of the Global South, for example, they are still sometimes poor in Europe
26 and the UK (Janta and Ladkin, 2024).
27
28

29 More generally the implications for the local economy are currently unclear. In appeal
30 APP/V5570/C/18/3201989, the London Borough of Islington argued that the overall
31 economic impact was negative, since the dark kitchen occupied industrial premises in an
32 Economic Growth Area. The council went on to suggest that the unit could otherwise be
33 used to provide affordable floorspace which could house micro and start-up businesses.
34 However, it was agreed that this could be mitigated by a contribution to the council for
35 replacement affordable workspace, and the inspector found that this made the development
36 satisfactory in terms of economic impact and went further to suggest that the development
37 endowed ‘benefits to the local area, in terms of economic growth and productivity’. In appeal
38 APP/X5210/C/18/3206954, the inspector also noted that the dark kitchen had brought back
39 into use (at least in part) a derelict building and was providing space for small businesses to
40 establish themselves – he therefore considered the development was consistent with
41 national and development plan policy that encourages the creation of conditions in which
42 businesses can invest, expand and adapt. He added that there was anecdotal evidence that
43 nearby high street businesses had lost trade – but without specific evidence, this
44 consideration bore ‘little weight’. There is, however, another potential impact on High
45 Streets: evidence gathered during the NIHR-funded study revealed how, on occasion, when
46 environmental health officers arrived at takeaway premises also operating as dark kitchens,
47 they found the premises shuttered and ostensibly closed. As one noted:
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51 *“It's five, six o'clock they're supposed to be open, shutters were down, lights were off,*
52 *[after they failed their inspection] they were chucked off Just Eat and they then*
53 *obviously contacted us and actually sued us.” [FG2]*
54

55 In fact, the kitchens on the premises were in operation, though there was no evidence of this
56 from the street-facing element of the business. If businesses choose to operate in this
57 manner, they would potentially present to the street an appearance that is no different to
58 empty premises – with associated visual impact and potential detriment to the amenity of the
59 street.
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Further evidence from appeals

Nuisance and disturbance to neighbouring properties

The impact of dark kitchen operation has been the subject of several of the appeals obtained for this review. For example, in the case of a unit operating in an industrial estate in Islington, the council sought to control the noise from scooters. However, the inspector noted that there was other noise associated with the industrial estate and a nearby railway and noted that 'the level and character of scooter noise is such that, when assessed against BS4142 [a British noise standard] and taking account of the context and other noise sources present, it has a low impact' [APP/V5570/C/18/3201989].

Detrimental impact to neighbouring properties was also at the heart of enforcement action taken by the London Borough of Camden against a dark kitchen operating on land to the rear of Finchley Road [APP/X5210/C/18/3206954]. The kitchen was located off a quiet close – a road entered and exited from one end only – and in this case, unexpected loud noises, such as shouting by delivery drivers, were deemed to be intrusive. The two cases show the importance of location and the surrounding context when assessing noise disturbance.

Air quality and odours

In appeal APP/V5570/C/18/3201989, the council argued that the operation of a dark kitchen on an industrial estate contravened their air quality strategy, due to the operation's reliance on petrol scooters. Assessing the development, however, the inspector noted that the site provided four charging points and has supported an increased use of electric scooters, over the period 2019 to date, with 27% of collections being made by e-scooters. They therefore concluded that impact on air quality was minimal. In appeal APP/X5210/C/18/3206954, the change of use to a dark kitchen was linked to strong odour emissions – however, it was able to be mitigated by mechanical means.

In summary, while at first there appeared to be a large body of academic literature which could potentially provide insights into the challenges and opportunities that dark kitchens might provide for urban planning – whether relating to the English or similar land-use based planning systems, or other models – in practice there exists very little academic critical analysis of this fundamental shift in the food environment that is of direct relevance. Planning appeals provide some clarity on how PINS views the operation of dark kitchens, but this is drawing on a very small evidence base. The NIHR-funded qualitative work reviewed underlines the lack of engagement with the issue at local government level and, furthermore, the absence of a strong sense of *who* should be leading the debate.

Discussion and Conclusions

The rapid rise of dark kitchens (and related modes of food delivery) had not been anticipated by the planning system in England, and current planning regulations and policies are arguably ill-equipped to address the issue. As it stands, dark kitchens operate in different modes, from premises with at least three different potential planning classifications, and in essence, the planning system has no way of knowing how many of these types of business are in operation and/or under which land use classification they are operating. Furthermore, while the research team found clear evidence of operations in the North East of England falling under all the types of dark kitchen outlined in Fig. 1, there was a sense among research participants that this was a 'London-based' phenomenon, and not a major issue in the regions. Moreover, unless there was a specific breach of planning regulations, the perception of participants was that dark kitchens were of little interest to planning colleagues

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3 – despite very real impacts on surrounding locations and communities apparent from the
4 academic literature and planning inspectors' reports.
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6 Different modes of operation may have significantly different implications for planning and
7 public health. For example, dark kitchens operating out of industrial and similar sites may
8 exacerbate the decline of the traditional high street by undercutting the operational costs of
9 conventional restaurants. Conversely, this kind of siting may take a 'bad neighbour' use
10 away from more residential areas to a location where frequent delivery departure, odour and
11 so on will not cause disruption. Shadow kitchens may actually help maintain the presence of
12 traditional sit-in restaurants on high streets and town centres by making those restaurants
13 more financially viable. However, whether this is sustainable in the long term is debatable
14 since cheaper premises in industrial parks will still be able to undercut their prices.
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17 Dark kitchens that are located on shopping streets situated in/adjacent to local residential
18 areas may also have more impact on local communities through long working hours, traffic
19 disturbance and generating odour in areas that have not experienced this before. Moreover,
20 if they effectively operate behind closed shutters, it may detract from the visual amenity of
21 the street. Dark kitchens may also have the potential to undermine planning and policy
22 attempts to manage the further proliferation of HFTs around schools and children's centres
23 by increasing the overall accessibility and availability of a seemingly diverse offer. However,
24 there is currently no evidence to suggest this will happen.
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27 All types of operation, however, may increase access and availability of food high in salt, fat
28 and sugar. In more deprived communities, this may exacerbate health inequalities.
29 Moreover, in terms of generating economic activity and creating jobs, those on offer would
30 appear to be overwhelmingly low-skilled, poorly paid, insecure and even encourage illegal
31 activity. This runs counter to the commitment of national planning policy to deliver healthy
32 and sustainable communities.
33

34 The links between the built and food environments and their implications for communities
35 have been established for two decades (Lake and Townshend, 2006; Townshend and Lake,
36 2017). Planning policies and guidance have been developed in relation to the proliferation of
37 HFTs (Lake, Townshend and Burgoine, 2017) and, moreover, the priority that health issues
38 are given in decision-making seems to be growing (O'Malley *et al.*, 2021; Bradford *et al.*,
39 2024). However, the food environment has also changed significantly over the last two
40 decades and while home delivery services have long antecedents, the development of
41 ODPs and delivery-only facilities has brought new dynamics into play. Dark kitchens, in their
42 many forms, are effectively hidden in plain sight, and how planning will react to this issue is
43 yet to be established.
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Fig. 1 Defining dark and shadow kitchens

Type	Definition	Planning use classification
Micro dark kitchen	A single operator in a small premises such as a re-purposed shipping container. Usually independent business. Multiple locations possible. Delivery only, no customer access.	Sui generis
Cluster dark kitchen	Multiple small operators with individual kitchens co-located within one building – usually an industrial unit – generally aimed at entrepreneurs entering the sector. Delivery only, no customer access.	Sui generis
Franchise dark kitchen	A single-chain franchise operating from an industrial unit. Delivery only, no customer access.	Sui generis
Multi-franchise dark kitchen	An operation of multiple franchises from one industrial unit. Often run by a 'delivery only' company (e.g., such as Deliveroo). There are no customer-facing operations on the premises.	Sui generis
Ancillary dark kitchen	An operation from an established non-restaurant kitchen – for example, a school canteen – as an ancillary business. There are no customer-facing operations on the premises during delivery-only operations	Whatever the primary use class is – in the case of a school, F1
Mobile dark kitchen	Delivery-only operation from a mobile unit – such as a traditional 'burger van'	Not covered by planning regulations
Shadow kitchen(s)	One or more delivery-only operations that are run from a premises which also has a customer-facing facility – this has a different identity. These shadow kitchens may, or may not, appear on documentation such as food hygiene certificates.	Class E (as housed in an existing restaurant)

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Exclusions

Type	Define
Non-profit programmes	Operations such as Meals on Wheels which deliver food to those unable to prepare it themselves
Commercially prepared meals for later consumption	Operations that provide meals that are not intended for immediate use – such as for those unable to prepare them themselves, slimming plans, etc.
Home baking	Individual operators, often providing baked goods such as cakes for special occasions

For Review Only

Figure 2 Planning Appeals

Appeal Reference	Description	Outcome
APP/X5210/C/18/3206954	Camden Council issued enforcement action against a Deliveroo-operated premises in June 2018, alleging an unauthorised change of use to a sui generis commercial kitchen and delivery centre. Deliveroo appealed, seeking retrospective planning permission	Appeal dismissed
APP/P4605/W/22/3296172	Birmingham City Council refused an application – 2021/07249/PA, dated 16 August 2021 – for proposed change of use of part of an industrial warehouse (Use Class B2) to a commercial kitchen (sui generis) and the installation of an extraction flue to rear.	Appeal allowed
APP/V5570/C/18/3201989	The council had rejected the company's application for a delivery-only (Deliveroo Editions) kitchen installation. Concerns had been raised by nearby residents about noise (mopeds) and the council wanted to include a condition that it be used by bicycle and electric bike users only	Appeal allowed
APP/Z1775/C/23/3325810	A branch of McDonalds commenced delivery-only services in April 2021. It was served with an enforcement notice and an application for a certificate of lawful development for its operation from the site was refused by the council in March 2022. An appeal to extend the compliance period was dismissed in 2024.	Appeal dismissed
APP/H5960/C/22/3305470	Roslyn Park Rugby Club was charged with installing a 'dark kitchen' without planning permission. The kitchen operated a franchise from a repurposed shipping container. An enforcement notice – which covered other installations such as gym was issued by London Borough of Wandsworth.	Appeal allowed in part but not in respect of dark kitchen