Title:

Scoping reviews: the PAGER framework for improving the quality of reporting

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Abstract:

Literature reviews generally analyse and synthesis the evidence (or lack thereof) in a particular topic area and they are an increasingly popular form of scholarly activity. The scoping review is a popular literature review approach that has been adopted across the social and health sciences over the last fifteen years. With this upsurge in use, differences of opinion about how to analyse and report scoping reviews has also grown. Drawing on work carrying out a scoping review on oral health and child maltreatment, we put forward a structured approach to analysis and reporting of such reviews: the PAGER (Patterns, Advances, Gaps, Evidence for practice and Research recommendations) framework. In this article, we reflect on the strengths and limitations of the framework, drawing on examples, laying out the methodological processes, and making suggestions as to how it might improve reporting. The article makes a contribution to efforts that seek to improve the reporting and utility of scoping reviews in health and social research.

1   **Introduction**

2   The purpose of a literature review is to analyse and synthesise work that has been

3   undertaken in a particular area and to identify what we know and do not know about the

4   question being asked. A literature review generally involves identifying one or more

5   questions which are then answered using a comprehensive and systematic approach.

6   Literature reviews are frequently undertaken in health and social research and the

7   emergence of the Campbell Collaboration (which produces systematic reviews and other

8   forms of evidence synthesis), is testament to this (see

9   https://www.campbellcollaboration.org/). Given the vast amount of published research on

10   most topics, a literature review is a practical response to managing this volume of

11   publications, presenting a summary and analysis so that the reader does not have to access

12   and read each individual research report. Instead, these are collated and synthesised into

13   one review. There are different types of literature reviews, each with a distinct purpose. For

14   example, the purpose of a Cochrane systematic review with meta-analysis is to determine

15   the effectiveness of an intervention or treatment (Higgins & Green 2019). The systematic

16   review's specific methodology is such that robust conclusions can be drawn regarding what

17   is and is not known (Denyer & Tranfield 2009). The purpose of a meta-ethnography is to

18   interpret qualitative research which focuses on a single issue (Noblet & Hare 1988), while

19   the purpose of a realist review is to determine what works, how and in what circumstances

20   (Wong et al 2012).

21   In an early analysis of the proliferation of review methods, Grant and Booth (2009) identified

22   fourteen different 'types' of reviews. We have already referred to some of them, but

23   additionally the range of review types include for example, the mapping review, literature (or

24   narrative) review and the scoping review. Definitional clarity around the use, method and

25   outcome of many reviews continues, despite efforts to present best practice around when

26   and how, specific review methods are most appropriate (Munn et al 2018). The most useful

27   distinctions are those that draw attention to the different purpose and aims of reviews, since

28   these are likely to aid researchers in identifying the most appropriate review to undertake.

29   Overall, there are multiple review types, each with its own purpose and techniques. This

30   article is concerned with one, prominent type of literature review: the scoping review . Later

31   in the article we focus on the development of a new framework for analysing and reporting of

32   scoping reviews. It is known as the PAGER (Patterns, Advances, Gaps, Evidence for

33   practice and Research recommendations) framework. To date we have published a number

34   of scoping reviews, which have culminated in the development of the PAGER framework.

35   We use these as examples in this article so that others can use the framework too. Before

36   focusing on the specifics of the PAGER framework, we provide an overview of scoping

37   reviews.

38   <u>Scoping reviews</u>

39   Scoping reviews are distinctive from many other forms of review - and systematic reviews in

40   particular - by virtue of the breadth of literature they can include and, consequently, the

41   range of methods they might include and the analysis they undertake (see for example

42   Pham et al 2014). At the same time, scoping reviews offer a more systematised and

43   transparent method to identify and analyse all the relevant literature than narrative reviews

44   where the selection and analysis of literature is often less systematic and comprehensive

45   (Grant & Booth, 2009). To this extent, we might position scoping reviews in the centre of a

46   continuum of review methods that offers opportunities for researchers to map, describe and

47   analyse a wider body of literature than a systematic review might attempt whilst following a

48   method more rigorous than traditional narrative literature reviews generally achieve.

49   However, the flexibility offered by scoping reviews leaves it open to criticism that it lacks the

50   kind of rigour in reporting guidelines that are provided for authors of systematic reviews. The

51   Preferred Reporting Items for Systematic Reviews and Meta Analysis (PRISMA) is a 27-item

52   checklist of reporting requirements that give authors, reviewers and commissioners of

53   research a standard benchmark for assessing systematic reviews. An extension to PRISMA

54   was introduced in 2018 for scoping reviews that contains 20 essential reporting items

55   including data charting, data items, and synthesis of results (items 10, 11 and 13

56   respectively) (Tricco et al 2018). Whilst the PRISMA extension for scoping reviews offers a

57   framework for methodological issues to be described, it falls short of offering any consistent

58   approach to the specifics of charting and synthesis – an omission the PAGER framework

59   seeks to address.

60   Scoping reviews have been used extensively in health research for some time (Tricco et al

61   2016). Their use in the wider social sciences has been less prolific, although it is possible to

62   find examples in social care research (O'Malley and Croucher, 2005; Ryan et al 2021);

63   housing (O'Malley and Croucher, 2005a); education (O'Flaherty and Phillips 2015); and

64   comparative research (Hamadeh et al 2021). The reasons for this variance across

65   disciplines is unclear, although it is possible that a lack of methodological and definitional

66   clarity is partly to blame. It is certainly the case that the main methodological advances in

67   scoping reviews has been generated from within the health research community (Tricco et al

68   21018; Levac et al 2010; Davis et al 2009; Anderson 2008). This is despite the obvious

69   benefits such an approach offers a social science academic community. For example,

70   scoping reviews are particularly good at synthesising studies and information from different

71   methodologies and disciplines, and they are well suited to exploring areas where a temporal

72   and critical understanding of knowledge development is valuable.

73

74   In general terms, scoping reviews can be conceived as a method of reviewing research

75   evidence for specific reasons: to examine the extent and reach of research activity in a

76   particular field; as a pre-cursor to a full systematic review; to summarise and disseminate

77   research findings (particularly for non-academic audiences) and to identify gaps in the

78   evidence base. The most widely used framework for scoping reviews describes an iterative

79   process across six core stages:

80

81   1. Identification of research questions

82   2. Identification of relevant studies

83   3. Study selection

84   4. Charting the data

85   5. Collating, summarising and reporting results

86   6. An optional final step to consult with stakeholders regarding findings

87

88   Wide-ranging research questions are recommended (stage 1) that can be refined if

89   necessary once relevant studies have been identified across a broad range of sources

90   encompassing academic and grey literature (stage 2). Study selection (stage 3) is facilitated

91   through the use of relevant and justifiable 'inclusion' and 'exclusion' criteria that can be

92   developed and informed as familiarity with the literature increases. It is recommended that a

93   descriptive-analytic approach to charting the data (stage 4) is used to ensure that issues of

94   context and process can be captured, understood and explained. Data are then collated,

95   summarised and reported (stage 5) with the intention of providing a thematic narrative report

96   of findings that also includes a numerical analysis of the overall extent and distribution of

97   studies. An optional final step (stage 6) involves consultation with stakeholders regarding the

98   review findings.

99   It is important to recognise that the choice of themes in reporting is open to researcher bias

100   and stop short in recommending any specific method for analysing findings, beyond a call

101   for "clarity in reporting strategy". However, this is often hard to achieve in practice (Levac et

102   al 2010) and many reports are unclear about the analytic approach taken. Additionally, many

103   scoping review articles fall short of laying out the profile of the included literature, the

104   inherent gaps within it, and how the review findings can resonate with and inform future

105   direction for both practice and research. The value of this current article therefore, lies in its

106   attempts to address such problems with the state of reporting scoping reviews.

107

108

109 **Background**

110

111 <u>A framework for reporting scoping reviews</u>

112

113 The PAGER framework was initially conceived as part of a scoping review study on the oral

114 health needs of children who had experienced abuse and neglect , carried out by three of

115 the authors of this article. We briefly set out the context of this initial study and the iterative

116 process that led to the development of the PAGER framework.

117

118 *Study context*

119

120 Over the past decade, there has been increasing recognition across the global dentistry

121 community that the profession can (and should) play a greater role in identifying and

122 responding to child (and adult) protection and welfare issues (Harris & Whittington, 2010).

123 Concomitantly, there has been a rapid upsurge in publications, practice guidance and

124 professional discussion articles about the intersection between child protection and oral

125 health. As a group of practitioner-academics working across dentistry, nursing and social

126 work, we considered it timely to carry out a review of this emerging work, mapping patterns

127 and gaps in the growing empirical and practice-orientated literature. We anticipated drawing

128 on an interdisciplinary literature that would likely encompass a range of methodological

129 approaches in terms of study design. Thus, a scoping review was an appropriate way of

130 beginning to map and critically engage with the diverse research landscape . We also

131 wanted to ensure that the review spoke to the needs of practitioners working at the interface

132 of child welfare and oral health. Scoping reviews are particularly well suited to exploring a

133 wide-ranging body of literature with the purpose of addressing a specific, often practice-

134 orientated research question (Levac, Colquhoun, & O'Brien, 2010; .

135

136 *Developing the PAGER framework*

137

At the stage of synthesising our initial findings, we were struck by the seemingly uneven

nature of the research landscape. For example, the proliferation of studies about dentists'

self-reported skills and worries in dealing with child protection issues, compared to the

paucity of studies exploring allied professionals' (e.g. nurses and social workers) skills and

confidence responding to child oral health concerns. This raised questions about what was

driving and inhibiting research and practice innovation across the different fields. These

observations highlighted the need to report the review findings in a clear and accessible way

to different professional audiences, amongst whom knowledge of this issue may vary

considerably. With this in mind, we started to create reflective memos for each of the

principal thematic findings, identifying where there were significant bodies of knowledge or

innovation (particularly over the past five years), as well as gaps and limitations in

understanding. It soon became evident that the implications of these 'Patterns', 'Advances'

and 'Gaps' was likely to differ for people in research and practice-orientated roles and we

started to create linked memos, entitled 'implications for practice' and 'implications for

research'. The separating out of research and practice implications seemed a little crude;

however, we reasoned, these summaries were intended as an aid to, rather than substitute

for, more detailed engagement with the study data and narrative analysis. To assist with the

development of a simple acronym, these titles were later amended to 'Evidence for practice'

and 'Research recommendations'. From this point, the draft outline of the PAGER framework

was traced.

The matrix proved to be a valuable orientating point for discussions amongst the research

team about the study's key findings and how they 'translated' into messages for and across

different audiences. It helped us to work through the implications of our findings in a

methodical way, without losing sight of the wider thematic context and purpose of the review.

In the latter stages of the study, we presented the PAGER framework to the study

stakeholder group, which included representatives from various practice disciplines. This

165   proved a helpful exercise and sparked interesting conversations that in turn sharpened our

166   key study messages. Thus, although the PAGER framework was used initially as a reflective

167   tool amongst the study team, it became invaluable for analysing and reporting the review

168   findings to a wider audience. Such was its use, that we published it as part of that original

169   review (see Table 1). We will use this as a reference point to explain the framework in the

170   discussion that follows.

171

172   [Table 1 here: at back]

173

174   The PAGER framework offers the opportunity to address weaknesses in scoping study

175   method, by providing a consistent approach to the analysing and reporting of review

176   findings. Previous studies have similarly sought to clarify and enhance stages of the original

177   framework (see Levac et al 2010), arguing that greater clarity and consistency around the

178   analysis stage of scoping studies could improve the method overall. However, it is fair to say

179   that there remains a lack of clarity or consistency around how scoping study findings might

180   be reported in ways that enhance methodological rigour. The PAGER framework goes some

181   way to overcome these challenges.

182   **Critical discussion of the PAGER framework**

183   The aim of this article is to describe and critique a framework that some of the author team

184   have developed in previous scoping reviews. It is an attempt to lay out the methodological

185   processes associated with the framework and to explore how it might be used to improve the

186   reporting of scoping review findings in health and social research. Although published the

187   first framework for scoping reviews in 2005, this type of literature review is still relatively new

188   (Peters et al. 2015). To further advance the field of scoping review methodology, several

189   articles have been published to date on the guidance for the reporting of scoping reviews.

190   For example, the guidance by Peters et al. (2015) states that – depending upon the objective

191   or focus of the review – extracted results may be classified under main conceptual

192   categories such as 'key findings' and 'gaps in the research' based on a logical and

193   descriptive summary of the results ('charting the results'). Depending on the gaps in

194   knowledge identified from the results, authors may then deduce clear and specific

195   recommendations for future research or the future conduct of systematic reviews needed in

196   the area. Finally, contingent on the aim of the scoping review, recommendations for practice

197   may or may not be developed. A comprehensive scoping review on the conduct and

198   reporting of scoping reviews by Tricco et al. (2016) found that among the 494 reviews

199   included, 85% identified evidence gaps, 84% future research opportunities, 69% strengths

200   and limitations and 54% implications for policy or practice. Noteworthy, none of the reviews

201   identified guidelines for reporting scoping reviews. Finally, pertaining to the reporting of

202   results another scoping review of scoping reviews found that out of 344 reviews included,

203   77% identified gaps in research, 77% recommended topics or questions for future research,

204   18% policy implications or recommendations for policy or practice, 19% recommended a

205   systematic review to be conducted and only 3% provided information to inform design or

206   scope of future research (Pham et al. 2014).

207   The scrutiny of available guidance for the reporting of scoping reviews as well as scoping

208   reviews of scoping reviews has provided clear evidence of inconsistent approaches of

209   reporting scoping review findings. The above described examples have demonstrated the

210   absence of standardised instructions on how to classify the findings. Our observations echo

211   the commentary on clarity in definition, methods and reporting of scoping reviews by

212   Colquhoun et al. (2014), who call for reporting guidance of scoping reviews. Hence, a

213   framework for the standardised reporting of scoping review results and recommendations is

214   timely and valuable. To further contribute to the ongoing enhancement of the scoping review

215   methodology, the PAGER framework has been developed to improve analysis and reporting

216   in a scoping review. It complements, rather than replaces, current guidelines for reporting.

217   Following the PAGER acronym, the framework consists of five domains: **P**atterns,

218   **A**dvances, **G**aps, **E**vidence for Practice and **R**esearch recommendations. We will refer to

219   these domains of the PAGER framework in more detail in the subsequent paragraphs of this

220   discussion section. For each domain we suggest some questions that authors might use

221   when developing their PAGER report as part of the scoping review. The starting point of the

222   detailed description of the framework constitutes the domain 'Patterns'.

223   <u>Patterns</u>

224   In most forms of review, it is standard practice to visually represent the flow of literature

225   through the review, from the initial database results to details of the included studies. This is

226   most typically in the form of the well-utilised PRISMA Flow Diagram (Moher et al 2009). As

227   regards an accompanying narrative, it is usual to begin the presentation of findings with a

228   **descriptive summary/characteristics of the included studies** (e.g. 35 studies were

229   quantitative in nature, six were qualitative and two used mixed methods). Depending on the

230   specific focus of the review, it is likely that authors will want to report on the geographical

231   spread of the literature and how the literature is patterned across countries. These are as

232   likely to feature as part of a scoping review, as with any other review types. However,

233   scoping reviews are an ideal means of discerning the patterns in a current body of literature

234   to a degree perhaps that is not always appropriate for other forms of review. It is placed first

235   in the process because it encourages a macro view of the corpus, reporting on the overall

236   patterning. It calls upon researchers to consider what the literature tells them about, for

237   example, the nature of the included articles (often from a methodological viewpoint as

238   already discussed) and the prominent thematic findings.

239   In our own reviews (that have included many forms of review, including scoping reviews), we

240   have found that a useful starting point in developing the PAGER framework is to produce

241   what we have named a '**Patterning Chart**'. This is essentially a table of key themes as

242   illustrated in Table 2 . The themes will arise from what is typically an inductive, thematic

243   analysis of the key findings from each included article in the review. The themes will

244   necessarily be unique to each particular scoping review. The tabulation of themes in the

245   form of the patterning chart is congruent with the charting stage of the scoping review . As

246   shown in Table 2, it displays the review themes and how these are distributed across the

247   included articles. It is not intended as a way of assigning numerical value *per se*, but rather a

248   way of showing the prominence and/or absence of the themes. The patterning chart can

249   stand-alone as a representation in its own right. Importantly though, it forms an important

250   component of the PAGER framework, as each pattern is reported in the left hand column.

251   Then working across each row, the patterns form part of a coherent overview of the

252   advances, gaps, evidence for practice and research recommendations associated with each

253   pattern.

254   The patterning chart is advocated as a way of presenting themes in a format that can readily

255   inform the identification of patterns and gaps in the included literature. In the example

256   shown, the sociodemographic themes of Age, Gender and Residential Status, were reported

257   in only one or two of the included articles in comparison to Marital Status, which was

258   reported as a theme in five articles. While these types of patterns might be limited in terms of

259   what might be extrapolated from them, they are useful in informing subsequent stages of

260   reporting and the development of the framework.

261   Key reflective questions to ask at this stage are:

262   • What are the main groupings/themes arising from the analysis?

263   • What has not been written about and where are the gaps?

264   • What patterns exist within and across the groupings and themes?

265   [Table 2 here: at back]

266   Advances

267 Once the patterns have been established, it is helpful to report on the advances that are held

268 within the body of literature. In other words, theoretical and methodological advances over

269 time: how the field of study has developed. Discerning and describing such patterns is

270 important as it reflects the dynamic state of knowledge and its growth within a body of

271 literature. Reporting these advances provides a preliminary justification for how gaps and

272 recommendations for research are framed in the conclusion of a scoping review. There

273 might be a number of ways to report advances, depending on the focus of the scoping

274 review, and we offer some thoughts on this here. The key feature in this stage of reporting is

275 placing the body of work used in the scoping review within a wider context (Anderson et al

276 2008; Kastner et al 2012).

277 Locating the body of work under discussion within a wider historical context allows the

278 reader to determine the validity of findings in relation to the current state of knowledge.

279 Demonstrating where this specific set of papers 'sits' within a broader historical context

280 allows us to consider the time frame within which advances have occurred and reflect on

281 why this might be the case. Whilst it is unusual for scoping reviews to be exclusively

282 focussed on theoretical debates, reporting where advances have occurred can support

283 claims relating to research gaps, through the application of alternative theoretical models for

284 example; and recommendations for research where these are rooted more firmly within a

285 theoretical framework. Consideration of methodological advances is also critical for informing

286 research recommendations. This is especially useful where scoping reviews are not normally

287 associated with quality appraisal. Studies have frequently identified the need for qualitative

288 or quantitative approaches to underpin the existing evidence base, and reporting a sense of

289 the overall methodological advances in the field will support these claims more thoroughly.

290 The patterning chart can be used to inform the identification of advances in the field.

291 Advances might be conceived as a means of establishing a chronology of the topic. Taking

292 the example in Table 2, we can see how there has been an expansion in interest in

293   sociodemographic characteristics since the first published study. If we combine this

294   observation with consideration of geographic spread, it allows us to reflect on where and

295   when issues have been prioritised in empirical studies. This has practical and theoretical

296   relevance because if the major advances in knowledge are rooted in particular national

297   institutional contexts, the relevance of these for any other place might be limited. In so doing,

298   a focus on advances allows reporting of findings to be more nuanced, taking into account the

299   chronological development of ideas, identification of those jurisdictions where research has

300   been most prolific, and how different national institutional contexts influence practice

301   developments. This story is important to consider when we are seeking to influence future

302   research directions, but even more so if we are concerned with offering practice

303   recommendations (Anderson et al 2008).

304   This stage of the framework is most akin to a traditional or narrative literature review, where

305   the basis for claims is made clear. It goes further than simply charting the data by seeking to

306   explain how and why some ideas have gained traction in a particular field. However, there

307   are important limitations that researchers need to be aware of: the advances are only

308   pertinent to the literature that has been identified. Therefore, advances that are identified will

309   be influenced by search strategies and the overall 'age' of a body of work. In for example,

310   the search strategy avoided specifying any time period for publication, and was thus able to

311   report advances with some authority since there was unlikely to be any extant literature that

312   was missed by the original search. In other topics, we find more arbitrary decisions made

313   regarding the time-period and in these instances reporting the findings with reference to

314   some appropriate context increases the overall validity of the findings.

315   Key reflective questions to ask at this stage are:

316   • How has new knowledge/findings developed over time?

317   • Is there anything new within the most recent findings?

318   • What types of insights or advances have been made in this body of work?

319   •   What needs to be expanded upon?

320

321   <u>Gaps</u>

322   Many scoping reviews are undertaken as the precursor to an empirical phase of a study and

323   justification for reviews is often based on addressing the limitations and under-development

324   of a certain aspect of the literature (Tricco et al, 2016). However, within the scoping review

325   process, the identification of gaps emerges from an analytical process that is shaped by the

326   context in which the research is carried out. Clearly, it is also influenced by the people

327   carrying out the analysis and their methodological and (implicit or explicit) epistemological

328   positioning (Thomas et al, 2019). These necessarily subjective dimensions are infrequently

329   identified and reflected upon in scoping review articles. This in turn can lead to questions

330   about the rigour and transferability of scoping review findings (Pham et al, 2014), in addition

331   to fatigue with the now ubiquitous finding that 'more research is needed'- a common

332   conclusion drawn from scoping reviews (Tricco et al, 2016).

333   The PAGER framework does not negate the need for reflexivity in scoping review reporting

334   and we would encourage anyone interested in using the framework to adopt a critical

335   approach (echoing Thomas et al, 2019). However, a strength of the framework is that it

336   offers a structured, tabular prompt for researchers to consider the inter-connections between

337   their review findings (often presented as themes), the nature of the research landscape and

338   recommendations for future work and/ or use of the research findings. This helps to ensure

339   that identified gaps are focused, well-contextualised and written for the purpose of those who

340   use research (e.g. for the purposes of practitioners, service users, policy-makers, etc.) as

341   well as people who carry out research. This is particularly pertinent given that to date

342   scoping reviews are often used in the context of health and social care research and carried

343   out by people in practice and policy-orientated roles (Peterson et al, 2016).

344 By way of example, in the child oral health study , we identified a gap in knowledge about

345 how dentists identify and respond to ethical dilemmas when they have concerns about a

346 child's safety or welfare (see Table 1). Although this is not a priority area for research in the

347 extant literature, we identified it as important given our findings about the limited levels of

348 training many dentists receive and the difficulties some dentists experience when working in

349 this potentially emotive area. Thus, the purpose of drawing attention to this gap was to

350 highlight an area of practice development and to identify the potential contribution of

351 research to this work. Other identified gaps in this review spoke to broader themes in the

352 research landscape. For example, the paucity of research from a medical, nursing, social

353 work or counselling perspective and the lack of research carried out with and by children and

354 parents.

355 Key reflective questions to ask at this stage are:

356 • What has been left out of research to date that really needs to be addressed?

357 • Are there avenues for further enquiry? If so, how should these areas by prioritised

358   and how might these prioritise differ between stakeholders?

359 • What has been done extensively, to the extent that we do not need to explore it

360   further?

361 • What is my/ our team's methodological and epistemological standpoint and how does

362   this shape our findings and framing of the reviews' recommendations?

363 <u>Evidence for practice</u>

364 Given that scoping reviews do not seek to report on the quality of evidence, this may appear

365 to be a misplaced aspect of the PAGER framework. Moreover, not all scoping reviews focus

366 on a 'practice' issue per se. However, we argue that many scoping reviews fall short in terms

367 of providing useful messages for practice, whatever that practice might be. We support a

368 broad interpretation of practice as being the practical messages that can be extracted from

369   the literature in the form of implications for patients and carers, clinicians, academics and

370   policymakers. This is important in demonstrating the utility of the review, as opposed to

371   remaining at a descriptive level of themes.

372   There are a number of ways to interpret the idea of 'evidence for practice' although

373   producing an overview of the "types and sources of evidence to inform practice,

374   policymaking and research" (Daudt et al 2013) features in more recent definitions of scoping

375   reviews. As such, there are similarities between some types of scoping review and

376   knowledge synthesis approaches that can "improve the understanding of inconsistencies in

377   diverse evidence, and define future research agendas" (Kastner et al 2012). In considering

378   how to report evidence for practice, the audience is critical (Levac et al 2010) and this is a

379   feature of scoping reviews that we would recommend forming part of the initial study design.

380   How we report our messages, and to whom, will affect the overall impact of scoping review

381   findings. To date there is limited consideration of how the audience of a scoping review will

382   affect findings and reporting, and in studies commissioned by policy makers we might

383   anticipate these to be driven by organisational priorities (see for example Anderson et al

384   2008).

385   A framework for reporting evidence for practice might include consideration of some or all of

386   the following stakeholder groups: Policy Makers; Research Commissioners; Service

387   Providers. There is some evidence that policy makers can make use of evidence that explain

388   or highlight inconsistencies in the evidence base for particular interventions (Anderson et al

389   2008; Kastner et al 2012). For research commissioners, there are benefits in having access

390   to evidence that can inform priorities for research particularly where these reflect the

391   interpretations arising from inter-professional and inter-disciplinary research teams (Daudt et

392   al 2013). Clearly, scoping reviews can offer researchers and academics useful overviews of

393   the research base – providing important levers for developing new research agendas that

394   are relevant and worthwhile. Similarly, advocacy groups can make practical use of scoping

395 reviews that reveal the breadth of service provision and implications for best practice,

396 including reporting on services available for dispersed and vulnerable groups (Anderson et al

397 2008). The selection of 'audience' for reporting needs to be considered by researchers, and

398 where possible, extend beyond the commissioning body.

399 However, the reporting mechanism for evidence for practice requires some consideration of

400 the most appropriate method for dissemination of findings. Scoping review researchers need

401 to pay attention to the most effective way to reach these different audiences, including the

402 production of briefing papers, lay summaries or peer reviewed journal articles. Evidence for

403 practice has meaning only if it has impact.

404 Key reflective questions to ask at this stage are:

405 • Who are the key stakeholders in this area who might benefit from the findings?

406 • What are the key messages for these stakeholders?

407 • What are the implications for my discipline or field of knowledge?

408 • What are the most appropriate means for disseminating this evidence?

409 Research recommendations

410 The research recommendations domain builds on the identification of gaps and

411 complements the reporting of the evidence for practice. As the final element of the PAGER

412 framework it completes the overall profile of the literature. As discussed, there is some

413 criticism that too many reviews and empirical research have relatively little to contribute,

414 other than stating the need for further research. In the context of the PAGER framework

415 however, the concrete recommendations for further research arises from a well-grounded

416 reporting of the four domains, making them relevant and contextual to the other elements of

417 the scoping review findings.

16

418   Using the child oral health study as a reference point, under points 2 and 3 of the PAGER

419   Framework, we highlighted important patterns regarding dentists' and non-dentists'

420   responses to child neglect. This led to the recommendations for further qualitative research

421   exploring both groups' experiences and understandings in identifying and responding to oral

422   health and injury when working with children. The important point is that these

423   recommendations as presented in the right-hand column of Table 1 were contextualised by

424   their juxtaposition to the Advances, Gaps etc. of the entire PAGER Framework.

425   Key reflective questions to ask at this stage are:

426   •   How can the findings of the review inform further research?

427   •   Where should that research be focused?

428   •   What are the research questions that have not been answered yet?

429   •   What does not require further research?

430   <u>Bringing it all together in a PAGER framework</u>

431   We have used this article as an opportunity to share our development and use of the

432   PAGER framework, anticipating that it will be useful for colleagues undertaking their own

433   reviews. We advocate its integration into the core stages for scoping reviews . We see the

434   patterning chart as an important part of the process, in some ways, linking the review

435   findings and main themes with the production of a tabulated PAGER framework. It is

436   important not to squeeze elements into the framework, merely for the sake of completeness.

437   Beginning with a blank framework ready to be populated, researchers may find that there are

438   natural gaps that cannot be filled, at least not without compromising congruence. For

439   example used the PAGER framework to report their findings (Table 3). As shown, their

440   presentation of the framework did not highlight any clear 'evidence for practice'. In that case,

441   it appears that rather than shoehorn their findings into those aspects of the framework, the

442   researchers reported that such evidence would emerge from future research. In our view this

443   reflects a flexible use of the PAGER framework, which is crucial in meeting the specific

444   needs of different reviews.

445   [Table 3 here: see back]

446   In our own scoping reviews, we have found the use of the PAGER framework to be highly

447   iterative and creative and we hope that other researchers experience it the same way. The

448   authors are from a range of disciplinary backgrounds and although the PAGER framework

449   has its roots in health research, we see its appeal for researchers across a range of

450   disciplines, particularly in the social sciences. We are not fixed about how it should be used

451   and we regard the publication of this article as an invitation to the further development and

452   critique of the PAGER framework. We are particularly excited by the potential to use and

453   develop the PAGER framework for reviews in qualitative social research and approaches to

454   systematic reviews within, for example, management and organizational studies.

455   **Conclusions**

456   Scoping reviews make a valuable contribution to the assessment of evidence and scope of

457   work on a particular topic. However, the research landscape in many areas is patchy and

458   uneven and different audiences will require different summaries of this. The PAGER

459   framework is a helpful orientation to analyse, report and translate messages for and across

460   different audiences. Its utility lies in its use as a reflective tool within the study team, as a

461   valuable tool for analysing and reporting scoping reviews, and in extending the rigour of

462   scoping reviews by providing a consistent approach to the presentation of review findings.

463 **Declaration of interest statement**

464 One of the authors is on the editorial board of IJSRM.

465 **References**

466 Anderson, S., Allen, P., Peckham, S., & Goodwin, N. (2008). Asking the right questions:

467 scoping studies in the commissioning of research on the organisation and delivery of health

468 services. *Health research policy and systems*, *6*, 7. https://doi.org/10.1186/1478-4505-6-7

469 Colquhoun, H.L.; Levac, D.; O'Brien, K.K.; Straus, S.; Tricco, A.C.; Perrier, L.; Kastner, M. &

470 Moher, D. (2014). Scoping reviews: time for clarity in definition, methods, and reporting.

471 *Journal of Clinical Epidemiology* 67: 1291-1294.

472 Daudt, H.M., van Mossel, C. & Scott, S.J. Enhancing the scoping study methodology: a

473 large, inter-professional team's experience with Arksey and O'Malley's framework. *BMC Med*

474 *Res Methodol* 13, 48 (2013). https://doi.org/10.1186/1471-2288-13-48

475 Davis, K., Drey, N., & Gould, D. (2009). What are scoping studies? A review of the nursing

476 literature. International Journal of Nursing Studies, 46(10), 1386-1400.

477 doi:10.1016/j.ijnurstu.2009.02.010

478 Denyer, D., & Tranfield, D. Producing a systematic review. In D. A. Buchanan & A. Bryman

479 (Eds.), *The Sage Handbook of Organizational Research Methods*. Sage Publications Ltd.

480 2009. pp. 671–689.

481 Grant M.J & Booth A. (2009) A typology of reviews: an analysis of 14 review types and

482 associated methodologies. Health Inf Libr J. 26(2):91–108.

483

484 Hamadeh R , Randah R.; Borgan S, Khabsa, J, Sibai A. Tobacco Research in the Eastern

485 Mediterranean Region: A Scoping Review of Published Studies from Seven Countries

486 *Journal of Community Health*, 2021. 46(1): 225-231.

487   Harris, J., & Whittington, A. (2016). Dental neglect in children. Paediatrics and Child Health,

488   26(11), 478-484. doi:10.1016/j.paed.2016.07.003

489   Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors).

490   Cochrane Handbook for Systematic Reviews of Interventions version 6.0 (updated July

491   2019). Cochrane, 2019. Available from www.training.cochrane.org/handbook.

492   Kastner, M, Tricco, A.C., Soobiah, C., Lillie, E., Perrier, L., Horsley, T., Welch, V., Cogo, E.,

493   Antony, J., & Straus, S.E. "What Is the Most Appropriate Knowledge Synthesis Method to

494   Conduct a Review? Protocol for a Scoping Review." *BMC Medical Research*

495   *Methodology* 12.1 (2012): 114. Web.

496   Levac, D., Colquhoun, H., & O'Brien, K. K. (2010). Scoping studies: Advancing the

497   methodology. Implementation Science, 5, 69. doi:10.1186/1748-5908-5-69

498   Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009) Preferred Reporting

499   Items for Systematic Reviews and MetaAnalyses: The PRISMA Statement. PLoS Med 6(7):

500   e1000097. doi:10.1371/journal.pmed1000097

501   Munn, Z., Peters, M.D.J., Stern, C. *et al.* (2018) Systematic review or scoping review?

502   Guidance for authors when choosing between a systematic or scoping review

503   approach. *BMC Med Res Methodol* **18,** 143 https://doi.org/10.1186/s12874-018-0611-x

504   Noblit G.W. & Hare R.D. (1988) *Meta-ethnography, synthesising qualitative studies,*

505   *Qualitative Research Methods*, Volume 11. SAGE Publications: London

506   O'Flaherty, J. & Phillips C. (2015) The use of flipped classrooms in higher education: A

507   scoping review, Internet and Higher Education 25 85-95

508   O'Malley L, Croucher K: Housing and dementia care - A scoping review of the literature.

509   Health Soc Care Community 2005, 13:570-577. 255.

510   O'Malley L, Croucher K: Supported housing services for people with mental health problems:

511   A scoping study. Hous Stud 2005a, 20:831-845.

512 Peters, M.D.J, Godfrey, C.M., Khalil, H., McInerney, P., Parker, D. & Soares, C.B. (2015).

513 Guidance for conducting systematic scoping reviews. *International Journal of Evidence-*

514 *Based Healthcare*.

515 Pham, M.T., Rajić, A., Greig, J.D., Sargeant, J.M., Papadopoulos, A., A McEwen, S.A.

516 (2014). A scoping review of scoping reviews: advancing the approach and enhancing the

517 consistency. *Res Synth Methods*, 5(4):371-85.

518 Preston N & Aveyard H (2018) in S Cartwright, C Walshe & S Brierley (eds), Handbook of

519 theory and methods in applied health research. Edward Elgar

520 Ryan C, Bergin M, & Wells J. Work-related stress and well-being of direct care workers in

521 intellectual disability services: a scoping review of the literature. *International Journal of*

522 *Developmental Disabilities*, 2021. 67(1): 1-22.

523 Tricco, A.C.; Lillie, E.; Zarin, W.; O'Brian, K.; Colquhoun, H.; Kastner, M.; Levac, D.; Ng, C.;

524 Sharpe, J.P.; Wilson, K.; Kenny, M.; Warren, R.; Wilson, C.; Stelfox, H.T. & Straus, S.E.

525 (2016). A scoping review on the conduct and reporting of scoping reviews. *BMC Medical*

526 *Research Methodology* 16:15.

527 Tricco, AC, Lillie, E, Zarin, W, O'Brien, KK, Colquhoun, H, Levac, D, Moher, D, Peters, MD,

528 Horsley, T, Weeks, L, Hempel, S et al. PRISMA extension for scoping reviews (PRISMA-

529 ScR): checklist and explanation. Ann Intern Med. 2018,169(7):467-473. doi:10.7326/M18-

530 0850.

531 Whittemore, R. & Knafl, K. (2005) The integrative review: updated methodology. *Journal of*

532 *Advanced Nursing*, 52, 546-553.

533 Wong G, Greenhalgh T, Westhorp G, Buckingham J and Pawson R (2013) RAMESES

534 publication standards: Realist syntheses. BMC Medicine 11(21).

Table 1. Illustration of the PAGER framework (adapted from Bradbury-Jones et al., 2019).

Pattern	Advances	Gaps	Evidence for practice	Research recommendations
1. The relationship between child neglect and poor oral health	There is evidence of an associative relationship between child neglect and oral health	There is a need for ongoing empirical work exploring the relationship between different types of oral health problems and injuries and their relationship with child abuse and neglect	Whilst there is growing evidence that child neglect and poor oral health outcomes are linked, this relationship needs to be explored further.	To continue work developing and validating diagnostic criteria for clinical practice. To continue work investigating the social and environmental factors linked to poor oral health and child neglect
2. Dentists' responses to child neglect systems and procedures	There is a growing evidence base about practitioners' knowledge and education needs working with children and families where child neglect may be an issue	There is limited evidence about how dentists manage ethical dilemmas and conflicts when identifying and responding to child neglect -related concerns	Dentists may benefit from ongoing and bespoke training; there is also a need for clearer inter-professional reporting	To carry out qualitative research exploring dentists' views, needs and experiences identifying and responding to child neglect
3. Non-dentists' responses to oral neglect and injury	There is some evidence about how non-dentists draw on their existing skills to identify and respond to oral health issues	There is a paucity of research about non-dentists' ability to consistently identify and respond to the oral health needs of children affected by abuse and neglect	It is important that nurses, social workers and doctors understand that poor oral health and injury may indicate that a child is suffering abuse or neglect and that such children may have additional or complex oral health needs	To carry out more research exploring non-dentists' understanding of, and responses to, oral health and injury when working with children at risk of abuse or neglect
4. Children's treatment needs and experiences	There is evidence that abuse and neglected children may have complex or additional oral health treatment needs (in childhood and adulthood)	There is a paucity of qualitative or participatory research about children's needs and experiences engaging with dental treatment	It is important that dentists consider how experiences of abuse and trauma may affect the nature of care that children (and adults) require	To carry out participatory and qualitative research with children affected by abuse and neglect, exploring their views, experiences and needs in relation to dental treatment

Table 2. Key themes and patterning chart (Adapted from Waigwa et al., 2018).

Articles \themes	Sociodemographic Factors							Socioeconomic Factors				Nature of Intervention				
	Age	Ethnicity	Language	Gender	Marital status	Residential status	Religion	Education	Occupation/Role	Prevalence rate	location	Attendance	Media	Graphics/artistic	Campaigns	Counseling
Author and study details					×									×		
Author and study details							×	×					×			
Author and study details			×		×					×						
Author and study details		×		×								×	×			
Author and study details		×			×	×	×				×		×			
Author and study details		×		×	×							×	×		×	
Author and study details	×		×		×	×		×						×		×
Author and study details											×			×	×	

Table 3. Example PAGER framework.

Pattern	Advances	Gaps	Evidence for practice	Research recommendations
Individual factors	Understandings about cerebral palsy and accelerated ageing have improved	Physical aspects of cerebral palsy are researched more than psychosocial No studies on ageing with cerebral palsy exist in the UK	Evidence to emerge from future research	Research is needed that explores women's and girls' own knowledge of how adulthood impacts CP and how this may change self-perception
Organisational factors	There is a growing body of literature about the impacts of health professionals' knowledge and attitudes	Transitions in care (from paediatric to adult services) in under-researched Few studies investigate the issue of sexual and reproductive education There are few studies about training and communication for healthcare professionals	Evidence to emerge from future research	Far greater attention needs to be given to research regarding girls' education about sexual health Need more research into appropriate menstruation management for teenage girls with cerebral palsy Research is needed into the training of healthcare professionals regarding cerebral palsy in adulthood
Social factors		There is a paucity of research at this level in relation to women and girls with cerebral palsy	Evidence to emerge from future research	Studies are required that address the significant gap in literature regarding structural and cultural impacts on women and girls with cerebral palsy