Efficient searching for NICE public health guidelines: Would using fewer sources still find the evidence?

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Abstract
Systematic searches are integral to identifying the evidence that is used in National Institute for Health and Care Excellence (NICE) public health guidelines (PHGs). This study analyses the sources, including bibliographic databases and other techniques, required for PHGs. The aims were to analyse the sources used to identify the publications included in NICE PHGs; and to assess whether fewer sources could have been searched to retrieve these publications. Data showing how the included publications had been identified was collated using search summary tables. Three scenarios were created to test various combinations of sources to determine whether fewer sources could have been used. The sample included 29 evidence reviews, compiled using 13 searches, to support 10 PHG topics. Across the PHGs, 23 databases and six other techniques retrieved included publications. A mean reduction in total results of 6.5% could have been made if the minimum set of sources plus Cochrane Library, Embase, and MEDLINE were searched. On average, Cochrane Library, Embase, and MEDLINE contributed 76.8% of the included publications, with other databases adding 11% and other techniques 12.2%. None of the searches had a minimum set that was comprised entirely of databases. There was not a core set of sources for PHGs. A range of databases and techniques, covering a multi-disciplinary evidence base, was required to identify all included publications. It would be possible to reduce the number of sources searched and make some gains in productivity. It is important to create a tailored set of sources to do an efficient search.

Keywords
bibliographic database searching, citation searching, information retrieval, literature searching, public health guidance, website searching

Highlights
What is already known
• NICE public health guidelines (PHGs) are supported by systematic searches of the evidence but there are no instructions on which sources to use.
What is new

- Sources had, on the whole, been well chosen by NICE information specialists to make the searches efficient.
- NICE could have reduced the number of sources searched and made gains in productivity equivalent to about a day per PHG.
- The Cochrane Library, Embase, and MEDLINE are important but not sufficient sources to support PHGs.
- Tailored lists of additional databases and other techniques were required to find all the included publications for the PHGs.

Potential impact

- It is not possible to define a core list of sources and searches have to be planned carefully to cover a multi-disciplinary evidence base without retrieving an unmanageable volume of results.
- It is important to include topic-specific databases and other search techniques (such as reference checking, citation searching and website searching) to support PHGs efficiently.

1 | BACKGROUND

1.1 | NICE public health guidelines

Systematic searches for published studies and unpublished data are an integral part of the process for developing recommendations in evidence-based guidelines. The National Institute for Health and Care Excellence (NICE) produces guidelines in England on promoting healthy living and preventing ill health. NICE public health guidelines (PHGs) cover a wide range of topics on health improvement, health protection, and improving services. These public health recommendations are based on the best available evidence identified and analysed through the rigorous and transparent methods set out in the NICE methods manual.¹ The manual states that searches should include a range of bibliographic databases, websites and other sources depending on the subject of the review question and the type of evidence sought.¹ (sec5.3) This study examines the mix of sources required to identify the evidence for PHGs.

The NICE manual lists potentially useful sources but it does not provide instructions on when to use them. The manual allows information specialists, in consultation with review teams, to tailor the sources when writing the search protocol. The manual observes that, although there has to be ‘adequate coverage of the relevant literature’, sources should only be searched if they are ‘likely to yield relevant results’.¹ (sec5.3) There are significant costs to NICE of searching a wide range of sources, including the costs of database access and administration. The more sources searched, the more staff time required to plan and run searches, download the results and remove the duplicates. There would also be an increase in the resources required to screen the results, such as the time spent resolving disagreements and the cost of ordering more full-text papers.² It is important to select the most efficient set of sources possible.

NICE has previously analysed the sources required to find the evidence for PHGs on obesity, spatial planning, and tuberculosis.³ This pilot study suggested that it was important to search a range of sources tailored to the review question, in order to cover a multi-disciplinary evidence base.³ The pilot was unable to progress to a full study, as the data required had not been collected at the time and it could not be generated retrospectively. NICE started to retain search data from that point and the current paper analyses these records.

1.2 | Searching for public health evidence

Public health is defined by the Faculty of Public Health (FPH) in the UK as ‘promoting and protecting health and well-being, preventing ill health and prolonging life through the organised efforts of society’.⁴ Reviews of public health interventions, in comparison to clinical questions, can require a ‘broader more epistemologically and methodologically diverse evidence base’, as they are concerned with populations or communities, rather than individuals.⁵(p1059) This means that the search must contend with ‘multiple levels of analysis and operation’ to understand complex relationships between interventions and outcomes.⁵(p1059) A systematic review on a public health topic may need to configure the evidence into new
concepts, models or theories, rather than just aggregate the data from clinical trials. This, in turn, may entail an iterative search that is developed through an ongoing process, instead of being planned at the beginning. This approach requires the searcher to pick ‘pieces of information a bit at a time’ through a series of actions. The search results are retrieved and processed, the remaining gaps in the evidence are identified, and then the next steps are planned.

The NICE manual warns against retrieving an unmanageable volume of results, even though it requires adequate coverage of the best available evidence. This can be particularly challenging in public health topics that are difficult to define at the outset, require a range of terminology and must draw on multi-disciplinary sources. Similarly, authors of social, behavioural, and educational science reviews for the Campbell Collaboration are advised that searches must be ‘thorough and identify as many relevant studies as possible’ while being done ‘within resource limits’. The potential demand for resources is clear from the standards for conducting Cochrane reviews of health interventions, where it is mandatory to search the Central Register of Controlled Trials (CENTRAL), Embase, and MEDLINE, as well as trials registers and the reference lists of relevant studies and reviews. It is also highly desirable for Cochrane authors to search national, regional or subject-specific databases, contact relevant individuals or organisations, and undertake additional work to identify reports, dissertations and other grey literature.

The number of databases searched in systematic reviews increased between 1994 and 2014, which might be related to the need to search a range of sources. It has been estimated that PubMed, one of the largest biomedical databases, may only index about three quarters of the primary studies included in systematic reviews on preventing obesity. Limiting the number of sources has been found to affect the conclusions and certainty of the evidence in reviews, particularly in public health.

It is difficult to create a definitive list of sources, as the topic of the review and type of evidence required will inform decisions on where to search. It is important to search beyond databases, as other search techniques have been shown to increase the likelihood of finding more relevant studies. The NICE pilot study found that non-database techniques contributed between 5% and 42% of the included publications in the three reviews analysed. Citation searching was found to be an efficient method in a different NICE PHG that used minimal database searching. One study of a public health review found that the key search techniques included citation searching, website searching and contacting experts, as well as focused database strategies. Cochrane reviews have also successfully used website searching to find additional relevant studies. Other search techniques that might be useful include contacting study authors, handsearching and searching trial registers. The importance of these techniques suggests that they might be more helpful in public health or other configurative reviews, where the key concepts are uncertain and cannot be expressed in well-defined subject headings.

1.3 Modelling efficient searches

Booth recommended in 2010 that searchers should collect data on how often sources contribute to reviews. The NICE pilot study was an attempt to apply this to public health. More recently, a template has been developed to facilitate data collection through search summary tables.

There has been some work to understand whether searches could be made more efficient. A study of optimal sets in musculoskeletal diseases recommends combining three databases with two other techniques. An investigation into a range of health domains found that Embase, MEDLINE, Web of Science Core Collection and Google Scholar perform well, with specialised databases also required in some topics. Further work has been done to establish which database combinations have the highest likelihood of contributing to reviews on diabetes, while a core set of databases and reference checking has been recommended for reviews on dementia care. There has also been an attempt to define an optimal set for overviews of reviews.

A literature review by the authors of the current paper identified a lack of research into approaches to public health searching, suggesting that further work modelling different scenarios was needed. This study takes up the challenge and shows the contribution of the sources that were used and then provides scenarios modelling whether a more efficient selection could have been used in a sample of NICE PHGs.

2 AIMS AND OBJECTIVES

The aims were to:

• analyse the sources used to identify the publications included in NICE PHG Evidence Statements; and
• assess whether fewer sources could have been searched to retrieve these publications.

The objectives were to:

• identify the sources for each publication included in the Evidence Statements from a sample of PHG evidence reviews;
assess a range of scenarios modelling the effects of searching fewer sources;
• establish whether any sources could have been removed from the searches without missing any publications included in the PHGs; and
• consider the implications for source selection in future PHGs.

3 METHODS

3.1 Collecting data from the sample

The NICE methods manual, introduced in 2014 and updated several times since, covers NICE guidelines on clinical, public health and social care topics. This study uses the FPH definition of public health to be consistent with the NICE pilot study.

PHG recommendations are based on an evidence review that identifies, critically appraises and summarises the evidence answering the review question. The evidence reviews contain Evidence Statements, which tabulate the results of studies to show the strength and applicability of the aggregated evidence. An included publication is one cited in an Evidence Statement. Background, epidemiological or methodological references in an evidence review are not considered included publications. A study, such as a clinical trial, could be reported in several places but the unit of analysis in this study is the included publication, as no attempt was made to establish whether there were multiple reports of the same study in the Evidence Statements. Figure 1 sets out the definitions of NICE terminology used in this study.

The criteria for selecting the study sample were:

• NICE Guidelines meeting the FPH definition of public health; and
• Evidence reviews conducted by NICE information specialists since the methods manual was introduced in 2014; and
• Evidence reviews that had been completed and had a finalised list of included publications from the Evidence Statements.

The data on the sources used to identify each included publication in the sample was extracted using a search summary table, as previously described in a conference report. A source is any database or other resource (including websites, emails, directories, registries or pre-print servers) ‘searched or browsed as part of the search’.

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**NICE Public Health Guideline (PHG)**

NICE uses the best available evidence to develop recommendations that guide decisions on a wide range of public health topics. The guidelines help professionals to prevent ill health, promote and protect good health, improve the quality of services and provide health and care services.

**Evidence review**

A summary of the evidence that is available to answer a particular review question. The review explains how evidence was identified from the relevant literature and other sources. The review team critically appraises this evidence, distils it into evidence tables and write brief summaries of it in Evidence Statements. Reviews can also include economic analyses.

**Evidence Statement**

A brief summary of the key findings from the evidence review. They are usually in the form of a table summarising the results of studies. The tables show the strength and applicability of the evidence once it has been aggregated. Committees use the Evidence Statements when developing their recommendations.

**Included publication**

The publications cited in the Evidence Statements, including journal articles, books, chapters and reports. One included study, such as a randomised controlled trial, could be reported in several included publications.

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**FIGURE 1 Definitions of NICE terminology used in the study**
‘Search’ is the ‘overall term for the entire information retrieval process’ in an evidence review.\(^{39}\) (Glossary)

To complete the search summary table, the list of included publications, the sources used for the search and the full search results (including duplicates) were required. Once completed, the table was used to cross check each included publication against the sources searched. A unique included publication is one retrieved by a single source and no other sources used in that search.

A search summary table was completed for each evidence review in the sample. The included publications were listed in the final versions of the evidence reviews. The lists of sources were obtained from the review protocols and related search history documents. Any discrepancies between the review protocol and the methods reported in the evidence review were discussed with the information specialist who conducted the search. Files containing the full results from each source, including the duplicates, were saved in EndNote (v7.3). Each record had been tagged in EndNote at the time of the search with the name of its source. Additional information was collected from the contemporary search records, such as the results of website searches.

### 3.2 Modelling the scenarios

Three scenarios were created to test the most efficient sets of sources that could have been used to retrieve the included publications. Duplicates were removed from the included publications, where they had been cited in more than one evidence review for the same PHG, before creating the scenarios. ‘Efficient’ meant the fewest sources that could be combined to find the largest number of included publications.\(^{38}\)(p3)

The three scenarios present different ways in which some of the sources that were searched could be removed without any of the included publications being missed. The scenarios were based on the number of searches done for the PHGs in the sample, rather than the number of evidence reviews. The figures in Appendix A were used to calculate each scenario. All three scenarios were calculated using the total number of results from each source. Duplicates were not removed from the number of results used in these scenarios as the time and resources were not available. The scenarios are therefore estimates of the impact, as the number of results to be screened has not been calculated. The baseline comparison for the scenarios is the search that was originally completed for the PHG. Figure 2 illustrates how the scenarios were constructed.

Scenario 1 analyses the effect of excluding sources that did not retrieve any included publications. This is the simplest method of showing the effect of searching fewer sources without missing any of the included publications. The total number of results from each source that did not contribute any included publications was subtracted from the total number of results for that search.

Scenario 2 examines the effect of excluding all sources beyond the minimum set required to retrieve all the included publications. This shows the most efficient combination of sources that would not miss any included publications. The sources contributing unique included publications always form part of the minimum set. Each included publication only needs to be found once. Therefore, some sources could be removed if they only found included publications that had already been retrieved from another source. In order to identify which other sources to include in the minimum set, those retrieving the same included publication were reviewed and the one with the lowest number of results was chosen. Note that MEDLINE and MEDLINE-in-Process (MIP) were never separated in the scenarios as it was unlikely that one would be searched without the other in practice. The number of results in the minimum set in Scenario 2 was calculated by adding the number of results from:

- the sources contributing unique included publications.
- the source with the lowest volume, where an included publication had been retrieved by more than one source.

Scenario 3 tests the effect of always searching Cochrane Library, Embase and MEDLINE (CLEM) in PHGs to reflect current searching practice.\(^{1,10}\) This builds on a study assessing the cumulative contribution of CENTRAL, Embase, and MEDLINE,\(^{31}\) as these are the core databases specified for Cochrane reviews of interventions.\(^{10}(secC24)\) It was more appropriate to use the whole Cochrane Library, rather than CENTRAL, in this scenario, as PHGs are not just concerned with evidence from randomised controlled trials.\(^{1(sec4.4)}\) In addition, MIP was included in this analysis. Therefore, in Scenario 3, CLEM refers to searching:

- Cochrane Database of Systematic Reviews (CDSR).
- Cochrane CENTRAL.
- Cochrane Database of Abstracts of Reviews of Effectiveness (DARE).
- Cochrane Health Technology Assessment (HTA).
- Cochrane NHS Economic Evaluation Database (NHS EED).
- Embase.
- MEDLINE.
- MIP.
Scenario 3 assesses the effect of searching the minimum set required plus CLEM before excluding the other sources that were searched. In Scenario 3, the number of results in CLEM plus the minimum set required to find all included publications was calculated by adding the number of results from:

- The components of CLEM used in that search.
- All other sources that contributed unique included publications.
- The source with the lowest volume, where an included publication had been retrieved by more than one source, but not by one of the previous steps in this scenario.

### Baseline: sources searched for the NICE PHGs

| Source contributing a unique included publication | CLEM | Other databases | Other techniques |
|--------------------------------------------------|------|----------------|-----------------|
| Source with the lowest volume when an included publication was retrieved by more than one source | CLEM | Other databases | Other techniques |
| Other source retrieving an included publication that did not have the lowest volume | Source only retrieving excluded publications |

### Scenario 1: excluding sources that did not retrieve any included publications

| Source contributing a unique included publication | CLEM | Other databases | Other techniques |
|--------------------------------------------------|------|----------------|-----------------|
| Source with the lowest volume when an included publication was retrieved by more than one source | CLEM | Other databases | Other techniques |
| Other source retrieving an included publication that did not have the lowest volume | Source only retrieving excluded publications |

### Scenario 2: the minimum set of sources required

| Source contributing a unique included publication | CLEM | Other databases | Other techniques |
|--------------------------------------------------|------|----------------|-----------------|
| Source with the lowest volume when an included publication was retrieved by more than one source | CLEM | Other databases | Other techniques |
| Other source retrieving an included publication that did not have the lowest volume | Source only retrieving excluded publications |

### Scenario 3: the minimum set of sources required plus CLEM

| Source contributing a unique included publication | CLEM | Other databases | Other techniques |
|--------------------------------------------------|------|----------------|-----------------|
| Source with the lowest volume when an included publication was retrieved by more than one source | CLEM | Other databases | Other techniques |
| Other source retrieving an included publication that did not have the lowest volume | Source only retrieving excluded publications |

**FIGURE 2** Visualisation showing how the scenarios were calculated

Scenario 3 assesses the effect of searching the minimum set required plus CLEM before excluding the other sources that were searched. In Scenario 3, the number of results in CLEM plus the minimum set required to find all included publications was calculated by adding the number of results from:

- The components of CLEM used in that search.
- All other sources that contributed unique included publications.
- The source with the lowest volume, where an included publication had been retrieved by more than one source, but not by one of the previous steps in this scenario.

### RESULTS

At the time of data collection in June 2018, there were 10 PHG topics meeting the criteria for the sample. There were 29 evidence reviews, compiled using 13 searches, associated with these 10 PHG topics (see Table 1). The four evidence reviews on Flu Vaccination (FLV) each had a separate search, whereas the other nine PHGs used a single search to cover all reviews. Data was collated for Workplace Health Long Term Conditions (WLTC) as it met the criteria of having a finalised list of included publications, although the PHG was subsequently discontinued.

#### 4.1 Results from the evidence reviews

Table 1 shows that the number of databases used ranged from 11 in Stop Smoking Interventions and Services (SSIS) to 16 in the Physical Activity and the Environment Update (PAEU). All searches incorporated at least two other search techniques. The number of results after removing duplicates ranged from 695 for FLV1 to 20,258 for Suicide Prevention (SUP).

Across the evidence reviews, 28 different databases were used (see Table 2). The databases covered multiple disciplines, such as general medical sources (e.g., MEDLINE and Embase), nursing (e.g., CINAHL), health management (e.g., HMIC), psychology (PsycINFO), general social science (e.g., ASSIA), economics (e.g., EconLit) and a range of topic-specialised sources, including education (ERIC) and environment (Greenfile). Table 2 shows that seven of the databases were used in all 13 searches. Full details are provided in the appendices: Appendix A shows the number of
| NICE PHG topic                          | Evidence review | Type of evidence review                           | Search approach                              | No. of databases searched | No. of other techniques used | No. of results before duplicates removed | No. of results after duplicates removed | No. of included publications |
|----------------------------------------|-----------------|---------------------------------------------------|----------------------------------------------|--------------------------|----------------------------|-----------------------------------------|------------------------------------------|-------------------------------|
| Community pharmacies (NG102)           | CP1             | Effectiveness and Cost effectiveness              | Single search covering 4 reviews             | 13                       | 4                          | 18,282                                  | 16,371                                   | 6                             |
|                                        | CP2             | Effectiveness and Cost effectiveness              |                                               |                          |                            |                                        |                                          |                               |
|                                        | CP3             | Effectiveness and Cost effectiveness              |                                               |                          |                            |                                        |                                          |                               |
|                                        | CP4             | Effectiveness and Cost effectiveness              |                                               |                          |                            |                                        |                                          |                               |
| Drugs misuse prevention (NG64)         | DMP1            | Effectiveness                                     | Single search covering 2 reviews             | 12                       | 3                          | 25,998                                  | 15,284                                   | 35                            |
|                                        | DMP2            | Barriers and facilitators                         |                                               |                          |                            |                                        |                                          |                               |
| Flu vaccination (NG103)                | FLV1            | Effectiveness                                     | Separate search for this review              | 12                       | 2                          | 1668                                    | 695                                      | 3                             |
|                                        | FLV2            | Effectiveness                                     | Separate search for this review              | 15                       | 2                          | 14,874                                  | 6048                                     | 21                            |
|                                        | FLV3            | Effectiveness                                     | Separate search for this review              | 15                       | 3                          | 13,523                                  | 6034                                     | 33                            |
|                                        | FLV4            | Effectiveness                                     | Separate search for this review              | 15                       | 2                          | 10,393                                  | 4393                                     | 39                            |
| HIV testing (NG60)                     | HIV1a           | Effectiveness                                     | Single search covering 3 reviews             | 12                       | 2                          | 28,231                                  | 20,199                                   | 47                            |
|                                        | HIV1b           | Cost effectiveness                                |                                               |                          |                            |                                        |                                          |                               |
|                                        | HIV2           | Barriers and facilitators                         |                                               |                          |                            |                                        |                                          |                               |
| Physical activity and the environment update (NG90) | PAEU        | Effectiveness and Cost effectiveness              | Single search covering 1 PHG                 | 16                       | 4                          | 20,711                                  | 15,808                                   | 71                            |
| Sexual health condom distribution (NG68) | SHC          | Effectiveness                                     | Single search covering 1 PHG                 | 14                       | 3                          | 7208                                    | 4179                                     | 22                            |
| Stop smoking interventions and services (NG92) | SSIS        | Effectiveness                                     | Single search covering 1 PHG                 | 11                       | 4                          | 82,34                                   | 6326                                     | 17                            |
| NICE PHG topic                                      | Evidence review | Type of evidence review                  | Search approach                                      | No. of databases searched | No. of other techniques used | No. of results before duplicates removed | No. of results after duplicates removed | No. of included publications |
|-----------------------------------------------------|-----------------|------------------------------------------|------------------------------------------------------|--------------------------|-------------------------------|------------------------------------------|-----------------------------------------|-------------------------------|
| Suicide prevention (NG105)                          | SUP1            | Effectiveness and Cost effectiveness     | Single search covering 9 reviews                      | 15                       | 2                             | 38,693                                   | 20,258                                   | 11                            |
|                                                     | SUP2            | Effectiveness and Cost effectiveness     |                                                      |                          |                               |                                          |                                         |                                |
|                                                     | SUP3            | Effectiveness and Cost effectiveness     |                                                      |                          |                               |                                          |                                         |                                |
|                                                     | SUP4            | Effectiveness and Cost effectiveness     |                                                      |                          |                               |                                          |                                         |                                |
|                                                     | SUP5            | Effectiveness and Cost effectiveness     |                                                      |                          |                               |                                          |                                         |                                |
|                                                     | SUP6            | Effectiveness and Cost effectiveness     |                                                      |                          |                               |                                          |                                         |                                |
|                                                     | SUP7            | Effectiveness and Cost effectiveness     |                                                      |                          |                               |                                          |                                         |                                |
|                                                     | SUP8            | Effectiveness and Cost effectiveness     |                                                      |                          |                               |                                          |                                         |                                |
|                                                     | SUP9            | Effectiveness and Cost effectiveness     |                                                      |                          |                               |                                          |                                         |                                |
| Transport related air pollution (NG70)              | TRAP1           | Effectiveness and Cost effectiveness     | Single search covering 3 reviews                      | 13                       | 3                             | 17,134                                   | 1316                                     | 29                            |
|                                                     | TRAP2           | Effectiveness and Cost effectiveness     |                                                      |                          |                               |                                          |                                         |                                |
|                                                     | TRAP3           | Effectiveness and Cost effectiveness     |                                                      |                          |                               |                                          |                                         |                                |
| Workplace health long term conditions (PHG discontinued) | WLTC         | Effectiveness                             | Single search covering 1 PHG                          | 15                       | 2                             | 15,177                                   | 11,950                                   | 42                            |
results from each source; Appendix B the included publications; Appendix C the unique included publications; and Appendix D lists the abbreviations used for the PHGs and sources.

There were 23 databases that retrieved an included publication in at least one search and 16 of these retrieved unique included publications (Table 2). MEDLINE contributed included publications to all

| Sources                  | No. of searches in which the source retrieved an included publication | No. of searches in which the source retrieved a unique included publication | No. of searches in which the source was used |
|--------------------------|----------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------|
| Databases                | No. of searches in which the source retrieved an included publication Number (percentage of searches used) | No. of searches in which the source retrieved a unique included publication Number (percentage of searches used) | No. of searches in which the source was used |
| Databases                |                                                                 |                                                                 |                                             |
| Cochrane CDSR            | 1 (8%)                                                              | 1 (8%)                                                                    | 13                                          |
| Cochrane CENTRAL         | 8 (62%)                                                             | 2 (15%)                                                                   | 13                                          |
| Cochrane DARE            | 2 (15%)                                                             | 0                                                                         | 13                                          |
| Embase                   | 13 (100%)                                                           | 11 (85%)                                                                  | 13                                          |
| MEDLINE                  | 13 (100%)                                                           | 7 (54%)                                                                   | 13                                          |
| MIP                      | 7 (54%)                                                             | 5 (38%)                                                                   | 13                                          |
| SPP                      | 3 (23%)                                                             | 1 (8%)                                                                    | 13                                          |
| Cochrane NHS EED         | 4 (40%)                                                             | 0                                                                         | 10                                          |
| EconLit                  | 2 (20%)                                                             | 1 (10%)                                                                   | 10                                          |
| HMIC                     | 7 (70%)                                                             | 2 (20%)                                                                   | 10                                          |
| PsycINFO                 | 9 (100%)                                                           | 7 (78%)                                                                   | 9                                           |
| Cochrane HTA             | 0                                                                   | 0                                                                         | 7                                           |
| ASSIA                    | 3 (60%)                                                             | 0                                                                         | 5                                           |
| BNI                      | 2 (40%)                                                             | 2 (40%)                                                                   | 5                                           |
| ERIC                     | 2 (40%)                                                             | 1 (20%)                                                                   | 5                                           |
| EPPI Trophi              | 2 (40%)                                                             | 0                                                                         | 5                                           |
| EconPapers               | 1 (33%)                                                             | 0                                                                         | 3                                           |
| EPPI Dopher              | 1 (33%)                                                             | 0                                                                         | 3                                           |
| Sociological Abstracts   | 0                                                                   | 0                                                                         | 3                                           |
| EPPI Bibliomap           | 1 (50%)                                                             | 1 (50%)                                                                   | 2                                           |
| Greenfile                | 2 (100%)                                                            | 2 (100%)                                                                  | 2                                           |
| Transport                | 2 (100%)                                                            | 2 (100%)                                                                  | 2                                           |
| Social Care Online       | 1 (50%)                                                             | 0                                                                         | 2                                           |
| AMED                     | 1 (100%)                                                            | 1 (100%)                                                                  | 1                                           |
| CINAHL                   | 1 (100%)                                                            | 1 (100%)                                                                  | 1                                           |
| Community Pharmacy Future| 0                                                                   | 0                                                                         | 1                                           |
| HealthEvidence           | 0                                                                   | 0                                                                         | 1                                           |
| Social Welfare           | 0                                                                   | 0                                                                         | 1                                           |
| Techniques               | No. of searches in which the source retrieved an included publication Number (percentage of searches used) | No. of searches in which the source retrieved a unique included publication Number (percentage of searches used) | No. of searches in which the source was used |
| Techniques               | Website searching                                                  | 8 (67%)                                                                   | 12                                          |
|                           | Contact experts                                                    | 3 (50%)                                                                   | 6                                           |
|                           | Reference checking                                                 | 5 (83%)                                                                   | 6                                           |
|                           | Analyst actions                                                    | 5 (100%)                                                                  | 5                                           |
|                           | Call for Evidence                                                  | 2 (50%)                                                                   | 4                                           |
|                           | Citation searching                                                 | 4 (100%)                                                                  | 4                                           |
| Search | Total results | Results from sources contributing included publications | Results from sources not contributing any included publications | Percentage of total results required to retrieve all included publications (%) | Potential reduction in total results (%) | Sources contributing included publications | Sources not contributing included publications |
|--------|---------------|-------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------|---------------------------------------------|-----------------------------------------------|
| CP     | 18,282        | 18,166                                         | 116                                            | 99.37                                                                          | 0.63                                     | ASSIA, CINAHL, CENTRAL, Embase, MEDLINE, MIP, PsycINFO, Analyst, Citation, Web | CDSR, DARE, Comm Pharm, EconLit, EconPapers, SPP, Call |
| DMP    | 25,998        | 25,346                                         | 652                                            | 97.49                                                                          | 2.51                                     | CENTRAL, Embase, MEDLINE, MIP, PsycINFO, SCO, SPP, Citation, Ref Check | CDSR, DARE, HTA, Dopher, Trophi, HealthEv, Web |
| FLV1   | 1668          | 1436                                           | 232                                            | 86.09                                                                          | 13.91                                    | Embase, MEDLINE, MIP, Contact                | BNI, CDSR, CENTRAL, DARE, HTA, NHS EED, EconLit, HMIC, SPP, Web |
| FLV2   | 14,874        | 14,485                                         | 389                                            | 97.38                                                                          | 2.62                                     | CENTRAL, Embase, ERIC, HMIC, MEDLINE, MIP, PsycINFO, Web | BNI, CDSR, DARE, HTA, NHS EED, EconLit, Soc Abs, SPP, Web |
| FLV3   | 13,523        | 13,278                                         | 245                                            | 98.19                                                                          | 1.81                                     | BNI, CENTRAL, NHS EED, Embase, HMIC, MEDLINE, MIP, PsycINFO, Analyst, Contact | CDSR, DARE, HTA, EconLit, ERIC, Soc Abs, SPP, Web |
| FLV4   | 10,393        | 10,148                                         | 245                                            | 97.64                                                                          | 2.36                                     | BNI, CENTRAL, DARE, Embase, HMIC, MEDLINE, MIP, PsycINFO, Web | CDSR, HTA, NHS EED, EconLit, ERIC, Soc Abs, SPP, Contact |
| HIV    | 28,231        | 27,982                                         | 249                                            | 99.12                                                                          | 0.88                                     | CENTRAL, NHS EED, Embase, HMIC, MEDLINE, MIP, PsycINFO, Web | CDSR, DARE, EconLit, Bibliomap, SPP, Call |
| PAEU   | 20,711        | 19,059                                         | 1652                                           | 92.02                                                                          | 7.98                                     | ASSIA, NHS EED, EconPapers, Embase, Trophi, Greenfile, HMIC, MEDLINE, MIP, Transport, Analyst, Contact, Ref Check, Web | CDSR, CENTRAL, DARE, HTA, EconLit, SPP |

(Continues)
| Search | Total results | Results from sources contributing included publications | Results from sources not contributing any included publications | Percentage of total results required to retrieve all included publications (%) | Potential reduction in total results (%) | Sources contributing included publications | Sources not contributing included publications |
|--------|---------------|--------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------|-------------------------------------|---------------------------------------------|
| SHC    | 7208          | 6621                                                   | 587                                                       | 91.86                                                                          | 8.14                              | CENTRAL, NHS EED, Embase, HMIC, MEDLINE, MIP, PsycINFO, Ref Check, Web | BNI, CDSR, DARE, EconLit, Trophi, ERIC, SPP, Contact |
| SSIS   | 8234          | 7435                                                   | 799                                                       | 90.30                                                                          | 9.70                              | CDSR, DARE, Embase, Dopher, MEDLINE, MIP, Analyst, Citation | ASSIA, CENTRAL, NHS EED, HMIC, SPP, Ref Check, Web |
| SUP    | 38,693        | 38,203                                                 | 490                                                       | 98.73                                                                          | 1.27                              | ASSIA, CENTRAL, EconLit, Embase, Trophi, ERIC, MEDLINE, MIP, PsycINFO, SPP, Analyst, Citation | CDSR, DARE, HTA, NHS EED, EconPapers, Web |
| TRAP   | 17,134        | 17,005                                                 | 129                                                       | 99.25                                                                          | 0.75                              | EconLit, Embase, Bibliomap, Greenfile, MEDLINE, MIP, SPP, Transport, Call, Ref Check, Web | CDSR, CENTRAL, DARE, NHS EED, HMIC |
| WLTC   | 15,177        | 14,464                                                 | 713                                                       | 95.30                                                                          | 4.70                              | AMED, Embase, HMIC, MEDLINE, MIP, PsycINFO, Call, Ref Check | ASSIA, CDSR, CENTRAL, DARE, Dopher, Trophi, SCO, Soc Welfare, SPP |
| Mean   | 16,933        | 16,433                                                 | 500                                                       | 97.05                                                                          | 2.95                              |                                                                      |                              |
| Search | Total results | Results from sources in the minimum set | Results from sources not in the minimum set | Percentage of total results in the minimum set required (%) | Potential reduction in total results (%) | Sources in the minimum set | Sources searched but not in the minimum set |
|--------|---------------|------------------------------------------|--------------------------------------------|-------------------------------------------------|-------------------------------------|---------------------------|-----------------------------------------------|
| CP     | 18,282        | 16,652                                   | 1630                                       | 91.08                                           | 8.92                                | CINAHL, CENTRAL, Embase, MEDLINE, MIP, Analyst, Citation, Web | ASSIA, CDSR, DARE, Comm Pharm, EconLit, EconPapers, PsyCINFO, SPP, Call |
| DMP    | 25,998        | 15,695                                   | 10,303                                     | 60.37                                           | 39.63                               | Embase, PsyCINFO, SCO, Citation, Ref Check | CDSR, CENTRAL, DARE, HTA, Dopher, Trophi, HealthEv, MEDLINE, MIP, SPP, Web |
| FLV1   | 1668          | 672                                      | 996                                        | 40.29                                           | 59.71                               | MEDLINE, MIP, Contact              | BNI, CDSR, CENTRAL, DARE, HTA, NHS EED, EconLit, Embase, HMIC, SPP, Web |
| FLV2   | 14,874        | 13,264                                   | 1610                                       | 89.18                                           | 10.82                               | Embase, ERIC, MEDLINE, MIP, PsyCINFO, Web | BNI, CDSR, CENTRAL, DARE, HTA, NHS EED, HMIC, EconLit, Soc Abs, SPP, Web |
| FLV3   | 13,523        | 12,994                                   | 529                                        | 96.09                                           | 3.91                                | BNI, CENTRAL, Embase, MEDLINE, MIP, PsyCINFO, Analyst, Contact | CDSR, DARE, NHS EED, HTA, EconLit, ERIC, HMIC, Soc Abs, SPP, Web |
| FLV4   | 10,393        | 9534                                     | 859                                        | 91.73                                           | 8.27                                | BNI, Embase, MEDLINE, MIP, PsyCINFO, Web | CDSR, CENTRAL, DARE, HTA, NHS EED, HMIC, EconLit, ERIC, Soc Abs, SPP, Contact |
| HIV    | 28,231        | 27,752                                   | 479                                        | 98.30                                           | 1.70                                | CENTRAL, Embase, MEDLINE, MIP, Web | CDSR, DARE, NHS EED, EconLit, Bibliomap, HMIC, PsyCINFO, SPP, Call |
| PAEU   | 20,711        | 17,110                                   | 3601                                       | 82.61                                           | 17.39                               | Embase, Greenfile, MEDLINE, MIP, Transport, Analyst, Contact, Web | ASSIA, CDSR, CENTRAL, DARE, HTA, NHS EED, EconLit, EconPapers, Trophi, HMIC, SPP, Ref Check |
| SHC    | 7,208         | 2756                                     | 4452                                       | 38.24                                           | 61.76                               | Embase, HMIC, Ref Check, Web       | BNI, CDSR, CENTRAL, DARE, NHS EED, EconLit, Trophi, ERIC, MEDLINE, MIP, PsyCINFO, SPP, Contact |
| SSIS   | 8,234         | 3367                                     | 4867                                       | 40.89                                           | 59.11                               | CDSR, Dopher, Analyst, Citation    | ASSIA, CENTRAL, DARE, NHS EED, Embase, HMIC, MEDLINE, MIP, SPP, Ref Check, Web |

(Continues)
13 searches, with seven of these having unique included publications. Embase also contributed to all 13 searches and provided unique included publications in 11 of these. Greenfile, Transport, AMED, and CINAHL contributed unique publications each time they were used (Table 2). Five databases did not retrieve any included publications.

Six other search techniques were used, in addition to databases, and they all contributed unique included publications (Table 2). Website searching was used in 12 searches and it contributed unique included publications in seven of them. Citation searching retrieved unique included publications all four times it was used. Reference checking contributed unique items in four of the six searches in which it was used. Analyst actions (steps taken by the review team after the main searches had been completed to ensure no relevant evidence was missed) were required in five of the 13 searches.

### Results from the scenarios

The scenarios were based on the 13 searches that were done for the 10 PHG topics. Scenario 1 shows the effect of excluding sources that did not retrieve any included publications (Table 3). For example, in FLV1 1668 results were downloaded and 1436 (86%) of these came from Embase, MEDLINE, MIP and contact with experts, which all provided included publications. On the other hand, 232 results (14%) came from BNI, CDSR, CENTRAL, DARE, HTA, NHS EED, EconLit, EconPapers, Trophi, ERIC which could all be removed without any included publications being missed.

In Scenario 1, a mean reduction of 3% in the total number of results downloaded could have been achieved (Table 3). The highest reduction, in absolute numbers, was in PAEU, with a cut of 1652 from 20,711 to 19,059 results (8%). The highest percentage decrease was 14% in FLV1 (from 1668 to 1436 results). The lowest reduction (in both absolute and percentage terms) was in Community Pharmacies (CP), which could have cut 116 of 18,282 results (0.6%).

Scenario 2 establishes the minimum set of sources required for each search (Table 4). Across the 13 searches, the volume, including duplicates, could have been reduced by a mean of 15.5%, from 16,933 to 14,307 (see Table 4). This indicates that 84.5% of the results were required to avoid missing any of the included publications. The potential reductions ranged from 1.7% in the HIV Testing search (HIV) to 61.8% in Sexual Health Condom Distribution (SHC).

FLV1, with three, had the lowest number of sources in the minimum set (Table 4). SUP and Transport Related Air Pollution (TRAP) required the largest
| Search | Total results | Results from sources in the minimum set required plus CLEM | Results from sources not in the minimum set required plus CLEM | Percentage of total results in the minimum set required plus CLEM (%) | Potential reduction in total results (%) | Sources in the minimum set required plus CLEM | Sources searched but not in the minimum set required plus CLEM |
|--------|---------------|----------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------|---------------------------------------------|--------------------------------------------------|
| CP     | 18,282        | 16,660                                                   | 1622                                                        | 91.13                                                            | 8.87                                   | CLEM, CINAHL, Analyst, Citation, Web        | ASSIA, Comm Pharm, EconLit, EconPapers, PsycINFO, SPP, Call |
| DMP    | 25,998        | 25,044                                                   | 954                                                         | 96.33                                                            | 3.67                                   | CLEM, PsycINFO, SCO, Citation, Ref Check    | Dopher, Trophi, HealthEv, SPP, Web               |
| FLV1   | 1668          | 1478                                                     | 190                                                         | 88.61                                                            | 11.39                                  | CLEM, Contact                              | BNI, EconLit, HMIC, SPP, Web                   |
| FLV2   | 14,874        | 14,316                                                   | 558                                                         | 96.25                                                            | 3.75                                   | CLEM, ERIC, PsycINFO, Web                  | BNI, EconLit, HMIC, Soc Abs, SPP, Contact       |
| FLV3   | 13,523        | 13,034                                                   | 489                                                         | 96.38                                                            | 3.62                                   | CLEM, BNI, PsycINFO, Analyst, Contact       | EconLit, ERIC, HMIC, Soc Abs, SPP, Web           |
| FLV4   | 10,393        | 9732                                                     | 661                                                         | 93.64                                                            | 6.36                                   | CLEM, BNI, PsycINFO, Web                   | EconLit, ERIC, HMIC, Soc Abs, SPP, Contact       |
| HIV    | 28,231        | 27,826                                                   | 405                                                         | 98.57                                                            | 1.43                                   | CLEM, PsycINFO, Web                        | EconLit, Bibliomap, HMIC, SPP, Call             |
| PAEU   | 20,711        | 17,989                                                   | 2722                                                        | 86.86                                                            | 13.14                                  | CLEM, Greenfile, Transport, Analyst, Contact, Web | ASSIA, EconLit, EconPapers, Trophi, HMIC, Soc Abs, SPP, Ref Check |
| SHC    | 7208          | 5588                                                     | 1620                                                        | 77.52                                                            | 22.48                                  | CLEM, HMIC, Ref Check, Web                  | BNI, EconLit, Trophi, ERIC, PsycINFO, SPP, Contact |
| SSIS   | 8234          | 7348                                                     | 886                                                         | 89.24                                                            | 10.76                                  | CLEM, Analyst, Citation                     | ASSIA, Dopher, HMIC, SPP, Ref Check, Web       |
| SUP    | 38,693        | 36,504                                                   | 2189                                                        | 94.34                                                            | 5.66                                   | CLEM, ASSIA, PsycINFO, SPP, Analyst, Citation | EconLit, EconPapers, Trophi, ERIC, Web           |
| TRAP   | 17,134        | 16,490                                                   | 644                                                         | 96.24                                                            | 3.76                                   | CLEM, EconLit, Bibliomap, Greenfile, Transport, Ref Check, Web | HMIC, SPP, Call |
| WLTC   | 15,177        | 13,862                                                   | 1315                                                        | 91.34                                                            | 8.66                                   | CLEM, AMED, PsycINFO, Call, Ref Check       | ASSIA, Dopher, Trophi, HMIC, SCO, Soc Welfare, SPP |
| Mean   | 16,933        | 15,836                                                   | 1097                                                        | 93.52                                                            | 6.48                                   |                                              |                                                  |
number of sources, each having nine in the minimum set. Nine searches required both MEDLINE and Embase. There were three searches where either MEDLINE or Embase were required but not both. For the SSIS search, neither MEDLINE nor Embase were required. All 13 minimum sets contained other techniques and none comprised only databases. From the other techniques, website searching was in the minimum set the most times, finding included publications in eight searches.

In Scenario 3, the CLEM databases were always included to show the cuts that could be made with usual searching practice. For example, in Scenario 2 it would be possible to reduce the number of results in Drugs Misuse Prevention (DMP) by 40% from 25,998 to 15,695, as Embase, PsycINFO, Social Care Online, citation searching and reference checking retrieved the included publications. In Scenario 3, all CLEM components are required and so CDSR, CENTRAL, DARE, HTA MEDLINE, and MIP are restored to DMP. This results in a potential reduction of 4% from 25,998 to 25,044 results, as only Dopher, Trophi, Health Evidence, SPP and website searching can now be removed. This difference between Scenario 2 and Scenario 3 in DMP is largely explained by the fact that the 8390 MEDLINE and MIP results (Appendix A) contributed no unique included publications.

In Scenario 3, the total number of results could have been reduced by a mean of 6.5%, ranging from 1.4% in HIV Testing to 22.5% in SHC (Table 5). None of the 13 searches had a minimum set comprised of CLEM alone. FLV1, which also needed contact with experts, was the only search that did not require any other databases beyond CLEM. In contrast, the other three FLV searches required various combinations of CLEM, BNI, ERIC, and PsycINFO, as well as other techniques.

Table 6 expands on Scenario 3 and shows the incremental value of adding more databases and techniques once CLEM has been searched. These figures show the value of adding other databases to CLEM and then using other techniques after the databases, they do not show the absolute contribution of the other databases and techniques. Searching CLEM first would find, on average, 76.8% of the included publications (Table 6). Searching other databases second in the sequence would add a further 11%. Taken together, 87.8% of included publications would be retrieved from database searching. Other search techniques would be required to identify the remaining 12.2% (Table 6).

### 5 DISCUSSION

#### 5.1 Multi-disciplinary evidence base

The NICE methods manual states that sources should only be included if they are ‘likely to yield relevant results’ and the scenarios show that, on the whole, the sources were well chosen. The searches were planned, conducted
and peer reviewed by NICE information specialists, suggesting that these processes had been worthwhile.

Restricting the searches to the minimum set in Scenario 2 would have saved about 16% of the volume downloaded, on average (see Table 4). This represents the maximum reduction that could have been made to still retrieve the included publications. There is no way of knowing in advance whether a source will retrieve included publications. Some potential savings are to be expected when performing this kind of retrospective analysis. Overall, there is no indication of long lists of sources being searched without them retrieving anything relevant.

The searches in this analysis were conducted prior to changes to the Cochrane Library, which will need to be reflected in future reviews. DARE, NHS EED and the HTA database were removed from the Cochrane Library platform in August 2018. Cochrane CDSR contributed unique included publications to one and CENTRAL to two searches (Table 2) so these are likely to remain core sources, in line with current recommendations.6

There is not a clear pattern to the minimum sets established in Scenario 2 (Table 4). For example, MEDLINE was an essential source in 10 searches but not in DMP, SHC or SSIS. Embase was needed in three FLV reviews but not in the fourth (FLV1). It is unlikely that the combination required in DMP (Embase, PsycINFO, Social Care Online, citation searching, and reference checking) would have been chosen at the outset. Scenario 2 could only be created retrospectively, once the included publications had been identified from the search results. Scenario 3, which includes CLEM to reflect current practice, shows more realistically the improvements in efficiency that might be achievable.

None of the searches in Scenario 2 had a minimum set that was comprised entirely of CLEM (Table 4). A PHG search that used just CLEM would, on average, miss about a quarter of the included publications (Table 6). The other databases in the minimum sets included CINAHL, Social Care Online, BNI, Greenfile, Transport, ASSIA and SPP, illustrating the value of the multidisciplinary approach. A core list could not be created, as there were no databases beyond CLEM contributing to each search. Identifying specialised or new sources appropriate to the topic should be an important part of writing a search protocol.

Other search techniques in addition to databases were needed in all 13 searches in Scenario 2. Six other techniques contributed to the minimum sets (Table 4). The other techniques could not entirely replace database searching in these scenarios. The scenarios suggest that sufficient time and resources should be allowed to use other techniques effectively when planning a search. Other techniques need to be tested to ensure they are used efficiently alongside databases. This would involve ensuring they target evidence from other disciplines or in different formats (such as grey literature) to avoid retrieving duplicate content from databases.

5.2 Efficiency savings

It would be possible to reduce the number of sources used and so cut the amount of time spent searching and screening the results. In Scenario 3 (Table 5), reflecting current search practice, an average of 1097 results, including duplicates, could have been saved. There would be time savings from having fewer files to manage, reducing the number of duplicates to remove and needing to report fewer search strategies. There would be related savings in the number of full-text articles to order, discrepancies to resolve and other screening decisions to make. The maximum saving of 1097 results is in line with the estimate that 500–1000 titles and abstracts can be screened in 8 h.

There was potential for each PHG to have saved up to a day’s time from screening and the related search, administration and reporting activities. A day is a relatively small amount of time, when NICE PHGs can take up to 2 years to produce. Multiplied over the number of guidelines developed each year, this would represent some gain in productivity.

Removing a database from a search does not necessarily lead to time savings when other sources on the same platform are still required. For example, the same strategy is used for all sources on the Cochrane Library platform and so removing CDSR and DARE from SHC (see Table 3) would not have saved time, as a strategy for CENTRAL still had to be developed.

The results suggest that, although small databases are worth retaining, they should be used as efficiently as possible. SPP was used in all 13 searches (Table 2) and only featured in the minimum set for SUP, while HMIC was searched 10 times and was only in the minimum set for SHC (Table 4). The size of these databases means a simpler method of translating strategies can be used, which retains the databases and widens the evidence base, without retrieving a high number of results.

5.3 Planning future searches

The data presented in this study demonstrates the value of analysing the sources and of using search summary tables. The findings could be used to prioritise the sources required if NICE were to update these reviews or...
produce new reviews on similar topics. For example, BNI did not retrieve any included publications for FLV1 or FLV2 but it did in FLV3 and FLV4 (Table 3). It would be worth testing BNI when scoping, say, reviews on uptake of other vaccinations or other flu prevention measures. Greenfile and Transport contributed unique included publications in both TRAP and PAEU and would probably be valuable in other environmental health topics.

Sources should be tested at the beginning of a review to indicate whether the extra time and resources required to search them is likely to be rewarded with unique content that would otherwise be missed. Five databases, including Sociological Abstracts, did not contribute any included publications and their value might be questioned (see Table 2). On the other hand, ASSIA, Social Care Online and Trophi found some included publications but contributed no unique included publications (Table 2). The key is to test and plan a tailored list of sources, even if it is not possible to know in advance exactly where the evidence might be identified.

6 | LIMITATIONS AND FURTHER RESEARCH

It would be valuable to undertake a full cost effectiveness analysis, showing how the decisions affect the time and resources required to complete a PHG search. It would be necessary to remove the duplicates and recalculate Scenario 3 to obtain a more precise estimate of the number of results that could have been saved. This would need to establish standard timings of search processes, such as strategy translations, de-duplication, and reporting.

It was not possible to establish how the papers used in citation searching and reference checking had been identified in the DMP search, which was developed iteratively. A paper might be used for citation searching and reference checking, even if it does not become an included publication in its own right. It was not possible to establish how these base papers had been identified in the first place. The results presented in this study show how each source contributed to the final list of included publications and not how useful they had been in the earlier steps. It is helpful to record the papers that are used for reference checking and citation searching and this finding suggests it is particularly important in iterative searches.

The review teams were sometimes including additional publications after the searches had been completed to ensure no relevant evidence was missed. The technique used by the review team was recorded where it could be established, for example reference checking if they had included a paper from the bibliography of another search result (which would be in line with the steps in the protocol). The category ‘analyst actions’ had to be used where a more specific method had not been recorded in EndNote. This accounts for 13 included publications across five searches (Appendix B). NICE has subsequently amended its processes to record these actions more accurately.

The 10 PHG topics assessed here are not fully representative of the entire NICE portfolio, as around 70 PHGs have been published and eight were ongoing in May 2022. It was not possible to examine the impact of the type of review on the sources required. Table 1 shows that there were 19 combined reviews of effectiveness and cost effectiveness evidence, seven reviews of effectiveness, one review of cost effectiveness and two reviews of barriers and facilitators. There were insufficient numbers of each type to make meaningful comparisons.

The scenarios were calculated using the number of included publications. The value of each included publication has not been measured. Further research would be required to examine the relative impact of each included publication on the Evidence Statement and whether failing to find it would have affected the recommendations. It would also be possible to investigate whether there were multiple publications reporting the same study in any of the Evidence Statements, which might mean the minimum set required could be reduced.

The analysis was based on where the included publications had been retrieved and it could be helpful to investigate alternative approaches to what was done. It was beyond the scope of this study to check the effectiveness of search strategies and whether this could have affected the minimum sets required. Search summary tables could be used to record whether included publications were present in a source but missed by the strategy.

There was no attempt to measure overlap between databases. The benefits of a multi-disciplinary evidence base have been stressed and further research into the role of multi-disciplinary sources, such as Web of Science or Scopus, would be welcome. Prospective research would be required to show the most effective way of using these sources and whether they would replace or supplement topic-specific sources.

The data was not analysed according to which provider platforms were used, as NICE searched the same one each time a database was accessed. The search summary table could be used to collect the data required to compare different versions of a database.

The results confirm that website searching is important. The number of websites used in each search was not assessed and it would require further research to understand how to create an efficient list of sources.
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CONFLICT OF INTEREST
The authors have no interests to declare.

DATA AVAILABILITY STATEMENT
The data that supports the findings of this study are available in the supplementary material of this article.

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REFERENCES
1. NICE. Developing NICE Guidelines: The Manual. NICE; 2020. https://www.nice.org.uk/process/pmg20/chapter/introduction
2. Shemilt I, Khan N, Park S, Thomas J. Use of cost-effectiveness analysis to compare the efficiency of study identification methods in systematic reviews. Syst Rev. 2016;5(1):140. doi:10.1186/s13643-016-0315-4
3. Levay P, Raynor M, Tuvey D. The contributions of MEDLINE, other bibliographic databases and various search techniques to NICE public health guidance. Evid Based Libr Inf Pract. 2015;10(1):50. doi:10.18438/B82P55
4. Faculty of Public Health. Good Public Health Practice Framework 2016. Faculty of Public Health; 2016. https://www.fph.org.uk/media/1304/good-public-health-practice-framework_2016_final.pdf
5. Kelly M, Morgan A, Ellis S, Younger T, Huntley J, Swann C. Evidence based public health: a review of the experience of the National Institute of Health and Clinical Excellence (NICE) of developing public health guidance in England. Soc Sci med. 2010;71(6):1056-1062. doi:10.1016/j.socscimed.2010.06.032
6. Gough D, Thomas J, Oliver S. Clarifying differences between review designs and methods. Syst Rev. 2012;1(1):28. doi:10.1186/2046-4053-1-28
7. Savolainen R. Berrypicking and information foraging: comparison of two theoretical frameworks for studying exploratory search. J Inf Sci. 2018;44(5):580-593. doi:10.1177/0165551517713168
8. Heath A, Levay P, Tuvey D. Literature searching methods or guidance and their application to public health topics: a narrative review. Heal Inf Libr J. 2021;39:6-21. doi:10.1111/hir.12414
9. Kugley S, Wade A, Thomas J, et al. Searching for studies: a guide to information retrieval for Campbell systematic reviews. Campbell Syst Rev. 2017;13(1):73. doi:10.4073/112414
10. Higgins JPT, Lasserson T, Chandler J, et al. Methodological Expectations of Cochrane Intervention Reviews (MECIR). Standards for the Conduct and Reporting of New Cochrane Intervention Reviews, Reporting of Protocols and the Planning, Conduct and Reporting of Updates. MECIR; 2021. https://community.cochrane.org/meicr-manual
11. Lam MT, McDiarmid M. Increasing number of databases searched in systematic reviews and meta-analyses between 1994 and 2014. J Med Libr Assoc. 2016;104(4):284-289. doi:10.3163/1536-5010.104.4.006

12. Hanneke R, Young SK. Information sources for obesity prevention policy research: a review of systematic reviews. Syst Rev. 2017;6(1):156. doi:10.1186/s13643-017-0543-2

13. Nussbaumer-Streit B, Klerings I, Wagner G, et al. Abbreviated literature searches were viable alternatives to comprehensive searches: a meta-epidemiological study. J Clin Epidemiol. 2018;102:1-11. doi:10.1016/J.JCLINEPI.2018.05.022

14. Ewald H, Klerings I, Wagner G, et al. Abbreviated and comprehensive literature searches led to identical or very similar effect estimates: meta-epidemiological study. J Clin Epidemiol. 2020;128:1-12. doi:10.1016/j.jclinepi.2020.08.002

15. Affengruber L, Wagner G, Waffenschmidt S, et al. Combining abbreviated literature searches with single-reviewer screening: three case studies of rapid reviews. Syst Rev. 2020;9(1):162. doi:10.1186/s13643-020-01413-7

16. Pham MT, Waddell L, Rajić A, Sargeant JM, Papadopoulos A, McEwen SA. Implications of applying methodological shortcuts to expedite systematic reviews: three case studies using systematic reviews from agri-food public health. Res Synth Methods. 2016;7(4):433-446. doi:10.1002/1615

17. Frandsen TF, Eriksen MB, Hammer DMG, Christensen JB, Wallin JA. Using Embase as a supplement to PubMed in Cochrane reviews differed across fields. J Clin Epidemiol. 2021;133:24-31. doi:10.1016/j.jclinepi.2020.12.022

18. Hartling L, Featherstone R, Nuspl M, Shave K, Dryden DM, Vandermeer B. The contribution of databases to the results of systematic reviews: a cross-sectional study. BMC Med Res Methodol. 2016;16(1):127. doi:10.1186/s12874-016-0232-1

19. Wood H, Arber M, Glanville JM. Systematic reviews of economic evaluations: how extensive are their searches? Int J Technol Assess Health Care. 2017;33(1):25-31. doi:10.1017/S0266462316000660

20. Wright JM, Cotrell DJ, Mir G. Searching for religion and mental health studies required health, social science, and grey literature databases. J Clin Epidemiol. 2014;67(7):800-810. doi:10.1016/j.jclinepi.2014.02.017

21. Goossen K, Tenchhoff S, Probst P, et al. Optimal literature search for systematic reviews in surgery. Langenbecks Arch Surg. 2018;403(1):119-129. doi:10.1007/s00423-017-1646-x

22. Farrah K, Mierzwinski-Urban M. Almost half of references in reports on new and emerging nondrug health technologies are grey literature. J Med Libr Assoc. 2019;107(1):43-48. doi:10.5195/jmla.2019.539

23. Enticott J, Buck K, Shawyer F. Finding “hard to find” literature on hard to find groups: a novel technique to search grey literature on refugees and asylum seekers. Int J Methods Psychiatr Res. 2018;27(1):e1580. doi:10.1002/mpr.1580

24. Levay P, Ainsworth N, Kettle R, Morgan A. Identifying evidence for public health guidance: a comparison of citation searching with web of science and Google scholar. Res Synth Methods. 2016;7(1):34-45. doi:10.1002/jrsm.1158

25. Cooper C, Lovell R, Husk K, Booth A, Garside R. Supplementary search methods were more effective and offered better value than bibliographic database searching: a case study from public health and environmental enhancement. Res Synth Methods. 2018;9(2):195-223. doi:10.1002/jrsm.1286

26. Briscoe S, Nunns M, Shaw L. How do Cochrane authors conduct web searching to identify studies? Findings from a cross-sectional sample of Cochrane reviews. Heal Inf Libr J. 2020;37(4):293-318. doi:10.1111/hir.12313

27. Cooper C, Booth A, Britten N, Garside R. A comparison of results of empirical studies of supplementary search techniques and recommendations in review methodology handbooks: a methodological review. Syst Rev. 2017;6(1):234. doi:10.1186/s13643-017-0625-1

28. Alpi KM. Expert searching in public health. J Med Libr Assoc. 2005;93(1):97-103. http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC545128

29. Booth A. How much searching is enough? Comprehensive versus optimal retrieval for technology assessments. Int J Technol Assess Health Care. 2010;26(4):431-435. doi:10.1017/S0266462310000966

30. Bethel AC, Rogers M, Abbott R. Use of a search summary table to improve systematic review search methods, results, and efficiency. J Med Libr Assoc. 2021;109(1):97-106. doi:10.5195/jmla.2021.809

31. Aagaard T, Lund H, Juhl C. Optimizing literature search in systematic reviews – are MEDLINE, EMBASE and CENTRAL enough for identifying effect studies within the area of musculoskeletal disorders? BMC Med Res Methodol. 2016;16(1):1-11. doi:10.1186/s12874-016-0264-6

32. Bramer WM, Rethlefsen ML, Kleijnen J, Franco OH. Optimal database combinations for literature searches in systematic reviews: a prospective exploratory study. Syst Rev. 2017;6(1):245. doi:10.1186/s13643-017-0644-y

33. Justesen T, Freyberg J, Schultz ANØ. Database selection and data gathering methods in systematic reviews of qualitative research regarding diabetes mellitus – an exploratory study. BMC Med Res Methodol. 2021;21(1):94. doi:10.1186/s12874-021-01281-2

34. Hirt J, Bergmann J, Karrer M. Overlaps of multiple database retrieval and citation tracking in dementia care research: a methodological study. J Med Libr Assoc. 2021;109(2):275-285. doi:10.5195/JMLA.2021.1129

35. Goossen K, Hess S, Lunny C, Pieper D. Database combinations to retrieve systematic reviews in overviews of reviews: a methodological study. BMC Med Res Methodol. 2020;20(1):138. doi:10.1186/s12874-020-00983-3

36. Heath A, Levay P, Tuvey D. Collaborating to plan efficient public health guideline evidence reviews. J EAHIL. 2021;17(9):13. doi:10.32384/jeahil7449

37. Rethlefsen ML, Kirtley S, Waffenschmidt S, et al. PRISMA-S: an extension of the PRISMA statement for reporting literature searches in systematic reviews. Syst Rev. 2021;10(1):39. doi:10.1186/s13643-020-01542-z

38. Arber M, Glanville J, Isjarvi J, et al. Which databases should be used to identify studies for systematic reviews of economic evaluations? Int J Technol Assess Health Care. 2018;34(6):547-554. doi:10.1017/S0266462318000636

39. NICE. Community Pharmacies: Promoting Health and Wellbeing. NICE Guideline 102. NICE; 2018. https://www.nice.org.uk/guidance/ng102

40. NICE. Community Pharmacies. Review 1: Evidence Reviews for Providing Information on Health and Wellbeing. NICE; 2018. https://www.nice.org.uk/guidance/ng102/documents/evidence-review
72. NICE. Air Pollution: Outdoor Air Quality and Health. NICE Guideline 70. NICE; 2017. https://www.nice.org.uk/guidance/ng70

73. NICE. Air Pollution: Outdoor Air Quality and Health. Evidence Review 1 on: Environmental Change and Development Planning. NICE; 2016. https://www.nice.org.uk/guidance/ng70/documents/evidence-review-2

74. NICE. Air Pollution: Outdoor Air Quality and Health. Evidence Review 2 on: Traffic Management and Enforcement, and Financial Incentives and Disincentives. NICE; 2016. https://www.nice.org.uk/guidance/ng70/documents/evidence-review-3

75. NICE. Air Pollution: Outdoor Air Quality and Health. Evidence Review 3 on: Travel Planning and Other Initiatives Providing Information, Advice, Education and Skill Development. NICE; 2016. https://www.nice.org.uk/guidance/ng70/documents/evidence-review-6

76. NICE. Workplace Health: Support for Employees with Disabilities and Long-term Conditions. Draft Evidence Review Methods, Evidence and Recommendations. NICE; 2016. https://www.nice.org.uk/Media/Default/About/what-we-do/NICE-guidance/NICE-guidelines/Public-health-guidelines/Additional-publications/WPLTC-collated-reviews-report.pdf

77. Briscoe S, Cooper C, Glanville J, Lefebvre C. The loss of the NHS EED and DARE databases and the effect on evidence synthesis and evaluation. Res Synth Methods. 2017;8(3):256-257. doi:10.1002/jrsm.1235

78. Wright K, Golder S, Rodriguez-Lopez R. Citation searching: a systematic review case study of multiple risk behaviour interventions. BMC Med Res Methodol. 2014;14(1):73. doi:10.1186/1471-2288-14-73

79. Lefebvre C, Glanville J, Briscoe S, et al. Chapter 4: searching for and selecting studies. In: Higgins J, Thomas J, Chandler J, et al., eds. Cochrane Handbook for Systematic Reviews of Interventions. 6.2. Cochrane; 2021. https://training.cochrane.org/handbook/current/chapter-04

80. Finnegan A, Levay P. A method for translating search strategies efficiently into HMIC and SPP. Health Info Libr J. 2021. doi:10.1111/hir.12391

81. Briscoe S, Bethel A, Rogers M. Conduct and reporting of citation searching in Cochrane systematic reviews: a cross-sectional study. Res Synth Methods. 2020;11(2):169-180. doi:10.1002/jrsm.1355

82. NICE. Guidance and Advice List. NICE; 2021. Accessed May 1, 2022. https://www.nice.org.uk/guidance/published?type=ph

SUPPORTING INFORMATION
Additional supporting information may be found in the online version of the article at the publisher's website.

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# APPENDIX A

## A.1  TOTAL NUMBER OF RESULTS FROM EACH SOURCE (BEFORE DUPLICATES REMOVED)

| Source                          | CP  | DMP | FLV1 | FLV2 | FLV3 | FLV4 | HIV | PAEU | SHC | SSIS | SUP | TRAP | WLTC |
|---------------------------------|-----|-----|------|------|------|------|-----|------|-----|------|-----|------|------|
| **Databases**                   |     |     |      |      |      |      |     |      |     |      |     |      |      |
| AMED (Ovid)                     |     | 644 |      |      |      |      |     |      | 1428| 21   | 1964| 36   |      |
| ASSIA (ProQuest)                |     |     | 46   | 82   | 589  | 294  | 136 |      |      |      |     |      |      |
| BNI (ProQuest)                  |     | 540 |      |      |      |      |     |      |      |      |     |      |      |
| CINAHL (EBSCOhost)              |     | 2   | 13   | 2    | 29   | 31   | 7   | 35   | 70  | 17   | 276 | 73   | 9    | 23   |
| Cochrane CDSR (Wiley)           |     | 805 | 703  | 38   | 978  | 643  | 187 | 971  | 785 | 201  | 21  | 597  | 55   | 14   |
| Cochrane CENTRAL (Wiley)        |     | 6   | 238  | 0    | 6    | 3    | 3   | 11   | 11  | 5    | 196 | 34   | 0    | 16   |
| Cochrane DARE (Wiley)           |     | 5   | 1    | 2    | 1    | 0    |     | 4    |     | 7    |     |      |      |      |
| Cochrane HTA (Wiley)            |     | 1   | 37   | 5    | 1    | 28   | 9   | 5    | 0   | 6    |     | 0    |      |      |
| Cochrane NHS EED (Wiley)        |     |     |      |      |      |      |     |      | 10  |      |     |      |      |      |
| Community Pharmacy Future.org.uk|     | 1   | 1394 | 1681 |      |      |     | 10   | 108 | 36   |     |      |      |      |
| EconLit (Ovid)                  | 14  | 0   | 17   | 10   | 8    | 37   | 565 | 42   | 85  | 2397 |     |      |      |      |
| EconPapers (repec.org)          | 9   | 95  | 95   |      |      |      |     |      |     | 194  |     |      |      |      |
| Embase (Ovid)                   | 7761| 4941| 764  | 6384 | 6863 | 5007 | 11066| 1117 | 2587| 2182 | 7958| 5488 | 4018 |
| EPPI Bibliomap (EPPI)           |     |     |      |      |      |      | 10  |      |     |      |     |      |      |      |
| EPPI Dopher (EPPI)              |     | 262 |      |      |      |      |     | 108  | 36  |      |     |      |      |      |
| EPPI Trophi (EPPI)              |     |     |      |      |      |      | 149 | 16   | 102 | 51   |     |      |      |      |
| ERIC (ProQuest)                 |     |     | 69   | 69   | 69   |      | 306 | 1632 |     |      |     |      |      |      |
| Greenfile (EBSCOhost)           |     | 1394|      |      |      |      |     |      |     |      |     |      |      |      |
| HealthEvidence.org              |     | 104 |      |      |      |      |     |      |     |      |     |      |      |      |
| HMIC (Ovid)                     | 66  | 243 | 279  | 424  | 202  | 202  | 175 | 78   | 46  | 65   | 655 |      |      |      |
| MEDLINE (Ovid)                  | 5377| 8390| 629  | 5960 | 4082 | 3487 | 9840 | 6687 | 2422| 1420 | 9640| 3215 | 5598 |
| MIP (Ovid)                      | 586 | 28  | 261  | 226  | 164  | 811  | 1029 | 182  | 270 | 3201 | 1818| 214  |      |      |
| PsychINFO (Ovid)                | 870 | 6426| 575  | 575  | 575  | 4851 | 1055 | 8573 |     |      |     |      |      |      |
| Social Care Online (SCIE)       |     | 274 |      |      |      |      |     |      |     |      |     |      |      |      |
| Social Welfare (British Library)|     |     |      |      |      |      |     |      |     |      |     |      | 164  |      |

(Continues)
| Source                          | CP   | DMP | FLV1 | FLV2 | FLV3 | FLV4 | HIV | PAEU | SHC | SSIS | SUP | TRAP | WLTC |
|--------------------------------|------|-----|------|------|------|------|-----|------|-----|------|-----|------|------|
| Sociological Abstracts (ProQuest) | 66   | 66  | 66   |      |      |      |     |      |     |      |     |      |      |
| SPP (Ovid)                      | 36   | 558 | 65   | 65   | 65   | 65   | 130 | 217  | 63  | 7    | 912 | 541  | 57  |
| Transport (Ovid)                |      |     |      |      |      |      |     |      |     |      |     |      |      |
| Analyst actions                 | 63   |     | 1    |      |      |      |     |      |     |      |     |      |      |
| Call for Evidence               | 48   |     |      |      |      |      |     |      |     |      |     |      |      |
| Citation searching              | 1459 | 1003|      |      |      |      |     |      |     |      |     | 2959 | 3537 |
| Contact experts                 | 15   | 15  | 15   | 15   |      |      |     |      |     |      |     |      |      |
| Reference checking              | 3051 |     |      |      |      |      |     |      |     |      |     |      |      |
| Website searching               | 61   | 28  | 13   | 85   | 0    | 21   | 213 | 259  | 90  | 697  | 176 | 176  |      |
| Total no. of results before duplicates removed | 18,282 | 25,998 | 1668 | 14,874 | 13,523 | 10,393 | 28,231 | 20,711 | 7208 | 8234 | 38,693 | 17,134 | 15,177 |

*Note:* Shading indicates that the source was used in that search.
## APPENDIX B

### B.1 NUMBER OF INCLUDED PUBLICATIONS RETRIEVED FROM EACH SOURCE

| Sources                      | CP1  | CP2  | CP3  | CP4  | DMP1 | DMP2 | FLV1 | FLV2 | FLV3 | FLV4 | HIV1a | HIV1b | HIV2 | PAEU | SHC |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
| **Databases**                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| AMED                         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| ASSIA                        | 1 (17%) | 5 (26%) | 1 (5%) | 0 |      |      | 6 (18%) | 3 (8%) |      |      |      |      |      |      |      |     |
| BNI                          | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CINAHL                       | 3 (50%) | 6 (32%) | 3 (14%) | 0 |      |      | 9 (43%) | 12 (36%) | 3 (8%) | 21 (45%) | 2 (17%) | 0 | 8 (36%) |      |      |     |
| Cochrane CDSR                | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cochrane CENTRAL             | 1 (17%) | 4 (21%) | 7 (32%) | 0 | 6 (17%) | 1 (5%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cochrane DARE                | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cochrane HTA                 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cochrane NHS EED             | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 (3%) | 2 (9%) |      |      |      |     |
| Community Pharmacy Future    | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EconLit                      | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EconPapers                   | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Embase                       | 1 (17%) | 3 (16%) | 7 (32%) | 3 (60%) | 7 (20%) | 5 (25%) | 2 (67%) | 15 (71%) | 23 (70%) | 30 (77%) | 34 (72%) | 9 (75%) | 4 (67%) | 25 (35%) | 19 (86%) |
| EPPI Bibliomap               | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EPPI Dopher                  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EPPI Trophi                  | 1 (5%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ERIC                         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Greenfile                    | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Health Evidence              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| HMIC                         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| MEDLINE                      | 2 (33%) | 11 (58%) | 13 (59%) | 0 | 9 (25%) | 5 (25%) | 2 (67%) | 12 (57%) | 29 (74%) | 35 (74%) | 9 (75%) | 5 (83%) | 37 (52%) | 16 (73%) |      |
| MIP                          | 0 | 2 (11%) | 2 (9%) | 2 (40%) | 0 | 3 (14%) | 5 (15%) | 4 (9%) | 0 | 2 (33%) | 8 (11%) | 0 | 0 | 3 (4%) | 2 (9%) |
| PagelNFO                     | 1 (17%) | 6 (32%) | 6 (27%) | 0 | 13 (37%) | 9 (45%) | 1 (5%) | 2 (6%) | 1 (3%) | 16 (34%) | 3 (25%) | 4 (67%) | 8 (36%) |      |      |
| Social Care Online           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Social Welfare               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Sociological Abs             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| SPP                          | 0 | 0 | 0 | 0 | 0 | 0 | 3 (15%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Transport                    | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Techniques**               |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| Analyst actions              | 1 (17%) | 1 (5%) | 0 | 2 (40%) | 1 (3%) |      |      |      |      |      |      |      |      |      |      |     |
| Call for Evidence            | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Citation searching           | 0 | 2 (11%) | 2 (9%) | 0 | 11 (31%) | 5 (25%) |      |      |      |      |      |      |      |      |      |     |
| Contact experts              | 21 (60%) | 6 (30%) |      |      | 1 (33%) | 0 | 2 (6%) | 0 |      |      |      |      | 2 (3%) | 0 | 1 (1%) | 1 (5%) |
| Reference checking           | 0 | 1 (5%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Website searching            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
| **Total no. of included papers** | 6 | 19 | 22 | 5 | 35 | 20 | 3 | 21 | 33 | 39 | 47 | 12 | 6 | 71 | 22 |
| Sources                | SSIS | SUP1   | SUP2   | SUP3   | SUP4   | SUP5   | SUP6   | SUP7   | SUP8   | SUP9   | TRAP1  | TRAP2  | TRAP3  | WLTC   |
|------------------------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Databases              | AMED |        |        |        |        |        |        |        |        |        |        |        |        |        |
|                        | ASSIA|        |        |        |        |        |        |        |        |        |        |        |        |        |
|                        | BNI  |        |        |        |        |        |        |        |        |        |        |        |        |        |
|                        | CINAHL |      |        |        |        |        |        |        |        |        |        |        |        |        |
| Cochrane CDSR          |      | 13 (76%) | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Cochrane CENTRAL       |      | 0      | 1 (9%) | 0      | 0      | 10 (24%) | 1 (6%) | 0      | 0      | 0      | 1 (9%) | 0      | 0      | 0      |
| Cochrane DARE          |      | 1 (6%) | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Cochrane HTA           |      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Cochrane NHS EED       |      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Community Pharmacy Future |    |        |        |        |        |        |        |        |        |        |        |        |        |        |
| EconLit                |      |        |        |        |        |        |        |        |        |        | 1 (9%) | 0      | 0      | 0      |
| EconPapers             |      |        |        |        |        |        |        |        |        |        |        | 0      | 0      | 0      |
| Embase                 |      | 1 (6%) | 6 (55%) | 1 (17%) | 0      | 14 (34%) | 2 (13%) | 12 (52%) | 5 (56%) | 2 (18%) | 1 (25%) | 20 (69%) | 13 (57%) | 1 (11%) | 25 (60%) |
| EPPI Bibliomap         |      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1 (11%) |
| EPPI Dopher            |      | 1 (6%) |        |        |        |        |        |        |        |        |        |        |        | 0      |
| EPPI Trophi            |      | 0      | 0      | 0      | 0      | 7 (17%) | 2 (13%) | 1 (4%)  | 0      | 2 (18%) | 0      |        |        | 15 (52%) | 5 (22%)  | 1 (11%) |
| ERIC                   |      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |        |        |
| Greenfile              |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| HealthEvidence         |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| HMIC                   |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| MEDLINE                |      | 1 (6%) | 9 (82%) | 3 (50%) | 2 (67%) | 25 (61%) | 9 (56%) | 16 (70%) | 4 (44%) | 9 (82%) | 2 (50%) | 15 (52%) | 7 (30%) | 2 (22%) | 33 (79%) |
| MIP                    |      | 0      | 1 (9%) | 0      | 1 (33%) | 7 (17%) | 0      | 5 (22%) | 1 (11%) | 0      | 0      | 0      | 0      | 0      |
| PsyInfo                |      | 0      | 0      | 0      | 0      | 8 (73%) | 2 (33%) | 3 (100%) | 28 (68%) | 12 (75%) | 17 (74%) | 5 (56%) | 8 (73%) | 4 (100%) |
| Social Care Online     |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Social Welfare         |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Sociological Abs       |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| SPP                    |      | 0      | 0      | 1 (17%) | 0      | 3 (7%)  | 1 (6%) | 0      | 1 (11%) | 1 (9%)  | 1 (25%) | 0      | 1 (4%)  | 0      | 0      |
| Transport              |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Techniques             |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Analyst actions        |      | 1 (6%) |        |        |        |        |        |        |        |        |        |        |        |        |
| Call for Evidence      |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Citation searching     |      | 2 (12%) | 10 (91%) | 2 (33%) | 0      | 30 (73%) | 10 (63%) | 16 (70%) | 3 (33%) | 7 (64%) | 1 (25%) | 0      | 0      | 2 (22%) |
| Contact experts        |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Reference checking     |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Website searching      |      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| Total no. of included publications | 17| 11| 6| 3| 41| 16| 23| 9| 11| 4| 29| 23| 9| 42|
| LEVAY ET AL.           |      |        |        |        |        |        |        |        |        |        |        |        |        |        |
## APPENDIX C

### C.1 NUMBER OF UNIQUE INCLUDED PUBLICATIONS RETRIEVED FROM EACH SOURCE

| Sources                          | CP1  | CP2  | CP3  | CP4  | DMP1 | DMP2 | FLV1 | FLV2 | FLV3 | FLV4 | HIV1a | HIV1b | HIV2 | PAEU | SHC |
|---------------------------------|------|------|------|------|------|------|------|------|------|------|-------|-------|------|------|-----|
| Databases                       |      |      |      |      |      |      |      |      |      |      |       |       |      |      |     |
| AMED                            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| ASSIA                           | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| BNI                             | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| CINAHL                          | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| Cochrane CDSR                   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 15   | 0     | 0     | 0    | 0    | 0   |
| Cochrane CENTRAL                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 15   | 0     | 5     | 1    | 0    | 0   |
| Cochrane DARE                   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| Cochrane HTA                    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| Cochrane NHS EED                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| Community Pharmacy Future       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| EconLit                         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| EconPapers                      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| Embase                          | 1    | 2    | 3    | 1    | 1    | 1    | 1    | 1    | 0    | 0    | 1     | 4     | 1    | 1    | 0   |
| EPPI Bibliomap                  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| EPPI Dopher                     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| EPPI Trophi                     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| ERIC                            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1     | 0     | 0    | 0    | 0   |
| Greenfile                       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1     | 0     | 0    | 0    | 0   |
| HealthEvidence                  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| HMIC                            | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 1    | 25   | 0   |
| MEDLINE                         | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 8    | 3     | 0     | 0    | 8    | 24  |
| MIP                             | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 14   | 2     | 22    | 0    | 4    | 12  |
| PsycINFO                        | 0    | 0    | 0    | 0    | 2    | 2    | 1    | 1    | 1    | 1    | 1     | 1     | 0    | 0    | 0   |
| Social Care Online              | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| Social Welfare                  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| Sociological Abs                | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   |
| SPP                             | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0   | (Continues)
| Sources | CP1 | CP2 | CP3 | CP4 | DMP1 | DMP2 | FLV1 | FLV2 | FLV3 | FLV4 | HIV1a | HIV1b | HIV2 | PAEU | SHC |
|---------|-----|-----|-----|-----|-------|-------|------|------|------|------|------|------|------|------|-----|
| Transport |     |     |     |     |       |       |      |      |      |      |      |      |      |      |     |
| Analyst actions | 1 (33%) | 1 (14%) | 0 | 2 (67%) |       |       |      |      |      |      |      |      |      |      |     |
| Call for Evidence | 0 | 0 | 0 | 0 |       |       |      |      |      |      |      |      |      |      |     |
| Citation searching | 0 | 2 (29%) | 2 (20%) | 0 | 6 (33%) | 4 (36%) |       |      |      |      |      |      |      |      |     |
| Contact experts |     |     |     |     |       |       |      |      |      |      |      |      |      |      |     |
| Reference checking | 1 (100%) | 0 | 2 (15%) | 0 |       |       |      |      |      |      |      |      |      |      |     |
| Website searching | 0 | 1 (14%) | 0 | 0 | 0 | 0 | 3 (43%) | 0 | 1 (10%) | 0 | 1 (50%) | 0 | 4 (12%) | 1 (25%) |     |
| **Total no. of unique included publications** | 3 | 7 | 10 | 3 | 18 | 11 | 1 | 7 | 13 | 10 | 9 | 2 | 0 | 34 | 4 |
| **Total no. of included publications** | 6 | 19 | 22 | 5 | 35 | 20 | 3 | 21 | 33 | 39 | 47 | 12 | 6 | 71 | 22 |
| % of included publications which are unique | 50% | 37% | 45% | 60% | 51% | 55% | 33% | 33% | 39% | 26% | 19% | 17% | 0% | 48% | 18% |

| Sources | SSIS | SUP1 | SUP2 | SUP3 | SUP4 | SUP5 | SUP6 | SUP7 | SUP8 | SUP9 | TRAP1 | TRAP2 | TRAP3 | WLTCC |
|---------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|
| Database |     |     |     |     |      |      |      |      |      |      |       |       |       |       |
| AMED |     |     |     |     |      |      |      |      |      |      |       |       |       |       |
| ASSIA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |      |       |       |       |
| BNI |     |     |     |     |      |      |      |      |      |      |       |       |       |       |
| CINAHL |     |     |     |     |      |      |      |      |      |      |       |       |       |       |
| Cochrane CDSR | 13 (81%) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cochrane CENTRAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cochrane DARE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cochrane HTA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |      |       |       |       |
| Cochrane NHS EED | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |      |       |       |       |
| Community Pharmacy Future |     |     |     |     |      |      |      |      |      |      |       |       |       |       |
| EconLit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 (17%) | 2 (17%) | 3 (43%) |     |
| EconPapers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |      |       |       |     |
| Embase | 0 | 0 | 0 | 0 | 0 | 0 | 1 (25%) | 0 | 0 | 0 | 3 (25%) | 5 (42%) | 0 | 5 (29%) |
| EPPI Bibliomap |     |     |     |     |      |      |      |      |      |      |       |       |       |       |
| EPPI Dopher | 0 |     |     |     |      |      |      |      |      |      |       |       |       |       |
| EPPI Trophi | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |      |       |       |     |
| ERIC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |      |       |       |     |
| Greenfile |     |     |     |     |      |      |      |      |      |      |       |       |       |       |
| HealthEvidence | 3 (25%) | 1 (8%) | 0 |     |     |     |      |      |      |      |       |       |       |     |

LEVAY ET AL.
| Sources               | SSIS | SUP1 | SUP2 | SUP3 | SUP4 | SUP5 | SUP6 | SUP7 | SUP8 | SUP9 | TRAP1 | TRAP2 | TRAP3 | WLTC |
|----------------------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|------|
| HMIC                 | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 1    | 2    | 0     | 0     | 0     | 0    |
| MEDLINE              | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 1    | 2    | 0    | 3     | 2     | 0     | 8    |
| MIP                  | 0    | 0    | 0    | 0    | 3    | 0    | 3    | 0    | 0    | 0    | 0     | 0     | 0     | 0    |
| PsycINFO             | 0    | 0    | 0    | 3    | 2    | 0    | 0    | 0    | 0    | 1    | 1     | 0     | 0     | 6    |
| Social Care Online   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    |
| Social Welfare       | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    |
| Sociological Abs     | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    |
| SPP                  | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    |
| Transport            | 1    | 2    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    |
| Techniques           | 0    | 0    | 0    | 3    | 4    | 0    | 1    | 1    | 0    | 1    | 2     | 0     | 6     | 1    |
| Analyst actions      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    |
| Call for Evidence    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    |
| Citation searching   | 2    | 0    | 0    | 3    | 4    | 0    | 1    | 1    | 0    | 1    | 2     | 0     | 6     | 0    |
| Contact experts      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    |
| Reference checking   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    |
| Website searching    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1     | 2     | 1     | 0    |
| Total no. of unique  | 16   | 11   | 6    | 3    | 41   | 23   | 9    | 11   | 4    | 29   | 23    | 9     | 42    | 17   |
| included publications |      |      |      |      |      |      |      |      |      |      |       |       |       |      |
| Total no. of         | 17   | 11   | 6    | 3    | 41   | 23   | 9    | 11   | 4    | 29   | 23    | 9     | 42    | 17   |
| included publications |      |      |      |      |      |      |      |      |      |      |       |       |       |      |
| % of included        | 94%  | 0%   | 17%  | 0%   | 24%  | 17%  | 44%  | 27%  | 0%   | 41%  | 52%   | 78%   | 40%   | 100% |
# APPENDIX D

## D.1 ABBREVIATIONS USED IN THE TEXT

*NICE Public Health Guidelines (PHGs)*

| Abbreviation | Topic                          | NICE PHG                                                                 |
|--------------|--------------------------------|--------------------------------------------------------------------------|
| CP           | Community Pharmacies           | Community pharmacies: promoting health and wellbeing. NICE guideline 102 |
| DMP          | Drugs Misuse Prevention        | Drugs misuse: targeted interventions. NICE guideline 64                  |
| FLV          | Flu Vaccination                | Flu vaccination: increasing uptake. NICE guideline 103                   |
| HIV          | HIV Testing                    | HIV testing: increasing uptake among people who may have undiagnosed HIV. NICE guideline 60 |
| PAEU         | Physical Activity and the Environment Update | Physical activity and the environment. NICE guideline 90 |
| SHC          | Sexual Health Condom Distribution | Sexually transmitted infections: condom distribution schemes. NICE guideline 68 |
| SSIS         | Stop Smoking Interventions and Services | Stop smoking interventions and services. NICE guideline 92 |
| SUP          | Suicide Prevention             | Preventing suicide in community and custodial settings. NICE guideline 105 |
| TRAP         | Transport Related Air Pollution | Air pollution: outdoor air quality and health. NICE guideline 70 |
| WLTC         | Workplace Health Long Term Conditions | Workplace health support for employees with disabilities and long-term conditions (PHG discontinued) |

**Sources: databases**

| Abbreviation | Database                                                                 |
|--------------|--------------------------------------------------------------------------|
| AMED         | Allied and Complementary Medicine                                       |
| ASSIA        | Applied and Social Sciences Index and Abstracts                         |
| BNI          | British Nursing Index                                                   |
| CLEM         | Cochrane Library, Embase, MEDLINE                                       |
|              | Cochrane Library (Cochrane CDSR, Cochrane CENTRAL, Cochrane DARE, Cochrane HTA, Cochrane NHS EED), Embase, MEDLINE, MEDLINE-in-Process |
| CDSR         | Cochrane Database of Systematic Reviews                                  |
| CENTRAL      | Cochrane Central Register of Controlled Trials                          |
| DARE         | Cochrane Database of Abstracts of Reviews of Effectiveness               |
| HTA          | Cochrane Health Technology Assessment                                     |
| NHS EED      | Cochrane NHS Economic Evaluation Database                               |
| Comm Pharm   | Community Pharmacy Future                                               |
| Bibliomap    | EPPI Centre Bibliomap                                                   |
| Dopher       | EPPI Centre Database of Promoting Health Effectiveness Reviews           |
| Trophi       | EPPI Centre Trials Register of Promoting Health Interventions            |
| ERIC         | Educational Resources Information Centre                                 |
| Greenfile    | Greenfile                                                                |
| HealthEv     | Heath Evidence [http://healthevidence.org/](http://healthevidence.org/) |
| HMIC         | Health Management Information Consortium                                  |
| MIP          | MEDLINE-in-Process                                                      |
| Abbreviation | Database |
|--------------|----------|
| SCO          | Social Care Online |
| Soc Abs      | Sociological Abstracts |
| Soc Welfare  | Social Welfare at the British Library |
| SPP          | Social Policy and Practice |
| Transport    | TRANSPORT database |

**Sources: other techniques**

| Abbreviation | Other technique |
|--------------|----------------|
| Analyst      | Analyst actions taken after the main searches had been completed to ensure no relevant evidence was missed (sec 6.1) |
| Call         | Call for evidence |
| Citation     | Citation searching |
| Contact      | Contact with experts |
| Ref Check    | Reference checking |
| Web          | Website searching |