Trent Focus for Research and Development in Primary Health Care

Carrying Out a Literature Review

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Carrying Out a Literature Review

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PRODUCED BY:
TRENT FOCUS GROUP, 1998
(UPDATED 2002)
This resource pack is one of a series produced by the Trent Focus Group. This series has been funded by the Research and Development Group of NHS Executive Trent.

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Reference as: Hewitt, Michael. Trent Focus for Research and Development in Primary Health Care: Carrying Out a Literature Review. Trent Focus, 1998
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Introduction

The aim of this pack is to provide an introduction to ‘reviewing the literature’. After working through the pack you will be able to:

• Appreciate the role of the literature review in the research process
• Conduct a literature search
• Develop skills to critically review research literature
• Write a literature review.

This pack defines some key terminology and presents an overview of the process of the literature review.

What is meant by the ‘literature’?

In professional and academic disciplines the term ‘literature’ is used to describe all the published work on a particular subject. Within this definition, no judgement is made regarding the quality of any single piece of work.

The main corpus of the literature lies within academic and professional journals. It has been estimated that about 20,000 journals published each year carry articles that are relevant to the disciplines of the medical and health sciences.

What is a literature review?

A literature review is a self-contained piece of written work that gives a concise summary of previous findings in an area of the research literature. It reflects an author’s knowledge and interpretation of the area of interest. It has a reference section that lists the individual pieces of work referred to in the review. Like all pieces of written research output it should include a description of the methods used to create the work.

Literature reviews vary considerably in their depth and breadth, as well as style of presentation, depending on the purpose intended by the author. This may range from a superficial search of the literature to give a researcher an insight to an area of potential research through to a scientifically rigorous ‘systematic review’.

Researchers committed to writing a review, however, should be encouraged to go beyond superficial searches and simply listing research works; they will inevitably get a biased or incomplete view of the research area under investigation. Instead, they should develop skills that will enable them to systematically search for literature and critically review the research uncovered by the search. This pack aims to help primary health care professionals achieve these skills.
Why do a literature review?

In general, the research process follows a number of distinct stages. Before any actual research can take place there are a number of planning stages to consider. Figure 1 shows a schematic representation of possible planning stages and their relationship to the full research process.

Figure 1. Stages of the research process.
Central to the planning stages is the literature review. A preliminary review of the literature will help in further identifying and clarifying your research problem. A little further down the line it may provide the theoretical input to your research idea and help in the formulation of the research question. More specifically, a literature review will:

1. provide an up-to-date picture of the research area of interest and shows which areas have been investigated and the results obtained
2. identify methods of investigation that could be used in further research
3. give indications of problems that might be encountered and possible solutions
4. reveal common findings among studies
5. reveal inconsistencies between studies
6. identify factors not previously considered
7. provide suggestions for further research.

How is a literature review done?

The process of carrying out a literature review can be described by three actions. These are searching, reviewing and writing. All three actions are outlined below and covered in later sections in more detail.

Searching requires a trip to a medical library and, in the early stages, the assistance of a librarian is particularly helpful. It involves scanning a range of information resources and careful recording of different searches and outputs. The literature yield from searching is likely to be of variable relevance and quality. The next stage in the process is, therefore, to critically assess each work along relevance and quality dimensions. Finally, it is important to document the whole process. This includes how the search was performed and how the literature was assessed in terms of the aforementioned dimensions. The body of the report summarises the main findings presented in the literature and highlights areas of agreements, inconsistencies, or areas where more research is needed.

Published literature reviews


Summary

This section has presented an overview of reviewing the literature. The following sections look in more detail at the process. The next section examines the publication of primary health care research. It describes in more detail what is meant by the literature and how a piece of research becomes a part of this body of knowledge. This is followed by two sections describing the methods that have been devised for selecting out particular subsets of the literature. The next
section describes a step-by-step approach to planning and conducting a literature search. The final section provides an overview of how to process the results of your literature search and turn them in to a review. To assist the learning process practical exercises are provided at the key stages of the pack. These take you through the essential steps of conducting your own review.
The publication of primary health care research

The main source of literature used for a review is articles published in journals. Other sources of literature, however, need to be considered and these include books, reports, conference proceedings, theses and dissertations. This section provides an overview of how and where research findings are published.

Journals

The final step of the research process (Figure 1) requires that research findings be published. This is necessary for two main reasons. First, so that the findings are open to critical examination by others, and second, that they are accessible to all who might benefit from them. The traditional vehicle for publishing research findings is journals.

Journals are magazine-sized publications containing articles. They are published in issues at regular intervals usually weekly, monthly or quarterly. Because of the regularity of publication they are also known as periodicals or serials. This regularity means that each new issue contains articles that describe the latest research findings; this is a distinct advantage over other publication media such as books that take longer to produce and update.

The publication of an article in a journal involves a number of steps:

1. Writing the article: this requires the author or authors to present their research findings in a broadly scientific style. The layout of the article may also need to conform to a particular style laid down by the editorial board of the journal; this may require the authors to include a summary (or abstract) of their work, or to keep within a specified word limit for example.

2. Submission of the article to a journal: usually via the journal’s editor.

3. Refereeing: some journals require that articles are critically reviewed by experts in the field prior to publication. This process is also known as ‘peer-review’. Referees may suggest amendments to the original text before publication can proceed, or may reject the article outright if they argue the work is fatally flawed in some way.

4. Changes to the original text: if indicated by the referees.

5. Publication: if, or when, the editor accepts the article.

There are basically two main types of journal:

- Research journals
- Professional journals.

Research journals publish peer-reviewed articles. A few examples of the many thousands of research journals available include the British Medical Journal, the Lancet and the British Journal of General Practice. In contrast, professional journals publish articles on professional issues, service developments, the use of research findings in practice and some short research articles. They are primarily written for practising health care professionals rather than researchers.
Examples include the Health Visitor Journal, the Journal of District Nursing (now known as The Journal of Community Nursing) and Practice Nurse.

**Reports**

Research reports appear in many different shapes and sizes. In general, however, they will give a more detailed account of a piece of research than that found in a journal article. Reports of original research may arise from many different sources including health authorities, professional organisations and pharmaceutical companies. The publicity and distribution of some reports may be very limited making it difficult to know of them or obtain copies.

**Theses and dissertations**

Theses and dissertations are very detailed and comprehensive accounts of research work. They are usually submitted for a higher degree at a university. Like reports their publicity and distribution may be very limited.

**Conference proceedings**

Conference proceedings comprise brief summaries of research work presented at conferences. Researchers to present preliminary findings of their work sometimes use conferences. A more detailed and complete account of the work may appear at a later date in a journal article, report or thesis.

**Books**

Textbooks generally provide comprehensive overviews of a particular subject. In doing so they may refer to, sometimes extensively, the research literature found in journal articles, reports, conference proceedings or theses. They are not usually used to present new research findings. There are, however, a few exceptions to this and some very important and influential research findings have been published in book format. These are sometimes known as research monographs.

**Summary**

Primary health care research is published in a variety of formats including journal articles, books, reports, conference proceedings, theses and dissertations. The first stage of the literature review is to locate all the research findings on a particular subject from the literature, regardless of the publication format. The next section shows how this can be achieved.
EXERCISE 1

1. The publication process

Locate one or two journals that present articles written by health care professionals or researchers. Look for information on the publication of articles within each journal (this may be presented as instructions for authors or may be found with the general information about the journal or editors located on the front inside cover).

Use the information to answer the following questions:

i. Is there a limit to the number of words each article must not exceed?

ii. Are the articles peer-reviewed?

iii. Should each article include an abstract?

iv. How should references be presented?

v. Can the article be submitted on a floppy disc?

2. Relevant literature

List any journals you know of that are likely to contain articles relevant to your profession. Add to the list any relevant reports, theses, conference proceedings and books.
Bibliographic tools to locate published research

A key stage in the literature review is to search out all the research literature on a particular subject. This may at first seem an impossible task given the huge volume of research literature published worldwide. This problem, however, has long been recognised and considerable effort has been made to simplify and speed up the process. The results of this effort are known as ‘bibliographic tools’. This section describes the main bibliographic tools used to locate published research and how to use them.

**Bibliographic tools: Journals**

The main bibliographic tools for locating journal articles are Indexing journals and Abstracting journals.

**Indexing journals**

Indexing journals tell you what has been published and where. They are published like journals but contain lists of references to journal articles, not articles themselves. A reference provides basic information about a published work such as who wrote it, the title, which journal it was published in and when. An example of a reference is:


The references in an index are listed under different subject headings. Some indexes have a large number of subject headings that represent the majority of key terms or concepts that appear in the medical and health sciences literature. A few of the many key terms relevant to primary health care could include; General Practice, Practice Nurse, Primary Health Care, Community Nursing.

In producing an index a publishing company has scanned a large number of journals noting the reference of each article found. Each article is tagged with a number of permitted key terms that best describe the contents. The reference to each article is then published in the index under each major key term (subject heading) carried by it. As an example, the reference above could be best described by following key terms: Practice Nurse, Primary Health Care, Nursing: Theory. The reference would be listed under those headings in the published index.

There are several indexes that cover journals relevant to primary health care research. These include Index Medicus, the Cumulative Index to Nursing and Allied Health Literature, the British Nursing Index, the Nursing Bibliography and the International Nursing Index. A brief outline of each is presented below.

**Index Medicus**

Index Medicus is one of the largest indexing journals. It covers a wide range of the international biomedical and medicine-related literature. Information is currently indexed from about 3900
CARRYING OUT A LITERATURE REVIEW

journals. It lists references under an extensive system of subject headings known as MeSH (Medical Subject Headings). It is published monthly with annual cumulative editions.

**Cumulative Index to Nursing and Allied Health Literature (CINAHL)**

CINAHL covers about 1200 journals in the nursing and related health fields. It is published bi-monthly with an annual cumulative editions.

**The British Nursing Index (BNI)**

NMI covers about 220 journals in nursing and midwifery. It is published monthly with annual cumulative editions. In 1997 the index was retitled as the British Nursing Index (BNI).

**Nursing Bibliography**

This is a monthly index published by the Royal College of Nursing (RCN). It covers the journals held in the RCN Library.

**International Nursing Index(INI)**

INI covers about 600 journals on nursing, midwifery and health visiting. It is published quarterly with annual cumulative editions.

**Abstracting journals**

Abstracting journals are similar to indexing journals in that they tell you what has been published and where. They differ, however, in the information they publish. Whereas indexing journals publish references to articles they have found, abstracting indexes publish each reference with an accompanying abstract. The abstract summarises the full written work.

Research journals commonly require authors to submit abstracts with their full article. They are usually printed at the beginning of each article when published. An example of an entry in an abstracting journal is:


Randomised trial of lipid lowering dietary advice in general practice: The effects on serum lipids, lipoproteins, and antioxidants


Objective - To determine the relative efficacy in general practice of dietary advice given by a dietitian, a practice nurse, or a diet leaflet alone in reducing total and low density lipoprotein cholesterol concentration.

Design - Randomised six month parallel trial.

Setting - A general practice in Oxfordshire.
Subjects - 2004 subjects aged 35-64 years were screened for hypercholesterolaemia; 163 men and 146 women with a repeat total cholesterol concentration of 6.0-8.5 mmol/l entered the trial. Interventions - Individual advice provided by a dietitian using a diet history, a practice nurse using a structured food frequency questionnaire, or a detailed diet leaflet sent by post. All three groups were advised to limit the energy provided by fat to 30% or less and to increase carbohydrate and dietary fibre. Main outcome measures - Concentrations of total cholesterol and low density and high density lipoprotein cholesterol after six months; antioxidant concentration and body mass index. Results - No significant differences were found at the end of the trial between groups in mean concentrations of lipids, lipoproteins, and antioxidants or body mass index. After data were pooled from the three groups, the mean total cholesterol concentration fell by 1.9% (0.13 mmol/l, 95% confidence interval 0.06 to 0.22, P<0.001) to 7.00 mmol/l, and low density lipoprotein cholesterol also fell. The total carotenoid concentration increased by 53 nmol/l (95% confidence interval 3.0 to 103, P=0.039). Conclusions - Dietary advice is equally effective when given by a dietitian, a practice nurse, or a diet leaflet alone but results in only a small reduction in total and low density lipoprotein cholesterol. To obtain a better response more intensive intervention than is normally available in primary care is probably necessary.

An abstract of an article is useful addition information to have. It may help when assessing the relevance of the research work to your particular area of interest without the need for the full article. We shall return to this issue later in the final section: Examining the Results and Writing a Review.

The main abstracting journal for medical sciences is known as *Excerpta Medica*. It covers about 4700 journals (including some book reviews and conference proceedings) from the biomedical literature. It has a strong coverage of European research and the pharmaceutical literature. *Excerpta Medica* is published as a series of 51 sections on different medical topics, each is published monthly with annual cumulative editions.

**Bibliographic tools: Other sources of literature**

Although the majority of literature for a review will be journal based you may need to trace material in other formats such as books. If this is the case then a different set of bibliographic tools must be used. These include bibliographies and library catalogues.

**Bibliographies**

Bibliographies do for books and other formats of literature what indexes do for journals. The major bibliography for books currently in print is called Whitaker’s Books in Print. Books are arranged in alphabetical order separately for authors and titles as well as a subject index. One major limitation is that not all publishers are represented. Another significant bibliography is the British National Bibliography, which is based on the stock of the British Library.

There are a small number of specialist bibliographies. The most notable one is the Steinberg Collection of Nursing Research, which is published by the Royal College of Nursing (RCN). It provides details of all theses held in the RCN Library in London.
Library catalogues
Library catalogues provide guidance to the literature available within a particular library. As well as books and conference proceedings they will list locally produced reports, dissertations and theses that are held in stock.

Summary
Bibliographic tools have been developed to help locate research literature. There are a number of different indexing and abstracting journals (simply referred to as ‘indexes’) to help locate articles in journals. Other sources of literature can be located using bibliographies and library catalogues. The next section describes how to use the various bibliographic tools.
How to use bibliographic tools

Most of the bibliographic tools described in the last section are available in two formats: paper and electronic. Searching the paper versions can take many hours of work, involving manually scanning the different indexing or abstracting journals. The electronic (or computerised) versions are relatively new but have already had a significant impact on the search process; what can take several hours of manual searching can be achieved in minutes with a computer.

There are two ways of searching the literature using a computer. The first is via ‘CD-ROM’ and the second is ‘online’. Until recently CD Rom was a commonly used method of searching, particularly in libraries with CD-ROM (Compact Disc Read-Only Memory) the references to the literature are stored in digital form on compact discs. The online method uses networks of electronically connected computers. A large remote computer to is used to store the references and access to them is made via a local library computer or more commonly now via the Internet. There is currently access for health professionals in the Trent Region to a suite of bibliographic databases known as Biomed. This includes Medline and CINAHL, and is available at [http://biomed.niss.ac.uk](http://biomed.niss.ac.uk). You will need to register for a password with your local healthcare library to access the website. Most medical libraries will offer at least one of these services, with the assistance of a librarian if required.

The remainder of this section shows examples of manual and computerised searches. Manual searching is sometimes still required, as not every indexing or abstracting journal is available online.

**Manual search**

Subject: Postnatal depression Index: Volume 6, No. 8, 2002 of the British Nursing Index (BNI) will be searched:

1. Check that Postnatal depression is a subject heading used by BNI. The list of subject headings is located at the back of the issue. Also a list of the Journals covered by the index is listed at the back of the volume.

2. Find the heading in the main part of the index.

3. Note the references:

   Robinson, J  
   Separation from the baby: a cause of PTSD? (Consumer comments series. Post traumatic stress disorder following staff taking a baby away from a mother. 2 refs).  

   Sanderson, C; Cowden, B and Hall, D  
   Is postnatal depression a risk factor for sudden infant death? (Research within the Sheffield Child Development study replicating a New Zealand study. 27 refs).  

   One more reference is listed.
Online search

This example shows a search of Medline using the OVID online interface. Medline is the computerised version of *Index Medicus*, which is described in the previous section. The computerised versions differ slightly from the original paper version in that it carries abstracts for most references.

Subject: The management of asthma in general practice

The following keywords were entered in turn:

- asthma
- general practice

The following is displayed on the screen:

<table>
<thead>
<tr>
<th>#</th>
<th>Search History</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ASTHMA/</td>
<td>59267</td>
</tr>
<tr>
<td>2</td>
<td>Family Practice/</td>
<td>39420</td>
</tr>
<tr>
<td>3</td>
<td>1 and 2</td>
<td>481</td>
</tr>
</tbody>
</table>

For each keyword entered the computer generates a result which indicates the number of articles found. Notice that although the second keyword entered was ‘general practice’ the computer records it as ‘family practice’. The change occurred as the search software mapped ‘general practice’ onto the preferred subject heading i.e. family practice (Index Medicus is produced in the United States of America hence it uses American terminology and spellings). The final line requests that the first two keywords are combined in one search. That is, find only those articles that appear under both subject headings. As the result is still quite large (481) it may be necessary to select subheadings to the key terms rather than include all the subheadings as at present.

Each search set can be viewed which shows each the reference to each article found together with the abstract. References and abstracts can be selected and printed out, or transferred electronically to other computer software such as databases and word processing packages.

This example shows a search of the online service called EMBASE. This is the computerised version of *Excerpta Medica* which is described in the previous section.

Subject: The management of depression in general practice

Index: Embase on-line 1980 to present

A search using ‘Words in title’ (selected via the on-screen menu e.g. the ‘title’ icon) was carried out. The keywords entered were:

- depression
- general practice

The two keywords were combined in a single search with AND.
This generated the following output:

<table>
<thead>
<tr>
<th>#</th>
<th>Search History</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>depression.ti.</td>
<td>23701</td>
</tr>
<tr>
<td>2</td>
<td>general practice.ti.</td>
<td>6136</td>
</tr>
<tr>
<td>3</td>
<td>1 and 2</td>
<td>117</td>
</tr>
</tbody>
</table>

In this example, only references with the keywords in their title (indicated by the notation @TI) were located. This is an alternative strategy for searching.

The same search is performed with MEDLINE where the differences in results reflect the greater size of MEDLINE and also the differences in the journal coverage of the database.

<table>
<thead>
<tr>
<th>#</th>
<th>Search History</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>depression.ti.</td>
<td>28630</td>
</tr>
<tr>
<td>2</td>
<td>general practice.ti.</td>
<td>10512</td>
</tr>
<tr>
<td>3</td>
<td>1 and 2</td>
<td>166</td>
</tr>
</tbody>
</table>

**General points on computer searching**

Unlike manual searching computer searching is an interactive process. The searcher types in a keyword on the keyboard, and the computer displays the result as the number of references retrieved. The references themselves can be seen when the user issues a ‘display’ or ‘print’ command. Usually the commands are available via an on-screen menu.

Computer searching offers a number of advantages over manual searching. First it is very much quicker. Second, as demonstrated above search terms can be combined in order to retrieve references listed under two or more subject headings. Third, you have the choice of using keywords that the index uses or you can use so-called ‘free-text’, which can be any word or phrase. Free-text searches will retrieve references where the word or phrase appears anywhere in the title or abstract of an article.

**Summary**

This section has briefly described how to use different bibliographic tools. In practice you will encounter many different indexes and computer systems; it is beyond the scope of this pack to describe them all. The examples and exercises (below) are limited to those most commonly available. Learning how to use bibliographic tools is best achieved through practical experience in the library and becoming familiar with the systems available to you.
EXERCISE 2
Most libraries will offer the assistance of a suitably experienced librarian when using bibliographic tools. Beginners are well advised to seek this assistance.

1. Locating bibliographic tools

Medical libraries have a number of bibliographic tools available for general use. Visit your local library and find out which ones are held and in which format they are available (i.e. paper/electronic).

2. Using bibliographic tools

Replicate the manual search on postnatal depression using the British Nursing Index as described in this section.

Replicate the Medline CD-ROM search on asthma in primary care as described in this section.
Conducting a literature search

The objective of a literature search is to retrieve as much accurate information on a given subject as is possible from suitable sources. It is clear from this and the preceding sections that the novice reviewer is faced with a difficult task. The pool of available research literature is huge and only a tiny fraction of it, the particular subject of interest, needs to be located. Help is at hand of course in the form of bibliographic tools, but which ones should you use? And in which format, paper or electronic?

This section presents some basic guidelines to follow when tackling a literature search. Like all types of investigation, an effective search requires careful planning. A badly organised search is likely to yield little relevant information and waste time.

General points

The first point to note is that the planning stage is the same for both manual and computerised searching; only the mechanics of searching differ. Second, a search takes time to complete, even for the experienced reviewer. A reasonable continuous period of time should be set aside for task; an hour here or there is not sufficient. Third, it is important to be systematic and record each step of your search. With indexes or abstracting journals one useful approach is to start with the most recent and to work backwards. There are no hard and fast rules for the period of the search, except to say that it would be unwise to restrict it to recent years. Finally, decide on your subject of interest and stick to it during the search. When browsing through indexes many interesting looking titles will appear - don’t get side tracked.

Bibliographic tools

The choice of bibliographic tools may well depend on what your local library can offer. If possible then at least one computerised search (e.g. Medline or Embase) should be performed. One general point to consider is the subject of interest and potential coverage by the different indexes. The main indexes cover much of the mainstream medical literature, but at the same time do not cover all of the journals in all disciplines. It is wise, therefore, to check the list of journals a particular index covers (this is published with each annual cumulative edition) before starting. If the most common journals in your field are missing, then a search of that particular index may not be a good place to start. Furthermore, although Medline and Embase cover over 3000 journals each, it has been estimated that there is only about a 30% overlap of journal coverage. If they are available, then both should searched.

Keywords

To increase the chances of retrieving relevant information from a search you need to create a description of the subject of interest. This takes the form of a set of words or phrases, which are known as ‘search terms’ or ‘keywords’. Each search term or keyword identifies a part of the subject and provides a focus for the search.
The process of creating keywords involves three stages:

1. **Identify the key concepts in your research area**

2. **Analyse the concepts; extend their scope to find broader terms; define them with increasing precision to produce narrower terms; produce a list of synonyms; produce a list of related terms.**

3. **Map the list of key words or terms to the subject headings of each index to be used in the search.**

**Creating key terms: an example**

The area of interest is health visiting and the prevention of accidents to children in the home. The key concepts are health visitor, accident prevention, children, and home. To analyse the concepts it can help to create ‘spider diagrams’ as shown below (Figure 2).

```
Broader terms
Community nursing
Community health services
Public health nursing

HEALTH VISITOR

Related terms
Family support
Social support
Home support

CHILDREN

Narrower terms
Pre-school
Infants

Broader term
Accidents

Related terms
Health education
Preventive health care
Injury

ACIDENT PREVENTION

Related term
Environment

Broader term
HOME

Narrower term
Home visit

Synonym
Domiciliary
```

**Figure 2. Key concepts and related terms**

Start the diagram by writing down the key concepts on a blank piece of paper. Carry out a brainstorming activity and make a note of related, broader and narrower terms as well as synonyms for each one.
Having worked through these steps you will have a list of keywords that you can match to the subject headings used by the indexing journals. Examples of this are shown below (Table 1). Keywords have been matched to subject headings from the British Nursing Index (BNI).

Table 1. Keywords and matched BNI subject headings

<table>
<thead>
<tr>
<th>Keyword</th>
<th>NMI Subject Heading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health visitor</td>
<td>Health visiting</td>
</tr>
<tr>
<td>Community nursing</td>
<td>Community nursing</td>
</tr>
<tr>
<td>Public health nursing</td>
<td>No match</td>
</tr>
<tr>
<td>Home support</td>
<td>Home care services</td>
</tr>
<tr>
<td>Family support</td>
<td>No match</td>
</tr>
<tr>
<td>Accident prevention</td>
<td>Accident prevention</td>
</tr>
<tr>
<td></td>
<td>Also Children: Accidents</td>
</tr>
<tr>
<td>Children</td>
<td>Children</td>
</tr>
<tr>
<td>Infants</td>
<td>Infants</td>
</tr>
<tr>
<td>Pre-school</td>
<td>No match</td>
</tr>
</tbody>
</table>

The majority of indexes publish the subject headings they use. The subject headings they use are individual to each index, some of your keywords will match exactly those used by a particular index (this includes a close match where the preferred subject heading will be suggested), some will match another, and others will not match at all.

**Recording the results**

The results of a search are references to articles. For manual searches then you have no choice but to write out by hand every reference found. One useful way to do this is to use index cards. Enter each reference on a single card (see Figure 3 below) and store in a box. This allows the references to be sorted in some meaningful way (e.g. alphabetically by author, or grouped into categories etc.) at a later date.

*Harding-Price, D*  
*St. John’s Wort and Drugs: What Nurses Need to Know.*  
*Nursing Times 2000; 13 July 96(28):41.*

**Figure 3. An example index card**

It is also important to record the progress of your search. This ensures a systematic approach. One way would be to compile a table (Table 2) as below which can be marked as required.
Table 2. Framework for systematic recording of searches

<table>
<thead>
<tr>
<th>Index</th>
<th>Subject Heading</th>
<th>Years searched</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMI</td>
<td>Health visiting</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Accident prevention</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Children: Accidents</td>
<td></td>
</tr>
<tr>
<td>Index Medicus</td>
<td>Community health nursing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accident prevention</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Child</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 and 2 and 3</td>
<td></td>
</tr>
</tbody>
</table>

Computerised searches will generate reference lists that can be transferred electronically on to a computer and loaded into a database or word processor. Alternatively they can be printed out on paper. Computerised searches will also record your search details, as for example:

**Database: Medline <1993 to April 1997>**

<table>
<thead>
<tr>
<th>Set</th>
<th>Search</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>community health nursing/</td>
<td>2095</td>
</tr>
<tr>
<td>002</td>
<td>accident prevention/</td>
<td>272</td>
</tr>
<tr>
<td>003</td>
<td>child/</td>
<td>97783</td>
</tr>
<tr>
<td>004</td>
<td>1 and 2 and 3</td>
<td>5</td>
</tr>
</tbody>
</table>

**Satisfactory searches**

When conducting your search it is always a good idea to periodically examine the references and decide if the search is ‘on target’. It is difficult, often impossible, to know how many references to expect on a particular subject. However, if you already know of some key references in the area and your search does not find these, you should suspect a problem.

There are a number of problems that can occur at each stage of search process. For example you may have:

1. defined your subject too narrowly and ended up with no references
2. defined your subject too broadly and ended up with thousands of references
3. used inappropriate keywords
4. chosen the wrong (or not the best) indexes for you search.

Finding too little: be especially careful if you find nothing. Often this is not the case. Proving that there is nothing is not easy. You should try several different approaches before coming to this conclusion. It is easier to begin a search with a broad strategy and narrow appropriately than to construct a narrow search and try to broaden it if you find nothing.

Finding too much: this is a common problem particularly with computerised searching. Try limiting the search by selecting relevant sub-headings for the search terms you are using.
If you decide your search is unsatisfactory then you need to revisit keyword and index selection and iterate through the process again.

**Summary**

This section has provided an insight into conducting a literature search. To maximise the success of a search careful planning is required. Decisions need to be made for instance concerning the bibliographic tools to be used and the time period to search. One important step is the construction of keywords to be used in searching; care here may save you time looking through irrelevant material later. Finally, it is important to record the searches you perform and the results.

The output from this the literature search is a list of references to articles of the subject of your interest. If you have used some of the computerised bibliographic tools or have searched an abstracting journal each reference is likely to include a summary (abstract) of the full article. The final section looks at how to analyse and review this literature.

**EXERCISE 3**

1. Plan and conduct a literature search

   a) Decide on an area of interest for investigation. Try to think of a specific area/problem/feature/question of your work rather than a general area. For example, ‘Are Practice Nurses effective in delivering health care?’ is too general; whereas, ‘Do Practice Nurses give effective quit-smoking advice?’ is more specific and a more appropriate starting place.

   b) Collect together any articles you may already have on the area of interest. Use the articles and your clinical experience in the area to make a list of key terms/phrases/concepts.

   c) Use the list of key terms and generate broader, narrower, and related terms and synonyms (use spider diagrams as shown in Figure 2 if this helps).

   d) Make a list of the bibliographic tools that are available to you, for instance, indexes such as Medline and BNI.

   e) Match your list of key terms (from step c above) to the subject headings used by each index.

   f) Draw up a table of the index, subject headings and years to be searched (see Table 2 for an example).

   g) Conduct the search, be systematic and record all results carefully as described in the section.
Examining the results and writing a review

Examining the results of a literature search can be performed at different levels of complexity. This may range from a superficial scan of the references to decide on relevance, to a detailed analysis of the quality of each article. The aim of this section is to present an overview of these levels of analysis. The final part of the section outlines the structure of a literature review report.

Relevance

The first level of analysis is to scan the list of references, remove duplicates and assess the relevance of the material your search produced. It is easier to assess relevance when using references from abstracting journals than indexing journals because a summary of the work is provided by the abstract.

However, assessing relevance on the strength of an abstract is not always possible and in some instances the full paper will be required. In addition, the quality of the material can only be assessed by looking at the original work. Collecting copies of original articles is, therefore, the next task and a visit to the nearest medical library is one place where a search can begin.

Medical libraries will publish a list of journals they subscribe to and a proportion of your references can be photocopied from stock. However, libraries have finite budgets and shelf space and will only hold a limited number of journals. It is not likely, therefore, that all of your references will be available from a single library. This problem is resolved by the Inter-library Loans (ILL) system whereby items from other libraries are lent or photocopied on request. Two important points must be made with regard to the ILL system. First, it takes time to process each request and provide the material; this delay can be as long as four weeks. Second, the ILL system is not free and a charge may be made for each item requested. Consult your local library staff for details.

Quality

It is important to note that the contents of an article do not necessarily represent facts just because they are in print. An article may instead represent the views or opinions of an author which are not based on research evidence. Reading literature critically and assessing quality can be a complex and involved activity. It is a skill that needs to be learned, practised and developed. There are, however, a number of guidelines that can help you get started with this process.

Peer review

The first section described the steps involved in the publication process. One important stage in the process is peer-review where each article is critically reviewed prior to publication. This acts as a filtering stage with the idea that only works of sufficient quality are published.

To some extent, therefore, you can judge an article by the journal in which it appears. Journals that use peer review will have an editorial committee and/or an editorial advisory board. They will outline their arrangements for peer-review in each issue of the journal. This can usually be found on the inside front or back cover of the journal.
**Carrying out a literature review**

**Reading articles**

Before you consider a detailed analysis of each article it is worth previewing each one by scanning the abstract, the introduction, headings and subheadings, tables and figures, discussion and conclusions, and the reference list. This will provide you with an initial impression of the article; whether there are any obvious omissions, lack of detail, errors in presentation of figures. A reference list, for example, that includes articles from a range of journals and years, with books and other formats included, will indicate that a proper search of the literature has been made.

**Critical appraisal**

Critical appraisal of research articles involves asking the question ‘Am I persuaded by this study’s results?’ Answering this question involves asking a series of other questions:

- Is the purpose of the study clear and well defined?
- How was the study done? Are the methods clearly described and appropriate?
- Are the results presented in a clear and understandable format?
- Does the interpretation of the results seem consistent with the results presented?
- Are there other explanations that could account for the results?

The above set of questions can be answered by a second set of more detailed questions. These take the form of checklists, which have been specifically developed to critically assess different types of research designs and articles (for instance, Crombie 1996).

**Writing a review**

The structure of a review generally follows that of an original research article. It will have sections for methods, results, discussion and conclusions as well as an introduction.

The introduction should state the purpose of the review and give brief background information on the subject of the review. The methods section should describe in detail the methods used to compile the review. This will include details of which indexes were used, the period covered by the search and keywords used in searching. Details of articles found in the search but excluded later should be given. This may include reasons associated with irrelevance of work to the subject of the review or low quality.

The results section summarises the main findings reported in the articles reviewed. One useful way of presenting results from many studies is in table form, for example:
Table 3. Compliance of insulin use by diabetics (fictitious reports and data)

<table>
<thead>
<tr>
<th>Article</th>
<th>No. of patients</th>
<th>Age range of patients (mean)</th>
<th>Method of measuring compliance</th>
<th>No. (%) of patients compliant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith (2000)</td>
<td>50</td>
<td>50-65 (55)</td>
<td>Self report</td>
<td>42 (84)</td>
</tr>
<tr>
<td>Jones (2001)</td>
<td>56</td>
<td>55-75 (62)</td>
<td>Self report</td>
<td>48 (86)</td>
</tr>
</tbody>
</table>

The table should be accompanied by text highlighting key points you wish to make about the data. This may include areas of agreement or disagreement between studies, and comments on any of the methods used by the researchers in obtaining their results.

The review ends with a discussion of your findings and any conclusions you wish to make. This may highlight important gaps in the field or how research in the area could be taken forward, including implications for health care practice.

**Summary**

Compiling a literature review is a crucial part of the research process. The first task is to search the literature for articles on your particular subject of interest. This is aided by the use of a range of bibliographic tools such as indexing journals. The collection of articles must then be assessed for relevance and quality. Finally, the whole process should be documented in the form of a structured report. The whole endeavour requires certain skills, planning, time and access to good library facilities. However, a good review will provide an overview of the research already conducted, identify gaps or limitations in the research and act as a sounding board for future research ideas.

**EXERCISE 4**

1. Summarising your results

   a) Scan the list of references from the previous exercise. Use title or abstract information to assess the relevance of each one. Make a note of relevant articles.

   b) Collect together copies of the relevant articles from your library.

   c) Extract key information from each relevant article and enter in a table (see Table 3 for an example).
**Answers to exercises**

Since the exercises for this pack are to a large extent based on self-selected examples, it is not feasible to provide specific answers to the exercises. You should, however, draw on the guidelines provided in the text when approaching them.
References


Further reading and resources


## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>a very concise overview of an article.</td>
</tr>
<tr>
<td>Abstracting journals</td>
<td>contain lists of references to journal articles, each one listed with the abstract. Lists are arranged under subject headings.</td>
</tr>
<tr>
<td>Article</td>
<td>a self-contained report on a particular subject.</td>
</tr>
<tr>
<td>Bibliographic tools</td>
<td>indexing or abstracting journals to help locate literature.</td>
</tr>
<tr>
<td>CD-ROM</td>
<td>compact disc read by computers. Used to store references to the literature.</td>
</tr>
<tr>
<td>Indexing journals</td>
<td>contain lists of references to journal articles. Lists are arranged under subject headings.</td>
</tr>
<tr>
<td>Journals</td>
<td>magazine-sized publications containing articles.</td>
</tr>
<tr>
<td>Literature</td>
<td>all published written work.</td>
</tr>
<tr>
<td>Literature reviews</td>
<td>a concise summary of published work on a specified subject.</td>
</tr>
<tr>
<td>On-line</td>
<td>connection via a computer network to a large remote computer that holds references to the literature.</td>
</tr>
<tr>
<td>Systematic review</td>
<td>an unbiased and scientifically rigorous approach to reviewing the literature.</td>
</tr>
</tbody>
</table>