Lessons Learned From Conducting a Rapid Review: A Case Study Examining Factors Associated With Flexible Sigmoidoscopy Screening Use

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Discipline

Public Health [D26]

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Contributor Biographies

Robert S. Kerrison is a research fellow at the Department of Behavioral Science and Health, University College London (UCL). He specializes in the development and evaluation of behavioral interventions for cancer screening. His research has led to the implementation of text message reminders for breast and cervical screening within London, as well as the implementation of self-referral reminders and locally tailored leaflets (also within London). More recently, he has focused on understanding and addressing reasons for non-attendance in bowel cancer screening, with a special focus on more socioeconomically deprived and ethnically diverse populations. His current research seeks to test the impact of locally tailored interventions in Hull.

Christian von Wagner is a reader in Behavioral Research of Early Diagnosis of Cancer at the Department of Behavioral Science and Health, UCL. He is currently working on research into the social and psychological determinants of uptake of the National Health Service Bowel Cancer Screening Program. His other research interests include patient experience of bowel cancer screening and diagnostic tests, and he is currently involved in monitoring patient experience of Bowel Scope Screening (BSS). His other research interests include patient decision making and preferences, health literacy, and cancer communication. He is co-principal investigator (with Dr. Lesley McGregor) on the Yorkshire Cancer Research (YCR)–funded study supporting this publication.

Alex Ghanouni is a research fellow at the Department of Behavioral Science and Health, UCL. His post-doctoral work has been funded by Cancer Research UK and has focused on informed decision-making in relation to cancer screening, particularly awareness and understanding of issues around over-diagnosis in breast cancer screening. Prior to this, his PhD research included studies on public preferences and patients' experiences in relation to various colorectal cancer screening tests, as well as research on reasons for non-attendance at bowel cancer screening follow-up tests in London.

Trish Green is a senior research fellow involved in several Department of Health–funded projects for the Policy Research Unit in Cancer Awareness, Screening and Early Diagnosis. She is also the main researcher on a study titled "Awareness of Cancer Symptoms," which is part of the Cancer Studies–Yorkshire series of projects funded by YCR. She is principal investigator for a study titled "Factors Influencing Smoking in Hull," funded by Hull Clinical Commissioning Group and Hull City Council, and co-investigator on an Economic and Social Research Council–funded research seminar series titled "On Encountering Corpses: Political, Socio-Economic and

Cultural Aspects of Contemporary Encounters With Dead Bodies," a collaboration of leading scholars from the universities of York, Durham, Bath, Manchester Metropolitan, and Central Lancashire. She recently secured University of Hull City of Culture Campus 2017 funding for two art projects.

Una Macleod became dean of Hull York Medical School on January 1, 2017. She joined the medical school in 2010 as professor of primary care medicine and had previously worked in Glasgow, where she trained in medicine and had been senior lecturer in general practice and primary care and a half-time general practitioner (GP) principal in the east end of the city. Her research interests revolve around primary care and cancer, and health inequalities. She is a national leader in the area of cancer and early diagnosis research, has contributed significantly to policy development, and holds or has held grants from Cancer Research UK, YCR, and the Department of Health Policy Research Unit program in this area. She continues to work clinically as a GP at Bransholme Health Center in Hull.

Mark Hughes is the clinical programme director for Humber and Yorkshire Coast Bowel Cancer Screening Centre. He is a registered nurse and qualified screening colonoscopist. He also holds a Diploma in Health Service Management.

Colin J. Rees is a professor of gastrointestinal endoscopy and chairs U.K. and European Endoscopy Research. His area of expertise is colonoscopy and he has particular interests in endoscopy quality, improving detection rates and optical diagnosis. Much of his research is undertaken in the English Bowel Cancer Screening Program and he has played a key role in the roll out, delivery, and evaluation of the English Fecal Occult Blood test and BSS programs. Colin founded and chairs the Northern Region Endoscopy Group—a network of 17 endoscopy units delivering endoscopy research and audit. Colin also has an interest in measuring and

improving patient experience of endoscopy and he chairs the bowel cancer screening program patient experience committee. He is lead author of U.K. colonoscopy standards and British Society of Gastroenterology and European Society of Gastrointestinal Endoscopy position statements on patient experience of gastrointestinal endoscopy.

Stephen Duffy is a statistician by training, educated at the University of Edinburgh and Imperial College London. He has worked in the United Kingdom, Singapore, France, Sweden, and Russia. For the last three decades, his research has been mainly in cancer epidemiology, prevention, and screening. He worked on the pioneering Swedish Two-County Trial of breast cancer screening, on which the United Kingdom's national breast screening program is based. Since then, he has taken a major role in a number of other trials of cancer screening, in breast, colorectal, and lung cancer. These include the U.K. Trial of Flexible Sigmoidoscopy, whose results changed national policy within weeks of publication, and the FH01 study of annual mammography in young women at enhanced familial risk of breast cancer, which contributed to the National Institute of Clinical Excellence guidelines on breast cancer risk management.

Lesley M. McGregor is a senior lecturer within the Faculty of Natural Sciences at University of Stirling, United Kingdom, and is a chartered health psychologist (Health and Care Professions Council registered). Lesley is also an associate fellow of The British Psychological Society. Lesley was a senior researcher within the UCL Department of Behavioral Science and Health from August 2016 to May 2019 but originally joined the team at UCL in 2011 soon after completing her PhD on the psychological impact of living organ donation. At UCL, Lesley transferred her skills, knowledge, and interest in health communication and decision making to the area of colorectal cancer screening. Lesley's research initially focused on developing strategies, including a narrative-based leaflet, to increase uptake of the guaiac Fecal Occult

Blood Test within the English Bowel Cancer Screening Program. More recently, Lesley's focus has moved to BSS (or flexible sigmoidoscopy), which was introduced to the English program in 2013. She has previously worked on studies to assess the psychosocial and sociocognitive predictors of BSS uptake and is currently co-principal investigator (with Dr. Christian von Wagner) on the YCR-funded study supporting this publication.

Published Articles

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Abstract

Rapid reviews enable researchers to obtain a snapshot of what is known about a topic in a quick and systematic way, and are increasingly becoming an important aspect of the research literature. Despite this, there are currently no formal guidelines as to how best to conduct a rapid review. One method is to begin with a narrow search, and to expand the search successively, until the number of new/additional publications considered potentially eligible, based on title and abstract alone, is less than 1% of the total number of publications found overall (at this point, one can be reasonably confident that expanding the search is unlikely to yield any considerable new information). One of the main advantages of this method is that it provides a rationale for terminating the search at a given point, thereby making it less time-consuming than many other methods, which require the reviewer(s) to screen all articles found in response to a comprehensive list of search terms. In this case study, we describe our experience using the aforementioned method to review the literature investigating factors associated with flexible sigmoidoscopy ("bowel scope") screening use, and the lessons learned from it. We also describe the problems encountered in performing our review, and the steps implemented to overcome

them. Finally, we provide suggestions for methodological improvements for the benefit of those considering conducting a rapid review in the future.

Learning Outcomes

By the end of this case, students should be able to

- Describe the differences between systematic and rapid reviews
- Describe the strengths and limitations of systematic and rapid review methods
- Perform a rapid review using a "stepped" approach

Case Study

Project Overview and Context

The authors are a group of researchers based at University College London, the University of Stirling, Hull York Medical School, Newcastle University, and Queen Mary University London, who are all interested in increasing participation in "bowel scope" screening (BSS). BSS is a screening test offered in England in which a thin, flexible tube with a tiny camera at the end (called an "endoscope") is used to examine the lower part of the large bowel (i.e., the rectum and sigmoid colon) for pre-cancerous lesions. By examining this part of the bowel, BSS aims to find pre-cancerous growths that can be removed before they become cancerous, and thereby prevent bowel cancer and bowel cancer–related deaths (Elmunzer et al., 2012).

As with many cancers, health inequalities in bowel cancer survival exist in England, with individuals living in more deprived areas being more likely to develop and die from bowel cancer than individuals who live in less deprived areas (Coleman et al., 2004). Linked to this is the problem that individuals who live in more deprived areas are less likely to attend bowel

cancer screening, where the chances of prevention or early detection of cancer can be enhanced (Hirst, Stoffel, Baio, McGregor, & von Wagner, 2018; McGregor et al., 2016). By focusing on increasing BSS participation in the most deprived areas, researchers hope to reduce inequalities in bowel cancer survival.

One area in England where bowel cancer survival and participation in bowel cancer screening are particularly low is Hull (Yorkshire Cancer Research, 2015). Hull is a small city located in the Northeast of England. It is a socioeconomically deprived area in which residents have below-average life expectancy (Yorkshire Cancer Research, 2015). To address the issue of low bowel cancer screening attendance and survival in this region, we sought funding from Yorkshire Cancer Research (registered charity: 516898), a local cancer research charity that specifically funds research to save lives from cancer in Yorkshire (Yorkshire Cancer Research, 2018). They awarded us a research grant to support our ideas to develop and evaluate interventions that could be implemented by primary care (i.e., general practices). The funding awarded was for 2.5 years, and commenced in April 2017 (ref: UCL407).

We divided our research into three stages: Stage 1 focused on the development of the interventions, while Stage 2 focused on the delivery of the interventions, and Stage 3 focused on the evaluation of the interventions (this included a randomized controlled trial, testing their impact on BSS uptake, as well as interviews and questionnaires with staff and patients who delivered and received the interventions). As the development of the interventions (Stage 1) was integral to the delivery and evaluation of the interventions (Stages 2 and 3), we imposed a fixed timeline to this stage, and developed a comprehensive development plan to combine existing research with local co-design strategies (the protocol for our study is described in full here: McGregor et al., 2018).

As researchers in the topic of BSS, we were already aware of many of the barriers to uptake. To ensure a breadth of factors were considered, however, we agreed it would be valuable to commence our research with a review of the extant literature. In the first instance, we considered performing a systematic review. Systematic reviews are the most common type of review (Higgins & Green, 2011), they follow a highly rigorous design, to ensure all of the relevant literature is captured, including not only articles published in peer-reviewed journals, but "gray literature" as well (examples of gray literature include outputs such as theses and dissertations, government reports, and conference abstracts; Higgins & Green, 2011). Of course, searching through all of the literature can take a very long time. Indeed, in a 2011 report of systematic review methods, Higgins and Green reported that, on average, systematic reviews take between 1 and 2 years to perform, and, what's more, need updating once every 2 years (Higgins & Green, 2011).

When results are needed in a shorter timeframe, one potential solution is to perform what is known as a "rapid review" (Tricco et al., 2015). Rapid reviews are essentially systematic reviews that omit certain steps of the systematic review process to expedite the procedure (Featherstone et al., 2015). While becoming increasingly popular, this type of review is less commonly used than the systematic review method, because it offers a less rigorous design (e.g., by limiting the search to peer-reviewed publications), and, therefore, is not always appropriate (e.g., when exploring a topic such as the safety or efficacy of an experimental drug, for which much of the data can only be found in the gray literature; Jefferson et al., 2014). Nonetheless rapid reviews have their place in research. They enable key data to be synthesized more quickly, which is particularly valuable when an answer is required in a short period of time, or the same level of rigor is not required (reviewing of evidence will have to be more rigorous for some

questions than others, depending on the level of evidence required; for example, one would require lesser evidence for plain packaging of cigarettes, or increasing the price of alcohol, than for a new chemotherapeutic agent for colon cancer).

To date, reviews exploring the association between bowel cancer screening participation and various patient-related factors have predominantly used the systematic review method, and have focused on factors associated with groups of screening tests, rather than individual screening tests. Examples of such reviews include Wools and colleagues' (2015) review of factors associated with lower endoscopy screening use, and Beydoun and Beydoun's (2008) review of factors associated with the use of any colorectal cancer screening test (including, but not limited to, lower endoscopy screening tests and home-based stool tests; Beydoun & Beydoun, 2008). Although such reviews have provided insights in terms of identifying factors associated with acceptance of groups of bowel cancer screening tests, none have focused on BSS specifically. Given that the authors were interested in BSS, and were working within a tight deadline to prepare interventions ahead of a randomized control trial (RCT), they challenged themselves to produce a rapid review to identify the factors frequently associated with flexible sigmoidoscopy screening use.

Section Summary

- BSS has the potential to save lives from bowel cancer and reduce inequalities in survival.
- At present, there is no summary of the literature describing which factors are frequently associated with BSS participation specifically.
- A review of the literature is needed to pool findings from a wide range of studies, and inform how best to develop interventions which are likely to be effective.

- As the authors were working within a tight deadline to prepare interventions ahead of an RCT, they challenged themselves to produce a rapid review to identify the factors frequently associated with BSS use.

Research Design

Our first task was to select a rapid review method from the plethora described in the extant literature (Tricco et al., 2015). We started by reading Tricco and colleagues' (2015) review of rapid reviews, in which the authors described 50 unique methods for conducting a rapid review (rapid review methods were coded using a framework which assessed whether rapid review methods were employing a "systematic," "streamlined," or "partially streamlined" method in relation to the following criteria: "data synthesis," "quality appraisal," "data abstraction," "screening full-texts," "screening titles and abstracts," "applying limits to dates," "applying limits to language," "protocol published," and "duration of the review"). Our main concern after reading Tricco and colleagues' article was that all of the methods described required reviewers to screen a large number of articles found in response to a comprehensive list of search terms (words that are entered into a search engine to specify a particular thing to be searched for), which we knew would take a very long time to do. We then searched the literature for rapid reviews conducted since Tricco and colleagues' review was published. Only one method did not require reviewers to use a comprehensive list of search terms, this was Duffy, Myles, Maroni, and Mohammad's (2017) article on the use of interventions to improve participation in cancer screening. In their review, Duffy and colleagues initially used a small number of search terms to identify potentially eligible papers and reviewed each of the titles and abstracts to assess suitability in relation to their research question. The next and subsequent steps were to gradually expand their search with additional search terms and to review any new

potentially eligible papers found. Once the number of new publications eligible on title and abstract review was less than 1% of the total number of publications identified overall, they stopped their search, on the basis that stopping the expansion at this point was unlikely to lead to a major loss of information.

Having identified a candidate rapid review method, our next step was to review the method in detail. Briefly, Duffy and colleagues' method can be described in 11 steps: Step 1: Define the research question; Step 2: Identify the principal components of the research question (these form the basis for the search strategy); Step 3: Identify analogous search terms (i.e., synonyms of the principal components); Step 4: Select publication database(s) for searching; Step 5: Define eligibility criteria of studies; Step 6: Conduct the initial search; Step 7: Conduct successive searches; Step 8: Perform full paper review; Step 9: Search the reference lists of selected papers for additional potentially eligible papers; Step 10: Extract data; and Step 11: Analyze results.

In reviewing Duffy and colleagues' method (2017), we identified several areas that required further clarification, in order for us to understand in more detail their rapid review process. We contacted the lead author and presented to him the following questions:

Q1: How were search terms for the initial search selected?

Q2: How were the combination and order of search terms determined?

Q3: Were search terms restricted to titles only, titles and abstracts, or the full text?

Q4: How many reviewers screened titles and abstracts?

Q5: How were disagreements between reviewers resolved?

Armed with responses and advice from Stephen Duffy (as well as adopting him as a collaborator), we embarked upon our own rapid review. As with any literature review, our first

task for this rapid review was to define the research question (i.e., “What are the barriers and facilitators of BSS use?”) and to consider the principal components thereof (i.e., the key words comprising the research question). While these were decided by Duffy and colleagues (2017) arbitrarily, we decided to apply a more formulaic approach (Q1). We agreed that the question (i.e., “What are the barriers and facilitators associated with BSS use?”) contained four principal components: (1) “barriers and facilitators,” (2) “flexible sigmoidoscopy,” (3) “screening,” and (4) “use,” and that at least one search term for each of these should be included in the initial search. For successive searches, we agreed that one additional search term for each of the components should be added to ensure a breadth of new papers were returned (in the context of our review, the word “screening” was essential, and so no other alternatives for this component, such as “assessment,” were added to the search string.). The exact search terms used for the initial search can be found in the published manuscript (see Kerrison et al., 2019).

Having established what the search terms for the initial search should be, our next task was to consider how best to address the order and combination in which further search terms were added to successive searches (Q2). To do this, it was first necessary to identify candidate search terms. Relevant (but not comprehensive) literature known to the authors was therefore reviewed to identify terms analogous to those comprising the research question (e.g., “participation,” “attendance,” and “compliance” were alternatives identified for “use” in this context). Once we had agreed that the most common alternatives to each component had been identified, we had to next agree on the combination and order in which they were added to the search string. Several options were considered, including (1) selecting search terms arbitrarily (as Duffy and colleagues did in their review; Duffy et al., 2017), (2) basing the combination and order on the frequency in which search terms appeared in the scoping review (e.g., adding those

that appeared most frequently first), and (3) basing the combination and order on the number of publications identified at each stage. After discussion, it was decided that the combination and order in which search terms were added should be based on the number of results obtained at each stage. In practice, this meant that we would have to run multiple searches to decide which combination and order search terms should be added to the search string. While this would inevitably mean our review would take longer to perform, it also meant that we could be reasonably confident that the expansion would not be stopped prematurely (i.e., that a yield of <1% was not achieved because a small number of papers was produced by the search). To obtain a sizable number of new papers at each stage, we decided to include one new search term analogous with each of the principal components at each stage. The exact order and combination in which search terms were added to successive searches can be found in the published manuscript (see Kerrison et al., 2019).

A brief note regarding truncation (truncation is a technique that broadens the search to include various word endings): we elected not to use truncation in our review, as broadening terms can produce an excessive number of irrelevant variants (PubMed, for example, will produce up to 600 for a single word), especially if the root of the word is short or common (Ecker & Skelly, 2010). In addition, not only can truncation produce a large number of irrelevant variants, but it may also result in the search being incomplete, and important variants may be missed (only the first 600 variants will be included). For example, searching for "therap" would not include "therapy," as it falls outside the first 600 variants (University of Tasmania, 2016). To ensure the most important variants of search terms were included in the search string (e.g., "utilisation" and "utlization"), we added them manually.

After agreeing the combination and order in which search terms were to be added to the searches, our next task was to agree whether search terms should be restricted to titles and abstracts, or extended to the full text (Q3). Considerably more, but less relevant, articles are identified when search terms are extended to the full text (papers which do not list search terms in the title or abstract, but do list them in the manuscript, are less likely to be relevant than those which include the search terms in the title or abstract, specifically). To keep the process as "rapid" as possible, and therefore minimize the proportion of irrelevant papers that need to be reviewed, we subsequently agreed to follow Duffy and colleagues' process and restricted search terms to titles and abstracts only.

The final items to discuss were "whether more than one reviewer was required to review papers" (Q4) and, if so, "how should disagreements between reviewers be resolved?" (Q5). In their review, Duffy and colleagues (2017) used a single reviewer, on the basis that they lacked the resources for a second reviewer. Given that we were in a position to strengthen the method by including a second reviewer, and had the resources to do so, we decided to have a second reviewer assess all papers for eligibility. By doing so, we minimized the risk of excluding relevant papers and any inherent bias in the selection process. As each person considered their reviews concurrently, this addition did not add to the timeline of the review. In preparation for potential disagreements regarding the paper acceptance, the plan was for resolutions to come from discussions between reviewers, with a third reviewer identified to make a final decision where necessary.

Section Summary

- We identified, reviewed, and modified a recently published rapid review method and developed our own rapid review process.

- Modifications to the method included steps to reduce potential bias and optimize results.

Research Practicalities

In conducting our review, we encountered several practical issues that had to be navigated. One of the first problems we encountered was with regard to the inclusion/exclusion of potentially eligible papers. For example, whether our review should be restricted to studies conducted within organized screening programs (such as those offered in England), or include those conducted within opportunistic screening programs (such as those offered in the United States). We also struggled with how best to present the data extracted from selected studies (data were extracted for several variables, including "study setting," "study design," and "sample size"). For example, whether the data extracted from studies conducted within organized screening programs should be combined with data extracted from studies conducted within opportunistic screening programs. To ensure that a breadth of potentially relevant factors were included in our review, we ultimately decided to include studies from both contexts (i.e., organized and opportunistic screening programs), and to report these collectively in the main article, and separately in the appendix (thereby making it possible for others to identify factors relevant to a particular setting).

Another issue we encountered was that it took much longer than we had initially anticipated (i.e., 6 months rather than 3). As with the systematic review method, we were required to screen hundreds of titles and abstracts, and extract data from many full-text articles. Perhaps the most time-consuming aspect of the entire review, however, was the process of manually entering the many different combinations of search terms to see which gave the largest number of papers for review at each stage (a step unique to our rapid review method). Although

this was a time-consuming step to perform, it was ultimately deemed to be time-saving (i.e., it prevented us from having to review the title, abstract, and full paper of the many additional and irrelevant articles that would have been produced in response to the full range of search terms had we included them). Access to a computer program which automates this process would streamline our method considerably (another related method might be to have an artificial intelligence (AI) tool sort identified papers in a very comprehensive search by relevance, and then have a human being start at the beginning and stop when 50 or 100 papers were classed as irrelevant on "human" review). Several computerized systematic review tools already exist. Cochrane has a systematic review program called "COVIDENCE," which helps reviewers manage all papers found and to be reviewed by multiple reviewers (Macdonald, Misener, Weeks, & Helwig, 2016). Although this program and others (such as "PubVenn"; Sperr, 2015) do not currently contain a search strategy component, this is something they could conceivably include in the future, potentially with the option for a "stepped" element that helps identify the optimal order and combination for entering search terms. It is our hope that such a program will be developed for those wanting to employ this type of rapid review methodology.

Section Summary

- Despite careful planning, several practical issues arose and needed to be navigated during our review.
- The authors of this article recommend readers set aside up to 6 months to conduct their review, to allow time for any issues that arise.

Method in Action

Thus far, we have described why we set out to perform a rapid review, how we went about planning our review, and what some of the practical issues we encountered were. In this

section, we provide a step-by-step manual for our rapid review method, and some additional information on the challenges we faced at each step.

Step-by-Step Guide

Step 1: Define the research question. As with any review, the first step is to define the research question as clearly as possible. For this step in the review, we recommend using "PICO," a mnemonic device designed to help researchers frame and answer health care–related questions (Elkins, 2010). PICO stands for "Patient, Problem, or Population" (P); "Intervention" (I); "Comparison, Control, or Comparator" (C); and "Outcomes" (O).

Step 2: Identify principal components. The next step is to identify the key words or "principal components" forming the research question. These will be used as search terms in the initial search (Step 6) and to identify analogous search terms (Step 3), which will be used in subsequent searches (Step 7). If is used PICO in the previous step, it may not be necessary to complete this step. As PICO cannot be applied to every research question, however, it may still be necessary for you to identify the key words comprising your research question.

Step 3: Identify analogous search terms. The next step is to identify analogous search terms (as with systematic reviews, this should be as comprehensive a list as possible). To do this, we recommend referring to existing reviews in similar areas, to see which search terms they have used.

Step 4: Select publication databases. Depending on the topic of the review, some publication databases will be more relevant than others. For example, reviews relating to medical sciences will benefit more from searching databases such as MEDLINE, which contains literature from a range of medical science disciplines (e.g., gastroenterology, dermatology, herpetology, etc.), than say, PsycINFO, which has a special focus on psychology. We personally

chose to use PubMed. PubMed is considered the best place to commence a literature search (Ecker & Skelly, 2010). It provides a free-to-use search engine, which enables users to search for indexed peer-reviewed literature.

Step 5: Define eligibility criteria. Decisions need to be made regarding which studies should, or should not, be eligible for inclusion in the review. For example, whether the review will include both quantitative and qualitative research articles, or only one or the other (this will depend largely on the research question at hand). Some considerations for eligibility include written language, year of publication, and study design. For our review, we decided to limit the search to quantitative articles (only quantitative studies test associations between factors and BSS use—qualitative research studies in this area would typically identify factors that may be important, and for which associations can be examined in future quantitative research). As no previous review in this area had been performed, we decided there was no need to impose a date restriction. For the sake of rapidity, we limited the search to articles written in English.

Step 6: Conduct initial search. Now that the search terms and relevant study database(s) have been identified, and the eligibility criteria for studies defined, the next step is to conduct the initial search. Search terms should be entered into at least one database (care should be taken to ensure that different spellings for individual words and for singular and plural variants, etc. are accounted for [e.g., "utilisation" vs. "utilization"], some databases will allow you to use "wildcards" to do this [e.g., in Ovid, "wom#n," finds "woman" and "women"]; Ecker & Skelly, 2010), and connected using the Boolean operators "AND" and "OR," as appropriate. Potentially eligible papers should be screened in the first instance based on their title and, if eligible after title review, their abstract. We recommend extracting the results of the search (i.e., the reference for each paper found) into reference management software, such as endnote, to facilitate this

process; it may also be useful to keep a spreadsheet explaining your decisions for excluding papers—these can be particularly useful if there are any disagreements between reviewers as to whether or not a study should be included for full paper review (Step 9). We recommend that two researchers screen titles and abstracts (with researchers erring on the side of caution when excluding papers on title review, as not all titles adhere to reporting guidelines, such as those described by CONSORT; Schulz, Altman, & Moher, 2010), and that the researchers assess inter-rater agreement (using Cohen's kappa—a statistical test which takes into account the possibility of agreement happening by chance; Cohen, 1960) before proceeding with full paper review (this will prevent reviewers from having to review irrelevant full-text articles). If the inter-rater agreement is low (i.e., Cohen's kappa <.7), it is advisable for the researchers to reaffirm the purpose of the review, and re-screen titles and abstracts, until inter-rater agreement (i.e., Cohen's kappa) is $\geq$.7 (Cohen, 1960).

Step 7: Conduct successive searches. After conducting the initial search (screening articles by title and abstract), the next step is to conduct successive searches. We recommend basing the combination and order in which search terms are added to successive searches on the combination and order giving the highest number of new publications at each stage. To ensure a large number of papers are obtained at each stage, we recommend including one new search term for each "principal component" at each stage (see Table 1 for a worked example). Depending on the number of analogous terms, and the number of principal components, this process will take longer for some reviews than others. As mentioned previously, we found this to be one of the most time-consuming aspects of the review. To assist researchers with the process, we provide a template (Table 2). The process of conducting successive searches should be continued until the number of new publications eligible on title review is <1% of the total retrieved overall (the

authors agreed that a threshold of 1% was an acceptable for the purposes of their review; reviewers who want to be more rigorous in their approach could reduce the threshold even further, for example, reduce the threshold to $\leq$0.5 or $\leq$0.2%).

Table 1.

Caption: Worked example of successively broadening the search terms until newly identified papers potentially eligible on abstract review was less than 1% of the total papers found by the search.

PubMed Search[a]	**Number of publications**	**Number of publications selected on title review**	**New publications potentially eligible after abstract review**	**Percentage of new publications potentially eligible**
"(Flexible Sigmoidoscopy OR Sigmoidoscopy) AND Screening AND (Participation OR Attendance) AND (Barriers OR Facilitators)"	*n* = 28	*n* = 14	*n* = 8	29%

"(Flexible Sigmoidoscopy OR Sigmoidoscopy OR **Bowel Scope**) AND Screening AND (Participation OR Attendance OR **Compliance**) AND (Barriers OR Facilitators OR **Factors**)"	*n* = 74	*n* = 43	*n* = 10	14%
"(Flexible Sigmoidoscopy OR Sigmoidoscopy OR **Bowel Scope** OR **Endoscopy**) AND Screening AND	*n* = 159	*n* = 78	*n* = 7	4%

(Participation OR Attendance OR **Compliance** OR **Adherence**) AND (Barriers OR Facilitators OR **Factors** OR **Predictors**)"				
"(Flexible Sigmoidoscopy OR Sigmoidoscopy OR **Bowel Scope** OR **Endoscopy** OR **Endoscopic**) AND Screening AND (Participation OR Attendance OR **Compliance** OR **Adherence** OR **Utilization**)	*n* = 218	*n* = 104	*n* = 1	<1%

AND (Barriers OR Facilitators OR **Factors** OR **Predictors** OR **Determinants**)"				

[a]Search terms were limited to titles and abstracts.

Table 2.

Caption: Tool for successively broadening the search terms until newly identified papers potentially eligible on abstract review are less than 1% of the total papers found by the search.

PubMed Search[a]	**Number of publications**	**Number of publications selected on title review**	**New publications potentially eligible after abstract review**	**Percentage of new publications potentially eligible**
	n = ??	*n* = ??	*n* = ??	*n* = ??
	n = ??	*n* = ??	*n* = ??	*n* = ??
	n = ??	*n* = ??	*n* = ??	*n* = ??
	n = ??	*n* = ??	*n* = ??	*n* = ??

[a]Search terms limited to titles and abstracts.

Step 8: Full paper review. After title and abstract review, the next step is to review the full paper of selected articles. This is a quality control procedure, implemented to ensure that selected articles are suitable for inclusion in the review.

Step 9: Reference list searches. After full paper review, we recommend searching the reference lists of included papers, to see whether there are any additional papers that might be

eligible, but did not appear in the database searches (this step can be skipped for the sake of rapidity; although, it proved to be very important for our review—see "Practical Lessons Learned" for further information). These papers, in turn, should undergo abstract review and (if eligible) full paper review. Depending on resources, we recommend the same processes be applied to the reference list searches as the database searches, with two reviewers assessing the title, abstract, and full paper of any potentially eligible new papers.

Step 10: Collect data. Once all papers for inclusion in the review have been identified, the next step is to extract the relevant data (the selection of data to be extracted should be agreed in advance and driven by the research question). In the majority of cases, we would advocate collecting and reporting the following contextual data as a bare minimum: (1) first author, (2) year of publication, (3) study setting, (4) study design, (5) sample size, (6) outcome (for quantitative studies, this would be the "dependent variable"), (7) analysis, (8) factors examined (for quantitative studies, this would be the "independent variable(s)"), and (9) results.

Step 11: Analyze data. The final step is to use descriptive statistics to report summary data for the characteristics of studies included in the review. To assist researchers with the process, we provide a template (Table 3; for a worked example, see Table 4). We do not advocate using meta-analysis in the context of rapid reviews, or any type of review other than a systematic review, as missing studies may skew the results, leading to erroneous conclusions. We encourage students to speak with their designated systematic review librarian before embarking on their review.

Table 3.

Caption: Tool for summarizing the characteristics of articles included in the review.

Design feature	**Number of studies (%)**	**References**

Country		
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
Study design		
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
Context		
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
Sample size		
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
Outcome		
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]

Analysis		
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
Gender of participants		
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]
??	*n* (XX%)	[??]

Table 4.

Caption: Summary of characteristics of articles included in a review—worked example.

Design feature	**Number of studies (%)**	**References**
Country		
The United States	21 (50%)	[6, 11, 25–30, 36, 40, 43, 44, 48–52, 54, 57, 58, 60]
The United Kingdom	13 (31.0%)	[7–10, 33–35, 37–39, 42, 53, 59]
The Netherlands	3 (7.0%)	[32, 45, 46]
Italy	2 (4.8%)	[41, 47]
Germany	1 (2.4%)	[55]
Sweden	1 (2.4%)	[31]
Norway	1 (2.4%)	[56]

Program delivery		
Opportunistic screening	22 (52.4%)	[6, 11, 25–30, 36, 40, 43, 44, 48–52, 54, 55, 57, 58, 60]
Organized screening	20 (47.6%)	[7–10, 31–35, 37–39, 41, 42, 45–47, 53, 56, 59]
Study design		
Cross-sectional	30 (71.4%)	[6, 11, 25–27, 29, 30, 32–36, 38–45, 47, 49–52, 54, 57–60]
Prospective	11 (26.2%)	[7–10, 28, 31, 37, 46, 48, 53, 55]
Prospective and retrospective	1 (2.4%)	[56]
Context		
Real-world context	22 (52.4%)	[6, 11, 25–30, 33, 36, 40, 43, 44, 48–52, 54, 57, 58, 60]
Pilot program	6 (14.3%)	[31, 34, 38, 39, 46, 55]
RCT	14 (33.3%)	[7–10, 32, 35, 37, 41, 42, 45, 47, 53, 56, 59]
Sample size		
Less than 100	1 (2.4%)	[29]
100–299	9 (21.4%)	[6, 28, 30, 40, 44, 46, 48, 50, 58]
300–999	8 (19.1%)	[10, 11, 26, 36, 39, 45, 47, 55]
1,000–4,999	14 (33.3%)	[7, 8, 31, 32, 34, 35, 38, 43, 49, 52–54, 59, 60]

5,000–50,000	7 (16.7%)	[9, 27, 33, 37, 41, 51, 56]
More than 50,000	3 (7.1%)	[25, 42, 57]
Outcome		
Attendance/non-attendance at once-only FS	22 (52.4%)	[7–10, 31, 32–35, 37–39, 41, 42, 45–48, 53, 55, 56, 59]
Ever had FS	6 (14.2%)	[6, 36, 40, 43, 44, 52]
Up to date with FS	13 (31.0%)	[11, 25–30, 49–51, 54, 57, 58]
Ever had FS and up to date with FS	1 (2.4%)	[60]
Analysis		
Univariable analysis	11 (26.2%)	[10, 25, 30, 35, 38, 42, 43, 48, 51, 55, 58]
Multivariable regression	29 (69.0%)	[6, 8, 9, 11, 26–29, 31–34, 36, 37, 39–41, 44–47, 49, 50, 53, 54, 56, 57, 59, 60]
Discriminant analysis	1 (2.4%)	[7]
Analysis of covariance	1 (2.4%)	[52]
Gender of participants		
Both	39 (92.9%)	[7–11, 25–48, 51–60]
Females only	3 (71.1%)	[6, 49, 50]
Males only	0 (–)	–

FS: flexible sigmoidoscopy.

Section Summary

- Our rapid review method consists of 11 steps. Steps 1 to 5 concern the planning of the review, while Steps 6 to 11 concern the execution.
- Researchers' employing this particular rapid review method will need to make several decisions, including which database(s) to use, whether or not any restrictions should be applied, and which data to collect.

Practical Lessons Learned

Performing a rapid review was a new experience for the majority of the authors. As such, many practical lessons were learned along the way. For example, we quickly learned that even a rapid review can take a long time to perform (approximately 6 months from start to finish, with one full-time member of staff working on it 50% of the time). Indeed, despite careful planning, it quickly became apparent that our review would take much longer than anticipated. This was largely because a number of issues arose at each step of the process, causing delays. For example, when it came to doing the reference list searches, we had to review a much larger number of papers than we would have expected, as our search strategy had missed many containing "colorectal cancer," but not "flexible sigmoidoscopy" (or variants thereof) in their title. To those looking to employ this review method in the future, we would strongly advise factoring in some time to address any unanticipated delays which might occur. Of course, the exact duration one might expect a review to take to perform will be highly variable and depend on a number of factors, such as how much time each week the reviewer(s) can commit to the review, the topic under investigation, and the number of papers eligible for review. If, based on these factors, one anticipates their review will take 3 months to perform, we would strongly advise factoring in an additional 3 months to the timeline, just to be safe.

Another important practical lesson we learned from conducting this review was that the search terms we selected were too narrow. We deliberately avoided the search term "colorectal cancer," as we knew that this would quadruple the number of irrelevant titles, abstracts, and full-text articles we would need to screen (there are many colorectal cancer screening tests other than flexible sigmoidoscopy, such as colonoscopy, and the fecal immunochemical test, and articles on these specific texts would have been returned had we used the term "colorectal cancer"). While excluding this search term from our review may have had the desired effect in terms of reducing the number of irrelevant papers identified at the review stage, it also transpired that a large number of papers were also missed when conducting the database searches, as we discovered when searching the references lists of selected papers. Indeed, we found nearly half (i.e., 20 of 42; 48%) of all papers included in our review after reading the references lists of selected papers. Almost all of these papers featured the word "colorectal cancer" in the title or abstract. The reason for this was usually because authors discussed factors associated with colorectal cancer screening tests generally in the abstract, and it was not until the results section of the main article that associations within individual screening tests were discussed. Another issue was that factors associated with flexible sigmoidoscopy screening were not always the primary outcome of the study, and were secondary analyses. For this reason, many articles did not necessarily feature "flexible sigmoidoscopy" (or analogous terms thereof), in the title or abstract. This problem is likely to repeat itself in other colorectal cancer contexts (e.g., diagnostics and surveillance).

It is important to note that we did not assess the quality of papers. This was a deliberate decision on the part of the authors, one intended to expedite the rapid review process. As a consequence of our decision, however, we were not able to comment on the quality of studies, and equal weight was given to all studies included in the review, irrespective of their sample size

and study design (we did, however, provide details on these aspects within the main text, so that readers could develop a general impression for the quality of individual studies). This is a major limitation of our method, and those wanting to employ a more rigorous approach, might want to consider including an additional step to assess the quality of articles.

One final point to make is that there is currently no way to register rapid reviews, as there is systematic reviews. This can be problematic in terms of duplicating research. For example, it is possible that two reviews on similar topics take place concurrently, as only one is required to be registered. We recommend reviewers check PROSPERO before initiating their review, to minimize any issues that might arise in this area (Booth et al., 2012).

Section Summary

- Balancing the line between being "rigorous" and being "rapid" can be extremely challenging.
- Omitting certain steps from the systematic review process can have considerable implications on the results of the review, which need to be considered carefully ahead of time.

Conclusion

Performing a rapid review was a new and exciting experience for many of the authors, one in which many lessons were learned along the way. We soon learned, for example, that even a rapid review can take a long time to perform, and that issues can arise at every step of the process. Indeed, despite careful planning, we found that our review took nearly twice as long to perform as we had initially anticipated (i.e., 6 months, rather than 3). Our review still took considerably less time to perform than a systematic review of the literature (these typically take 1–2 years to perform), however, and were we to do it again, we'd still employ a rapid review

method. As to whether we would use the exact same method, it is difficult to say. While it clearly has some advantages over other methods (e.g., provides a rationale for stopping the search at a given point), it also has several disadvantages. For example, the process of identifying the combination and order of search terms that should be added to the search string was very time-consuming. The more search terms involved, the longer this will take. It might be that this method works best for reviews that involve only a small number of key words and analogous search terms. Some advice we might offer to others seeking to use this method would be to plan for the review to take approximately 6 months to perform. We'd also advise reviewers' to think carefully about the purpose of the review and to consider the full range of rapid review methods available. Ours is one of a plethora available, but we believe it to be a particularly rigorous one. An aim of ours was to publish the findings in a peer-reviewed journal. Reviewers who simply want results in a shorter period of time, and are less concerned about rigor, may want to use an alternative approach.

Section Summary

- Our review took 6 months to perform and was highly rigorous compared with some rapid reviews.
- Individuals less interested in rigor and more interested in rapidity may want to consider a less systematic approach.

Classroom Discussion Questions

1. What are the major strengths and limitations of the method described in this case study?
2. How does the method described in this case study differ from a systematic review (any major omissions)?
3. How do you think the method described in this case study could be improved upon?

Multiple Choice Quiz Questions

What is the minimum recommended Cohen's kappa score for inter-rater agreement?

a. 0.5
b. 0.6
c. 0.7

Correct answer: c

Which of the following would *not* be a suitable topic for a rapid review?

a. A new chemotherapeutic agent for treating colon cancer
b. Plain packaging for cigarettes
c. Increasing the price of alcohol

Correct answer: a

Which of the following is a mnemonic device that can be used to help reviewers define their systematic or rapid review question?

a. PROSPRO
b. PICO
c. COVIDENCE

Correct answer: b

Declaration of Conflicting Interests

The Authors declare that there is no conflict of interest.

Further Reading

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Web Resources

1. https://blogs.bmj.com/ce/2016/03/24/the-rise-of-rapid-reviews/
2. https://utas.libguides.com/SystematicReviews/SearchStrategies
3. https://pubvenn.appspot.com/

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