

1 **ABSTRACT**

2 In the United Kingdom, the National Institute for Health and Care
3 Excellence make recommendations to guide the local-level selection
4 and implementation of adult behavioural weight management
5 interventions (BWMI) which lack specificity. The reporting of BWMI
6 is generally poorly detailed, resulting in difficulties when comparing
7 effectiveness, quality and appropriateness for participants. This non-
8 standardised reporting makes meta-analysis of intervention data
9 impossible, resulting in vague guidance based on weak evidence,
10 reinforcing the urgent need for consistency and detail within BWMI
11 description. STAR-LITE – a 4-section, 119-item standardised adult
12 BWMI reporting template – was developed and tested using a two-
13 phase process. After initial design, the template was piloted using
14 adult behavioural weight management RCTs and currently
15 implemented UK BWMI mapping information to further refine the
16 template and examine current reporting and variance. Overall,
17 reporting quality of weight management RCTs was poor, and large
18 variance across different components of real-world BWMI was
19 observed. Non-specific guidance and wide variation in adult BWMI
20 are likely linked to inadequate RCT reporting quality and the inability
21 to perform reliable comparisons of data. Future use of STAR-LITE
22 would facilitate the consistent, detailed reporting of adult BWMI,
23 supporting their evaluation and comparison, to ultimately inform
24 effective policy and improve weight management practice.

25

26 **INTRODUCTION**

27 Behavioural weight management interventions (BWMI), employed in
28 an attempt to tackle rising obesity prevalence in adults¹, aim to
29 facilitate weight loss through intervening on three main topics – diet,
30 physical activity and behavioural change.

31 ***Intervention Guidance and Barriers to Commissioning***

32 In the United Kingdom, commissioners of these ‘Tier 2’
33 multicomponent behavioural interventions have identified a “lack of
34 clear guidance”, indicating that current National Institute for Health
35 and Care Excellence (NICE) best practice guidelines are too broad to
36 effectively assist local-level BWMI selection². NICE
37 recommendations aim to direct the delivery of high-quality, effective
38 BWMI, but the supporting evidence – a meta-analysis and
39 systematic review comparing weight management RCTs^{3,4} – failed to
40 reliably differentiate between the most effective and ineffective
41 components for weight loss. Authors cited paucity of data and
42 inadequate descriptions of BWMI as barriers to evaluation and,
43 following this, NICE collated a list of ‘knowledge gaps’ where
44 evidence lacked⁵, including:

- 45 • A lack of trials directly comparing BWMI in the UK
- 46 • A lack of evidence on which specific components of a BWMI
47 ensure effectiveness
- 48 • A lack of evidence on the effect of sexual orientation;
49 disability; religion; place of residence; occupation; education;
50 socioeconomic position; and social capital on the
51 effectiveness of BWMI and analysis of participants by age
52 and gender
- 53 • A lack of evidence as to whether any particular type of
54 training for practitioners leads to more effective BWMI

55 UK weight management mapping efforts have identified considerable
56 variation across nationally implemented BWMI, with indications that
57 widespread uncertainty regarding best practice amongst those who
58 select interventions for use at local-level is the likely cause^{2,6}. The
59 reports highlighted the large inconsistency of outcome reporting by
60 BWMI⁶, with authors identifying the absence of standardised
61 reporting as problematic for data analysis due to heterogeneity².

62 At present, there are no participant-specific gold standard BWMI⁷.
63 Given the wide variation between currently implemented
64 interventions^{2,6}, the placement of participants into appropriately
65 tailored BWMI is crucial to maximise individual success. To
66 adequately support informed decision-making regarding the provision
67 of such care, evidence-based guidelines must be drawn from robust
68 analyses of data. To facilitate accurate assessments of intervention
69 effectiveness and identification of the most beneficial components for
70 specific participants, delivery information and outcome reporting must
71 be clear, complete and transparent for the readers. A prominent
72 barrier to drawing reliable comparisons between BWMI lies within
73 general reporting styles of intervention delivery, in terms of a lack of
74 detail and uniformity – health intervention descriptive reports are
75 often incomplete and widely varying in structure^{7,8}. The consistent
76 reporting of BWMI within both research trial and real-world settings
77 is crucial for successful evaluation. The homogeneous, high-quality
78 reporting of BWMI descriptions would facilitate accurate evaluations
79 of interventions within systematic reviews and meta-analyses –
80 findings of which could inform policy and ultimately improve current
81 clinical practice. Further, consequential resource wastage (i.e. time
82 and finances) by the implementation of ineffective interventions
83 following vague recommendations could be mitigated by stronger
84 guidelines.

85 ***Intervention Reporting Frameworks and Templates –***

86 ***Development and Feedback***

87 Robust frameworks exist within clinical research, created to guide
88 intervention description; tackle low reporting quality within RCTs⁸;
89 avoid biased reporting of trials⁹; and address issues of reporting
90 inconsistency (which consequentially hamper comparison efforts), to
91 ultimately facilitate better-informed decisions by policy makers¹⁰.
92 Numerous tools have attempted to improve the overall poor quality of
93 description within published interventions, present possibly due to
94 little awareness amongst researchers of what constituted adequate
95 reporting¹¹. Transparency from authors is encouraged by 'checklists',
96 provided for reporters to follow as guides – however, most tools do
97 not attempt to standardise reporting structure^{8,9,11,12}, allowing great
98 variation in content reported. For example, the SPIRIT 2013
99 Statement (Standard Protocol Items: Recommendations for
100 Intervention Trials)¹² presented a list of minimum items to be
101 addressed within clinical trial protocols, but does not control for
102 variation in depth-of-detail within intervention descriptions. As
103 reporting guidance has developed, more discipline-specific tools
104 have been created – e.g. CONSORT-SPI 2018, an extension of
105 CONSORT 2010, expanded on several items to develop checklist
106 relevance for social and psychological RCTs¹³ – but a lack of highly
107 specific reporting recommendations for BWMI persists.

108 Clinical BWMI commonly do not publish all outcome or delivery
109 information explicitly and there is an absence of consistency in
110 reporting styles between those that have, limiting accuracy of
111 comparisons. In 2009, the National Obesity Observatory created the
112 'Standard Evaluation Framework for Weight Management
113 Interventions', a project aiming to facilitate future intervention
114 evaluation¹⁴. A revised version and online data-collection tool (where

115 intervention leads could submit delivery data to the Public Health
116 England database) was produced in 2018, informed by regionally
117 gathered feedback on the earlier edition from relevant users i.e.
118 BWMI commissioners, providers and researchers¹⁵. A prominent
119 issue with this tool was the general non-specificity of items included –
120 allowing opportunity for variation in responses. Similar to intervention
121 mapping and NICE guidance knowledge gaps, the Standard
122 Evaluation Framework document cited a need for high-quality
123 evidence regarding BWMI effectiveness. The National Obesity
124 Observatory recommended that to further support Standard
125 Evaluation Framework implementation, standardised reporting
126 templates for BWMI should be created which would specifically
127 assist the expansion of the current evidence-base of BWMI and
128 support rigorous evaluations of effectiveness.

129 ***Aims of the Current Paper***

130 Despite existing tools, reporting quality across weight management
131 interventions remains poor, persistently limiting the effectiveness of
132 comparisons within research and causing authors to call for
133 standardised guidance on reporting¹⁶⁻¹⁸. In order to improve overall
134 BWMI reporting quality with regard to consistency, clarity and
135 completeness, an effective and specific solution must be offered. In
136 2020, a comprehensive, 24-item 'core outcome and corresponding
137 definition/instrument set' gathered using expert consensus was
138 published to improve BWMI outcome reporting¹⁹. This list of
139 outcomes (defining which should be measured and how) aimed to
140 resolve uncertainty in decision making by presenting BWMI outcome
141 information equally across all interventions. The current paper
142 describes the development and piloting of a template for the
143 standardised descriptive reporting of adult BWMI, to complement
144 this core outcome set. Readily available descriptive data for BWMI

145 is predominantly from lab-based trials or research settings, which
146 may not entirely reflect that of clinical interventions^{20,21}. Moreover,
147 this information is found within individual papers and must be
148 deconstructed by readers without a consistently encouraged
149 reporting style or structure. Therefore, the current template will be
150 designed for both clinical BWMI and behavioural weight
151 management RCTs that are implemented in a real-world setting.
152 Template piloting will provide insight into the current variation and
153 reporting quality seen in both, respectively.

154

155 **METHODS**

156 Utilising a team approach (L.H., R.M.M., L.J.E., S.A.S., J.L.), the
157 template was designed and developed with expertise from areas of
158 obesity and weight management, BWMI implementation, psychology
159 and social care research. Design methodology was planned as a
160 two-phase process.

161 ***Phase 1 – Initial Template Design***

162 This phase was designed to produce a preliminary list of items within
163 an initial template draft, which was generated by one researcher and
164 individually checked by the research team. Available research similar
165 in the aim of guiding intervention reporting was examined using
166 online database search engines (PubMed, Google Scholar,
167 ScienceDirect) to identify items for inclusion within the reporting
168 template. Reference lists of relevant papers were hand-searched for
169 related papers to examine.

170 The initial design phase brought together several published
171 resources – including similar reporting tools^{11,15,22-24}, intervention
172 mapping reports^{2,6,15}, NICE guidance and related commissioner

173 feedback^{5,15} – to identify the key components required for detailed
174 capture of BWMI delivery data (Table 1). Template creation intended
175 to complement a pre-defined core outcome set for BWMI reporting¹⁹,
176 whilst aiming to address gaps in NICE knowledge⁵ and areas of
177 uncertainty via specific item inclusion.

178 **PHASE 2 – PILOTING**

179 The template was piloted using spreadsheet software for ease-of-
180 data-entry and analysis (Microsoft® Excel 2016). Three types of
181 BWMI reporting data were gathered:

- 182 • 11 completed, anonymised Scottish mainland health board
183 Tier 2 BWMI provision surveys with the original purpose of
184 investigating BWMI variation⁶
- 185 • 28 published RCTs^{7,28-53} (representing 39 individually-piloted
186 behavioural intervention arms) were identified from the
187 systematic review investigating the clinical effectiveness of
188 long-term BWMI conducted to inform NICE Tier 2 guidance⁴
- 189 • 9 anonymised national BWMI reports, freely submitted (from
190 2011 onwards) by respective organisations via the Public
191 Health England obesity evaluation Standard Evaluation
192 Framework data collection tool and archived within the
193 National Obesity Observatory intervention database²²

194 Specific inclusion and exclusion criteria for piloted interventions are
195 detailed in Table 2. BWMI data extraction was undertaken by one
196 researcher. Data was systematically entered into the spreadsheet
197 intervention-by-intervention.

198 Data gathered were used to refine item inclusion and wording,
199 depending on the item's ability to encourage consistent answer
200 specificity with minimal ambiguity. The same researcher analysed
201 reporting quality in currently available RCTs (examined through

202 reporting frequency and depth-of-description of template-specific
203 items) and variance across real-world BWMI (relating to delivery-
204 styles and components) by comparing collected data.

205

206 **RESULTS**

207 STAR-LITE (STAndardised Reporting of adult behavioural weight
208 management InTerventions to aid Evaluation), a BWMI reporting
209 template (Supp Table 1) was divided into four sections – ‘Referral
210 Pathway’; ‘Intervention Delivery’; ‘Intervention Components’ and
211 ‘Costing’, inclusive of 38 main items with corresponding sub-
212 questions (119 items in total).

213 ***Phase 1 – Initial Template Design***

214 The template included conditional, multiple choice and free-text
215 answers as modes of data-capture.

216 The ‘Referral Pathway’ section was designed to capture information
217 regarding how participants entered the intervention, eligibility criteria,
218 referral staff and timescale between referral and active weight loss
219 phase participation. ‘Intervention Delivery’ included geographical
220 data (i.e. total area covered by the intervention, number of bases),
221 delivery setting (i.e. primary care, community-based), staff involved
222 and number of sessions (in active weight loss phases and self-
223 defined weight maintenance phases). The third section, ‘Intervention
224 Components’, dealt with intervention content – specifically, the type
225 of dietary, physical activity and behavioural advice delivered.

226 Questions also aimed to capture whether or not diet and physical
227 activity were monitored, and how. The final section – ‘Costing’ –
228 concerned BWMI financial information, specifically the costs for

229 delivering the intervention in a real-world setting (and not including
230 research costs).

231 Initially, a simple check-list style reporting method was implemented
232 for the description of behaviour change technique (BCT) inclusion
233 using the CALO-RE taxonomy²⁴. Upon review, it was decided that a
234 simple 'tick-box' data collection approach elicited minimal detail other
235 than presence or absence of each BCT, and STAR-LITE was refined
236 to require additional delivery information for each technique. As
237 mentioned by the CONSORT statement, rigid reporting guidelines
238 may unintentionally encourage interventions to report fictitious
239 information⁹. As such, users were given a trichotomous 'yes', 'no' or
240 'unsure' option when reporting technique presence. Identified via
241 Scottish weight management provision mapping, an area of
242 suggested further investigation was 'how, where and by whom'
243 individual BCTs were delivered⁶. Thus, the final template required
244 users to report frequency of and during which intervention week(s)
245 each technique was delivered, how the technique was delivered, and
246 details of staff involved.

247 ***Phase 2 – Piloting***

248 Descriptive BWMI data were recorded during template piloting (Supp
249 Table 2). Real-world BWMI reports were examined for areas of
250 variation; RCTs were examined for reporting frequency (quantified
251 within Supp Table 3, Supp Table 4) and general description quality
252 (in terms of depth-of-detail) within template items.

253 Multiple choice and free-text items allowing large response variation
254 were amended to conditional answer format. Almost all multiple-
255 choice items were revised to contain additional answer options
256 according to the most commonly encountered data and variation in
257 intervention description.

258 Overall, real-world BWMI and RCTs fit well into STAR-LITE during
259 piloting, aside from 'Costing' (as only one intervention paper³⁴
260 reported financial information) and BCT reporting through CALO-
261 RE²⁴ (as few made use of a recognised taxonomy).

262 ***Referral Pathway***

263 Most real-world BWMI involved self-referral or healthcare
264 professional referral (i.e. GP, nurse) and were open to participants
265 ≥18 years, of any gender and ethnicity.

266 Items related to referral personnel (i.e. staff or self-referral) and
267 eligibility criteria were generally well reported by RCTs – of all 39
268 individually reported intervention arms, 37 reported the referral
269 pathway method (i.e. 'self-referral' in response to e.g. advertisement
270 flyers; healthcare professional referral). 38 intervention arms reported
271 specific inclusion criteria, 36 reported exclusion criteria and 29
272 reported pre-participation assessment methods. Few interventions
273 reported the duration between referral and active weight loss phase
274 initiation (n=9) or whether incentives for attending the intervention
275 were offered (n=14).

276 ***Intervention Delivery***

277 Real-world BWMI displayed large variance across delivery and
278 setting, with both group-based and 1-to-1 sessions delivered within
279 primary care (e.g. general practices, hospitals), leisure centres and
280 workplaces, amongst others. Active weight loss phase sessions
281 varied in total number (generally between 4-15 sessions), frequency
282 (mostly weekly or fortnightly) and duration (between 15-90 min).
283 Wide variation was seen in descriptions of weight maintenance
284 phases, and implementation of these sessions differed in frequency,
285 intensity and delivery mode, if present at all. Real-world interventions
286 varied widely in the type of staff employed (e.g. healthcare or

287 physical activity professionals, intervention-trained laypeople) and
288 staff training standards.

289 Delivery descriptions were reported by all 39 individual RCT
290 interventions but varied greatly in depth of detail. Most indicated total
291 number of sessions, delivery method and average session duration,
292 with higher-quality interventions describing in detail session
293 frequency, number of participants permitted in group-based sessions
294 (if applicable) and delivery setting. Five RCTs specifically indicated a
295 weight maintenance phase but definitions varied, usually with few
296 contact sessions^{31,32,44,46,48}. All 39 intervention arms reported some
297 form of staff description, ranging from identification of the job title
298 only to role details; 22 of these noted specific staff training details.

299 ***Intervention Components***

300 Dietary advice varied widely across real-world BWMLs. 'Healthy
301 eating' guidance (e.g. Eatwell Guide) was commonly referenced,
302 although application of other advice (e.g. prescribed eating plans,
303 macronutrient recommendations) varied. Components ranged from
304 non-supervised sessions optionally carried out by participants, to
305 weekly 45-60 min sessions delivered by a trained instructor. Both
306 were generally self-monitored via diaries. BCT application varied but
307 most included 'goal setting' and 'motivational interviewing'.

308 Of the 39 RCT intervention arms, 33 reported BCTs employed,
309 however, only 5 – from one paper³⁷ – used a recognised BCT
310 taxonomy²⁶. Description in the remaining 28 interventions varied from
311 "behavioural change" to lists of several techniques used. 36
312 intervention arms mentioned some form of dietary advice delivered to
313 participants; depth of detail ranged from "balanced diet based on
314 healthy-eating principles" to comprehensive instructions (i.e. calorie
315 recommendations, meal replacement items). 20 of these indicated

316 the staff responsible for delivering dietary advice (including e.g.
317 'trained dietitian', 'therapist', 'intervention leader'). 35 intervention
318 arms mentioned the physical activity advice delivered – description
319 varied from brief outlines of the benefits of physical activity to details
320 of duration, frequency, type and location. 15 RCT interventions
321 reported supervised physical activity sessions, only 11 of which
322 specifically detailed delivery by an exercise professional.
323 Descriptions were unclear as to whether staff were qualified physical
324 activity instructors, as per NICE guidelines⁵. Physical activity and
325 dietary monitoring were reported by 26 and 28 interventions,
326 respectively.

327 **Costs**

328 Costing information could not be adequately collected due to
329 absence of description across all data sources. 3 RCT interventions,
330 from one paper³⁴, reported estimated costs per participant as
331 estimated by “the total annual costs of the intervention (per RCT
332 condition), divided by the total number of participants in the group
333 with measured body mass index at 12 months”.

334

335 **DISCUSSION**

336 We have used multiple intervention mapping exercises, NICE and
337 Standard Evaluation Framework practice guidelines and previously
338 designed reporting frameworks^{5,15,25} to identify and select the critical
339 items required to adequately report BWMI for the purposes of future
340 analysis, creating STAR-LITE. Through consideration of high-quality,
341 evidence-based tools and pre-existing evidence of a need for a
342 specific BWMI reporting tool, a robust template was produced^{11,24}. A
343 lack of clear guidance regarding intervention specification was
344 identified as a barrier to the commissioning of BWMI². Effective

345 recommendations can only be made in the presence of well-reported
346 RCTs – transparent descriptions of which are needed to inform the
347 evidence-base of ‘what works’ for specific participants, thus shaping
348 real-world BWMIs. STAR-LITE was designed to complement a
349 comprehensive list of core outcomes, developed through expert
350 consensus, that should be reported by both weight management
351 trials and real-world interventions to facilitate comparisons of
352 intervention effectiveness¹⁹.

353 ***Phase 1 – Initial Template Design: Resources and Process***

354 STAR-LITE was developed to allow investigation into knowledge
355 gaps identified by NICE through specific item inclusion⁵. For
356 example, evidence surrounding practitioner training is lacking, in
357 relation to which types may lead to more weight loss. NICE
358 recommends that staff are trained prior to intervention
359 implementation, and professional staff development sessions are
360 delivered throughout but fails to make specific qualification
361 recommendations. Therefore, an item included within the template
362 required the description of staff, their qualifications and experience –
363 details commonly ill-defined within weight management RCT
364 reporting, as shown within piloting.

365 Taxonomies are a recognised method to assist the reporting of
366 (typically complex) behaviour change interventions and their applied
367 BCTs^{24,54,55}. Techniques are coded by a corresponding number
368 which can be reported by those who deliver them, facilitating
369 increased clarity and transparency within intervention reporting⁵⁶.
370 Without the use of a taxonomy, the same BCT could be described by
371 separate interventions in many different ways, causing issue for the
372 comparison of results. For this reason, and due to the challenges of
373 accurate BCT replication within research, CONSORT recommends

374 utilising a recognised BCT taxonomy to increase clarity and
375 transparency within intervention reporting⁵⁶. By incorporating a
376 widely-used BCT taxonomy²⁴, behavioural components can be more
377 accurately described, quantified and their presence or absence
378 compared with other interventions.

379 STAR-LITE was designed to capture all relevant BWMI delivery data
380 (prompting for information that was found to be frequently non-
381 reported through piloting), whilst aiming for minimal misinterpretation
382 via clear and simple language. Uniformly reported data is
383 encouraged through minimal use of free-text answer options. Free-
384 text answers were permitted for items that could not be adequately
385 detailed using standard multiple-choice answers – here, word counts
386 are suggested to avoid over- and under-reporting between
387 interventions and thus reduce more possible variance. To reduce
388 administration time where possible, simple data collection techniques
389 (i.e. multiple-choice ‘tick-box’ answers; conditional question and
390 answer formatting) attempted to lower user burden, thus increasing
391 the likelihood of compliance across different BWMI organisations.
392 STAR-LITE was initially based on the predominantly free-text answer
393 questionnaire used for Tier 2 and 3 Scottish weight management
394 mapping⁶, which took nine health boards each an estimated 1 h to
395 complete. The average time for STAR-LITE completion (a larger,
396 more comprehensive tool) by a knowledgeable intervention lead is
397 estimated to be 1-1.5 h, given the large reduction in free-text answer
398 options and increased use of closed answers, comparatively. The
399 template was designed to be completed once, updated with any
400 intervention changes, and published as an appendix to the
401 corresponding intervention paper as a distinct document detailing
402 BWMI delivery information.

403 STAR-LITE was structured for simplicity of use – key areas and
404 subsequent items were arranged in chronological order from initial
405 referral to intervention cessation.

406 ***Phase 2 – Piloting: Variation, Reporting Quality and Template***
407 ***Refinement***

408 Piloting had two main purposes – to inform template development
409 and to test STAR-LITE efficacy in data collection from both publicly
410 implemented clinical and research-trial interventions, ensuring
411 applicability across a range of BWMI. Data collected via piloting
412 offered the opportunity to observe differences in reporting frequency
413 and quality across currently published BWMI.

414 Through piloting we have observed that overall, behavioural weight
415 management RCT delivery descriptions generally lack consistency or
416 intervention component detail. For example, BCTs (despite being
417 fundamental to BWMI) are poorly described without taxonomy use;
418 minimal session- or staff-specific information is provided; and there is
419 a lack of clear description of the dietary and physical activity
420 components. ‘Costing’ was the most poorly reported section, yet
421 financial data would assist cost-effective intervention selection when
422 healthcare budgets are restricted. RCTs used were originally
423 gathered for the development of NICE guidelines, which made this
424 resource a high-quality, informative snapshot of trial reporting.

425 Template piloting highlighted large variation in current clinical BWMI
426 – allowed by non-specific NICE guidance – across many delivery
427 factors (i.e. setting, total number and duration of sessions, staff
428 employed) and components (e.g. advice delivered, presence of
429 supervised physical activity, BCTs used). Notably, areas of large
430 variation were usually those poorly reported within RCTs. Wide
431 variation is likely to persist without clear, precise BWMI delivery

432 guidelines – development of which would be aided by widespread
433 use of STAR-LITE to facilitate uniformed reporting by all BWMI and
434 support reliable comparisons of data.

435 Reporting standards of clinical data were heavily reliant on the
436 specificity of each original collection tool – as such, reporting quality
437 could not be discussed in comparable depth to RCTs. Non-specificity
438 of items allows for wide interpretation as to which details to include,
439 in what quantity. In light of this, items included within the template
440 were highly specific, with larger questions divided into sub-questions
441 to elicit short, distinct answers. Additionally, within real-world BWMI
442 reports, clinical personnel commonly left answers blank. ‘Missing’
443 answers could carry different meaning depending on the reporter,
444 which may confuse research efforts. Unfortunately, in certain
445 interventions, blank answers may have actually indicated ‘non-
446 inclusion’ rather than non-reporting of included components – without
447 the use of a specific, well-detailed reporting template it was difficult to
448 ascertain which. In future, an electronic version of STAR-LITE could
449 be formatted to force completion through data entry before
450 progression to the next item.

451 ***Possible Barriers to Uptake and Recommendations for Future***

452 Creating a new and widely accepted tool is not without hurdles.
453 Intervention personnel, likely already pressured by time constraints,
454 may not see the benefit of devoting up to 1.5 h to STAR-LITE
455 completion. However, the template was designed to be completed
456 once (and reviewed with any intervention changes) but will
457 subsequently reduce the workload of future users and reduce the
458 possibility of erroneous data extraction by external researchers.
459 Similar, albeit less specific tools to increase reporting quality exist
460 within research in different formats, e.g. checklists and frameworks.

461 STAR-LITE is complementary to such resources, which have tool-
462 specific advantages but lack the explicit structuring required to
463 consistently facilitate uniformed descriptive delivery reporting from
464 BWMI in both research and clinical settings. For example,
465 CONSORT-SPI 2018 is a checklist that guides reporting specifically
466 for social and psychological intervention trials over 26 different
467 items¹³. 'Item 5a' encourages reporters to describe intervention
468 delivery but does not specifically prescribe structure for these
469 descriptions, allowing opportunity for variation between reporters.
470 Similarly, the SPIRIT 2013 checklist for clinical trials reminds the
471 reporter to describe interventions "with sufficient detail to allow
472 replication" in 'item 11a'¹². Here, STAR-LITE can be referred to –
473 completed templates can be presented as an appendix to
474 corresponding intervention papers, covering these items without
475 additional reporter workload. These appendices would be ready-
476 made catalogues of intervention information for those who require it,
477 saving BWMI leads time when delivery descriptions are needed.
478 Additionally, although STAR-LITE contains 119 items in total (38
479 primary items with related sub-questions), the use of conditional
480 answer formatting means that not all questions will be relevant to
481 every intervention. In future, the development of an electronic form
482 would facilitate faster completion and simpler maintenance, further
483 reducing time-to-complete. Electronic storage of the template would
484 allow simple upkeep by intervention personnel.

485 To maintain relevance and acceptability over time, flexibility of design
486 is crucial for STAR-LITE due to the developing nature of weight
487 management research. For example, dietary advice has varied
488 significantly in the past decade. Within the next ten years, presently
489 offered multiple-choice answer options (e.g. 'intermittent fasting', 'low
490 carbohydrate diet') may become irrelevant, obsolete and discarded

491 from BWMI, replaced by novel components not yet examined. In
492 future, this will require STAR-LITE reappraisal and review in line with
493 developing research – changes may be necessary to ensure
494 continuous and complete, high-quality reporting. Regularly scheduled
495 reviews of template design will ensure that constant and accurate
496 capture of relevant intervention data is within the capabilities of
497 STAR-LITE. Again, developing STAR-LITE to exist as an e-reporting
498 tool – the products of which could be cited by intervention personnel
499 and linked within papers to direct readers – would facilitate this, by
500 allowing formatting to be modified over time as interventions evolve.

501 STAR-LITE will be rolled out for use by all BWMI to facilitate
502 detailed reporting of intervention delivery information for evaluation-
503 purposes. Widespread STAR-LITE completion by many intervention
504 teams would result in comprehensive, openly available sets of BWMI
505 delivery data for analysis within future research efforts. We
506 encourage interventions to highlight their use of STAR-LITE within
507 publication materials in order to spread awareness and knowledge
508 about this good practice, thus increasing future uptake by others.
509 Submission of user feedback and comments to support the future
510 development of STAR-LITE would also be encouraged to assist
511 STAR-LITE formatting reviews.

512 **Conclusion**

513 STAR-LITE, a specifically designed, developed and tested template,
514 could encourage a higher standard of reporting across adult BWMI
515 than is currently seen. With effective, evidence-based directions for
516 implementation resulting from robust meta-analysis of data, real-
517 world BWMI tailored to specific populations would successfully
518 reduce participant obesity prevalence.

519 **CONFLICTS OF INTEREST STATEMENT**

520 There are no conflicts of interest.

521

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523 L.H. and J.L. drafted the manuscript. All authors provided relevant

524 subject area expertise to shape STAR-LITE. R.M.M., L.J.E. and

525 S.A.S. critically reviewed the manuscript, before L.H. and J.L.

526 finalised the manuscript.

527

528 Table 1: Resources used to inform and shape initial template design

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530 Table 2: Inclusion and exclusion criteria for BWMIIs used during
531 template piloting phase

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Table 1. Resources used to inform and shape initial template design

1. Template for intervention description and replication (TIDieR) checklist and guide¹¹
 - *Items provided a basis for initial template draft to be built upon*
 - *E.g. 'what', 'who', 'how', 'where'*
 - *Layout inspected*

2. NICE best practice guidelines for BWMI⁵
 - *Examined to inform template design and for potential items of inclusion with respect to variation in interventions and areas of uncertainty within reporting*

3. Standard Evaluation Framework²⁵
 - *Examined for potential items of inclusion with respect to areas of uncertainty within reporting and variation in interventions*
 - *E.g. 'essential' and 'desirable' criteria for evaluating a BWMI*

4. Standard Evaluation Framework feedback report¹⁵
 - *Examined to inform template design with respect to variation in interventions, areas of uncertainty within reporting and barriers to uptake*
 - *Provided recommendation for standardised data collection tool*

5. Two-part NICE-affiliated review of current BWMI evidence^{3,4}
 - *Comparisons made within the review used as the basis for NICE BWMI guidance (part 1a and part 1b) informed item inclusion*

- *E.g. 'delivery style', 'delivery mode' and intervention content*

6. Scottish Tier 2 BWMI mapping survey⁶

- *Examined for potential items of inclusion, seeking to improve on potential areas of non-specificity relevant to intervention reporting*
- *Layout inspected*

7. Public Health England BWMI mapping report²

- *Provided recommendation for standardised data collection tool*
- *Feedback within mapping report informed important items of inclusion*
- *E.g. 'costing'*

8. Standard Evaluation Framework online data collection tool²²

created by the National Obesity Observatory to allow the collection of intervention summary data by practitioners

- *Items within the data collection tool were examined for potential inclusion, seeking to improve on potential areas of non-specificity relevant to intervention reporting*
- *E.g. 'dietary data collected', 'physical activity data collected'*

9. The Coventry, Aberdeen and London – Refined (CALO-RE) taxonomy²⁴

- *Identified and considered for integration within the template to record behaviour change techniques (BCTs) used within interventions*

10. Taxonomy of BCTs used in interventions²⁶

- *Identified and considered for integration within the template to record BCTs used within interventions*

11. The Oxford Food and Activity Behaviours (OxFAB) taxonomy²⁷

- *Identified and considered for integration within the template to record BCTs used within interventions*

12. Consensus on Exercise Reporting Template (CERT)²³

- *Examined to inform item inclusion for physical activity component description*
- *E.g. type of physical activity involved, generalised or personalised physical activity*

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Table 2. Inclusion and exclusion criteria for BWMI used during template piloting phase

Inclusion criteria

Fully completed evaluation (*National Obesity Observatory BWMI only*)

Delivered in any setting (i.e. community/commercial/primary care/online)

Long-term follow-up of ≥ 12 months (*RCTs only*)

Participants classified as overweight or obese (BMI of $\geq 25\text{kg/m}^2$ and $\geq 30\text{kg/m}^2$, respectively, or a BMI of $\geq 23\text{kg/m}^2$ in Asian populations) or $\geq 80\%$ of intervention arm was overweight/obese (*RCTs only*)

Real-life clinical or research-based BWMI, applicable to transfer into an NHS setting

Provision of care for participants ≥ 18 years only

Structured, sustained multicomponent BWMI (diet, physical activity, behavioural therapy)

Exclusion criteria

RCT control conditions detailing no intervention; information-only; one-off sessions for discussion with or without issuing of leaflets; 'usual care'

Participants that are pregnant/with disordered eating/with pre-existing medical condition (i.e. diabetes, heart failure, uncontrolled hypertension or angina) (*RCTs only*)

Use of surgery or medication for weight loss (*RCTs only*)

Focus on other lifestyle change (i.e. smoking cessation/reduction of alcohol intake)

Non-reporting of a measure of weight loss (*RCTs only*)

756 *Inclusion and exclusion criteria for BWMI used for piloting. RCT-only*

757 *criteria adapted from NICE guidance supporting paper^{3,4}*

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