



Process notes

Search for Evidence and Critical Appraisal Health Services Research (HSR)

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KCE Process notes

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I INTRODUCTION

This note describes the methodology to conduct a review of the literature on a health services research (HSR) topic. It provides a systematic approach to achieve uniformity in retrieval and quality of content. In consultation with KCE the methodology may be adapted to suit specific purposes or approaches of the literature review.

This note (version June 2007) should be considered as a living document. To take account of new evidence or new methods, yearly updates are required. The next update is scheduled for June 2008.

WHAT IS HEALTH SERVICES RESEARCH?

From Academy Health (Academy Health 2007)

“Health services research is the multidisciplinary field of scientific investigation that studies how social factors, financing systems, organizational structures and processes, health technologies, and personal behaviors affect access to health care, the quality and cost of health care, and ultimately our health and well-being. Its research domains are individuals, families, organizations, institutions, communities, and populations.”

(Academy for Health Services Research and Health Policy, 2000)

“Health services research examines how people get access to health care, how much care costs, and what happens to patients as a result of this care. The main goals of health services research are to identify the most effective ways to organize, manage, finance, and deliver high- quality care; reduce medical errors; and improve patient safety.”

(Agency for Healthcare Research and Quality, 2002)

Both definitions of HSR illustrate its multidisciplinary nature and the broad range of topics which are studied in HSR. Although the domain “equity and patient behaviour – EPB” is a separate KCE domain, topics that would typically fall within this domain meet the above definitions of HSR. Therefore, the (re)search procedure for EPB studies can follow the same methodology as for HSR studies.

BACKGROUND

Research topics in the domain of HSR are often ‘complex and multidimensional’ topics studied with different research methodologies. In this note we structure possible HSR-research topics into four broad domains: (1) the organizational structure of the health care system, (2) the way it is financed, (3) the payment scheme of providers and services and (4) the provision of services, including the benefits package. Most research questions in HSR studies of KCE can be assigned to one or more of these domains.

SCOPE AND METHODOLOGY OF THE LITERATURE REVIEW FOR HSR TOPICS

A necessary first step is to define the research question(s) unambiguously, followed by a clear-cut scope of the review (e.g. one should consider whether a systematic review is relevant and/or feasible given the time limits of the study, or whether other review methods suffice). The research team (KCE and external experts) determines the research question(s) that the literature review should address and the definition of the scope of the review.

Specific to literature reviews in HSR is the heterogeneity of the evidence. Systematic reviews of complex and heterogeneous evidence solely based on formal protocol-driven search strategies (as for Cochrane Systematic Reviews) may fail to identify important evidence. Informal approaches, including browsing and “asking around” can substantially increase the yield and efficiency of search efforts (Greenhalgh and Peacock 2005).

A review (systematic or not) of the literature on a HSR topic should clarify the process of collection, appraisal and interpretation of relevant studies.

An *evidence report* consists of the following steps :

1. Development of a review protocol
2. Formulating the review question(s)
3. Locating studies and sources of information
4. Selecting studies
5. Critical appraisal of the evidence
6. Data extraction
7. Analysing and interpreting results

Based on the Cochrane Collaboration Handbook (Higgins and Green 2006) and the CRD Report 4 (Richardson et al. 1995). Interested readers are also referred to Petticrew and Roberts (Petticrew and Roberts 2006).

2 METHODOLOGICAL APPROACH TO LITERATURE SEARCH

2.1 STEP 1 – DEVELOPMENT OF A REVIEW PROTOCOL

A review protocol, which specifies the plan the review will follow to identify, appraise and collate evidence, is indispensable. Since a review is less likely to be biased if it is based on a protocol that contains well-developed questions and methods to answer them, a review protocol is produced before proceeding with the review itself. During the review process it may be necessary to take or alter methodological decisions which were not fully anticipated in the initial protocol.

The main components of a protocol are:

- Background
- Review question(s)
- Search strategy including search terms and resources to be searched
- Study selection criteria and procedures
- Study quality assessment checklists and procedures
- Data extraction strategy
- Synthesis of the extracted evidence

Contrary to reviews of clinical evidence, quality assessment checklists and data extraction and synthesis methods are less developed for HSR topics.

2.2 STEP 2 – FORMULATING THE REVIEW QUESTION(S)

The protocol and hence the review should state precisely the main question and the secondary questions which will be addressed in the review. Well-formulated *clinical* questions are asked in PICO-format (type of participants or population, type of interventions or exposures - usually a comparison between two or more alternatives - and types of outcomes), which breaks down the research question into search terms. For HSR, the appropriateness of the PICO-format will depend on the specific research question and on the type of studies that are suitable for addressing the review question. If the PICO-format is not appropriate, possible alternatives in case of health service related issues are the ECLIPSE-format (Wildridge and Bell 2002) and the SPICE-format.

Even if not all of the elements in PICO, ECLIPSE or SPICE are relevant to every search, they should be considered at the start.

ECLIPSE:

- Expectations (about improvement or innovation or information)
- Client Group (at whom is the service aimed? e.g. persons above 65)
- Location (where is the service sited? e.g. primary care, hospital)
- Impact (what is the change in the service which is being looked for? What would constitute success? How is this being measured? - similar to outcomes in the PICO-format)
- Professionals Involved
- Service (e.g. outpatient services)

SPICE:

- Setting (What is the context of the question?)
- Perspective (Who are the users/potential users of the outcomes?)
- Intervention (What is being done to them?)
- Comparison (What are the alternatives?)
- Evaluation (How will you measure if the intervention is successful?)

An example of SPICE

Research question: what is the impact of an increase in the level of cost-sharing on access to health services for the chronically ill in European countries?

- Setting: (a selection of) European countries
- Perspective: chronically ill
- Intervention: increased cost-sharing
- Comparison: no increase
- Evaluation: access to health services

Irrespective of the format that is used to define the key components of a research question, the 'complex and multidimensional' nature of HSR topics makes it necessary to structure possible KCE research questions in this domain. Even if the main research question is specific, in most studies characteristics of the overall health care system have an added value to answer the more specific research question(s), certainly when an international comparison is made. This note structures HSR topics along four main characteristics of a health care system. Research questions in HSR-studies may relate to one or more of the four domains: organization, financing, payment of services and remuneration of the providers, provision of services and composition of the benefits package (adapted from the WHO-template (Mossialos, Allin, and Figueras 2007)). The WHO-template offers detailed guidelines to write reports that provide an analytical description of a country's health care system.

There exists a wide variety of definitions and typologies, especially for the financing and remuneration domains. This heterogeneity of typologies proposed in the literature reflects the large variability of institutional settings, regulations and characteristics of health care systems. Appendix I offers relevant references which review some well-known typologies. It is recommended to apply one or more of the mentioned typologies^a. Any other typology should be motivated and discussed with KCE. The WHO-template and the typologies serve primarily as a guide designed for a standardised structure of the description of the overall health system in KCE reports.

2.3 STEP 3 – LOCATING STUDIES AND SOURCES OF INFORMATION

The development of a successful search strategy contains several elements. A pre-assessment can be a valuable tool to support the information needs. A pre-assessment may involve contacting experts or pilot-searching basic bibliographic databases to define the scope of the study and hence of the literature review. The selection of experts and sources as well as the choice of MeSH or free-text terms should be explicitly stated.

A pre-assessment of the existing literature is based on a limited literature search. It is a useful instrument to (re)define the research question(s) and to determine the inclusion and exclusion criteria on

- the types of study designs
- the types of participating countries (in an international comparison)
- the types of participating populations (by age, sex, insurance status, provider, ...)
- the types of intervention (e.g. co-payments)
- the types of outcome measures (e.g. impact of co-payments on health care use and health)
- the quality of the studies (is there a clear description of the methodology, sources of data...).

After the review questions have been (re)defined, a more exhaustive search is needed. HSR articles are spread through a large number of peer-reviewed journals and grey literature. To avoid that relevant sources are missed by concentrating on protocol-driven search methods, the search should be as comprehensive as possible. Literature

^a Some typologies are only relevant in an international comparison of health care systems (see section 4).

should be located using a variety of methods. These methods should be fully described in reporting.

Data sources used to identify studies are summarised below. The main focus of this section is on sources of information other than electronic bibliographic database (e.g. grey literature).

2.3.1 Electronic bibliographic databases

A large number of electronic bibliographic databases in many fields have been developed. They contain bibliographic details and (frequently) abstracts of published material as well as thesaurus-driven indexing terms.

General medical databases such as MEDLINE/PubMed and EMBASE cover all areas of health care and index journals published from around the world. Other databases focus on specific regions in the world or on specific areas of health (such as the Cumulative Index of Nursing and Allied Health (CINAHL)).

For a HSR-topic, searching the general medical databases should be complemented with searches in one or more of the Health Economics Bibliographic Databases available at the NLM website (Academy Health 2004). The list is non-exhaustive and has to be completed by the authors of HSR reports, in function of the specific research question.

Recommended general bibliographic databases include:

- MEDLINE/PubMed
- EMBASE
- CRD-database

Recommended specific HSR bibliographic databases include:

- EconLit
- Sociological Abstracts
- NBER (National Bureau of Economic Research)
- RePEc (Research Papers in Economics) (IDEAS)

Other databases specific for health care domains are for example:

- CINAHL (nursing)
- PsychINFO
- ERIC

And for legal issues:

- JURA (Belgium)^b

SEARCH TERMS

A search strategy for electronic databases requires a structured approach. However, in many cases the development of a search strategy will not be a sequential process. Moving backwards and forwards through the scoping of the original topic is characteristic of searching in more multi-faceted subject areas (McNally and Alborz 2004).

In an iterative process the strategy is refined through testing of several search terms, incorporating new search terms and modifying existing terms. A starting point can be the identification of MESH terms through the MESH thesaurus. The search will be refined after the finding of adequate references that used these terms or other new possibilities. Strategies are built up from a series of pilot searches and discussions of the results of those searches among the review team.

^b International databases on legal issues can be found at <http://wetten.overheid.nl/>, <http://www.legifrance.gouv.fr/>, <http://www.bundesrecht.juris.de/>, <http://www.bundesanzeiger.de/>, http://www.opsi.gov.uk/legislation/about_legislation.htm, <http://www.eur-lex.europa.eu/>.

Depending on the possibility and choice of format to define the key components of a review question, the first step involves the identification of search terms for each key component. The group of search terms for each key component of the review question should include free-text terms (synonyms, spelling variants...) in the title and abstract of studies and subject indexing terms assigned by the database producer. Search terms should be adjusted in line with individual database requirements (e.g. translation of MESH terms to Emtree terms).

2.3.2 Other sources

A search for evidence exclusively based on electronic databases may overlook relevant publications. Reviewers are advised to search more widely. To classify other sources of evidence, the following headings can be used:

- Handsearching
- Reference lists
- Grey literature
- Correspondence

2.3.2.1 *Handsearching*

Handsearching involves a manual page-by-page examination of the entire contents of a journal issue to identify all eligible reports, whether they appear in articles, abstracts, news columns, editorials, letters or other text. To identify articles that have been missed in electronic database and reference list searches (see section 2.3.2.2), key journals could be handsearched. Since handsearching is time consuming, the amount of handsearching depends on the time limits of the research project. See Health Economics Core Library (Academy Health 2004) for a non-exhaustive list of journals (to be completed by the authors of HSR reports).

2.3.2.2 *Reference lists*

Reviewers should check the reference lists of articles obtained (primary studies and previously published systematic reviews) to identify additional relevant references. The process of reference tracking is generally an efficient manner to identify studies for possible inclusion in a review. However, reference lists should never be used as a sole approach to identifying articles for a review, but rather as an adjunct to other approaches. In addition to reference tracking, the (Social) Science Citation Index can be used to trace citations of important papers through time, which may yield further useful references. This process of reference and citation tracking ('snowballing'), may produce a better yield per hour spent than more protocol-driven search methods and is likely to identify relevant sources that would otherwise be missed (Greenhalgh and Peacock 2005).

2.3.2.3 *Grey literature*

Grey literature has been defined as, "that which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers" (GreyNet 1999).

Grey literature can be seen as information resources that are not always easily available. Grey literature may include, but is not limited to the following types of materials (Thompson and Giustini 2006):

Traditional types of GL

- Handbooks
- Theses and dissertations
- Census, economic and other data sources
- Databases of ongoing research
- Statistics and other data sources
- Conference proceedings and abstracts
- Newsletters
- Research reports (completed and uncompleted)
- Technical specifications, standards, and annual reports
- Informal communications (telephone conversations, meetings, etc.)
- Translations

Newer types of GL (technology-based)

- e-prints, preprints
- electronic networks
- blogs; audio, video over the Web
- repositories
- listserv archives
- digital libraries
- spatial data (ie. Google Earth)
- meta-searching, federated searching, portals

Producers of grey literature include

- Government departments and agencies (ie. municipal, provincial, national)
- Non-profit economic and trade organizations
- Academic and Research institutes
- Societies, political parties
- Libraries, museums, archives
- Businesses and corporations
- Freelance individuals

Grey literature provides very current perspectives, complements or fills in gaps of traditional publishers and is characterized by a lack of standard bibliographic description/ control raising questions about authenticity and reliability, and a short life-cycle of the information reports. While a formal publication may follow later, in many cases these papers are never made publicly available. Some examples: (1) The Research Findings Electronic Register (ReFeR) is a database of the findings of research studies funded by the Department of Health^c (U.K.); (2) The National Research Register (NRR) is a database of ongoing and recently completed research projects funded by, or of interest to, the United Kingdom's National Health Service (NHS)^d; (3) OAIster which is a union catalog of digital resources. They provide access to digital resources by "harvesting" their descriptive metadata (records) using OAI-PMH (the Open Archives Initiative Protocol for Metadata Harvesting)^e.

Searching for grey literature is difficult. In principle, the same strategy can be followed as for electronic bibliographic databases. In practice, many reviewers get lost in the overwhelming amount of web pages available. Therefore it is recommended to be consistent and systematic and hence to use the same keywords and strategy throughout the whole search process. In addition to the

^c Available from http://www.info.doh.gov.uk/doh/refr_web.nsf/Home.

^d Available from <http://www.nrr.nhs.uk/>.

^e Available from <http://www.oaister.org/>

necessary steps in searching electronic bibliographic databases, organisations that produce grey literature (e.g., OECD, WHO) should be identified.

It is advisable to document all steps to make tracking of the process possible. A checklist with the databases searched and a list of websites with organisations and web-addresses consulted, is recommended^f.

2.3.2.4 Correspondence - consultation of experts in the field

PURPOSE

The main values of consultation of experts in the field are:

- a source of information about unpublished studies
- to identify issues not covered in existing published and unpublished evidence
- to identify research in progress
- to 'teach back' (to evaluate the information gathered from the literature, especially unpublished literature)

RESOURCES

- Personal contacts of researchers, government organisations, ...
- International (research) networks

METHODOLOGY

Different methods are possible (e.g. semi-structured interviews), depending on the purpose of the consultation. Whatever the choice, the contact strategy should be documented.

2.3.3 Documenting a search strategy

From the Cochrane Collaboration Handbook (Higgins and Green 2006)

FOR ELECTRONIC DATABASE SEARCHES

The search strategy for electronic databases should be described in sufficient detail so that by following the description, the search can be replicated. The bibliographic databases searched, the dates and periods searched and any constraints, such as language should be stated. The full search strategies for each database should be listed in an additional table or in appendix.

The following information should be included for each electronic bibliographic database each time it is searched:

- Title of database searched (e.g. MEDLINE)
- Name of the host (e.g. Silver Platter version 2.0)
- Date search conducted (month, day, year)
- Years covered by the search
- Complete search strategy used, including all search terms (preferably cut and pasted rather than retyped)
- Any language restrictions or the absence of it

FOR SPECIFIC WEBSITES

- Name of the resource
- Publisher of the resource (e.g., US National Library of Medicine)
- Web address (URL)
- Search terms used

^f See http://weblogs.elearning.ubc.ca/googlescholar/greylit_manual_May11.pdf, <http://www.ala.org/ala/acrl/acrlpubs/crlnews/backissues2004/march04/graylit.htm>, <http://www.nlm.nih.gov/archive/2060905/nichsr/ehta/chapter10.html>, <http://www.nlm.nih.gov/nichsr/corelib/hecon.html> for a selection of grey literature resources.

- Data accessed

FOR SEARCH ENGINE SEARCHES

- Search engines used (searching across the Internet, e.g. google, or searching within a website, e.g. National Library for Health)
- Web address
- Search terms used
- Date accessed

Standard search strategy tables should be used to document your search strategy (see appendix 2 for electronic database searches).

2.4 STEP 4 – SELECTING STUDIES AND SOURCES OF INFORMATION

The aim of study selection is to identify those sources that help to answer the research question(s). The selection of relevant studies and sources is a process that involves several stages. The selection process should be explicit, decisions about the inclusion or exclusion of sources should be made according to predetermined criteria described in the review protocol.

2.4.1 Evidence sifting

To avoid a time-consuming critical appraisal process of all references located by the data sources listed in section 2.3, sifting of the search output is carried out to eliminate irrelevant material (and inappropriate study design, depending on in/exclusion criteria). In a preliminary sift (normally by the individual that carried out the search) papers that are clearly not relevant to the key questions are eliminated based on their title. Abstracts of remaining papers are then examined and any that are not relevant, that clearly do not have appropriate study designs, or that fail to meet specific methodological criteria, will also be eliminated at this stage. This process implies explicit exclusion criteria defined beforehand. The reproducibility of this process should be tested in the initial stages of the review. If reproducibility is shown to be poor, more explicit criteria may have to be developed to improve it.

All titles and abstracts identified as being potentially relevant are provisionally included. Their final inclusion/exclusion is decided after retrieving all full texts. Reviewers should assess the information contained in these reports to see whether the criteria initially defined have been met or not. It is useful to construct a list of excluded studies at this point, detailing the reason for each exclusion. This list may be included in the report of the review as an appendix. The final report of the review should also include a flow chart or a table detailing the number of studies included and excluded from the review (appendix 3).

The reliability of the decision process increases if all papers are independently assessed by more than one reviewer, and the decisions shown to be reproducible.

2.4.2 Study selection criteria

The decision to include or exclude studies should be free from biases and should be made according to predetermined written criteria, as stated in the review protocol. The inclusion and exclusion criteria should be defined, if appropriate, in terms of the study designs, the participating countries, the participating populations, the type of interventions, outcome measures, timing... The appropriateness of certain inclusion and exclusion criteria will depend on the specific review question(s). Only studies that meet all of the inclusion criteria and none of the exclusion criteria should be included in the review.

Even when explicit inclusion criteria have been specified, decisions concerning the inclusion of individual studies remain relatively subjective. There is evidence that using at least two authors has an important effect on reducing the possibility that relevant reports will be discarded. Agreement between assessors may be formally assessed mathematically using Cohen's Kappa (a measure of chance-corrected agreement). Many

disagreements may be simple oversights, whilst others may be matters of interpretation. These disagreements should be discussed, and where possible resolved by consensus after referring to the protocol. If disagreement is due to lack of information, the authors may have to be contacted for clarification. Any disagreements and their resolution should be recorded. The influence of uncertainty about study selection may be investigated in a sensitivity analysis.

2.5 STEP 5 – CRITICAL APPRAISAL OF THE EVIDENCE

Factors that warrant quality assessment are those related to

- Study quality (methodological quality)
- Bias (systematic error)
- Internal validity (validity)
- External validity (generalisability, applicability)

The methodological assessment is based on a number of key questions that focus on those aspects of the study design that have a significant influence on the validity of the results reported and conclusions drawn. These key questions differ between study types. To bring a degree of consistency to the assessment process, a critical appraisal checklist should be constructed or draw on existing models of appraising qualitative or quantitative research. See Phase 5 of the CRD Report 4 (*Undertaking systematic reviews of research on effectiveness: CRD's guidance for those carrying out or commissioning reviews 2001*), Critical Appraisal Tools from PHRU (Critical Appraisal Skills Programme (CASP) 2005) and Alborz and McNally^g(Alborz and McNally 2004) for some examples of quality checklists for different study designs. The KCE process notes on search for clinical evidence and HTA (available on the KCE website) provide recommendations and references on quality appraisal checklists for HTA reports, systematic reviews, primary studies and clinical practice guidelines.

The assessment process inevitably involves a degree of subjective judgement. To minimise any potential bias resulting from this, it is recommended that each study is evaluated independently by two members of the research team. If independent assessment is not possible (e.g. due to time limits), the assessment of all studies can be undertaken by one reviewer and double-checked by a second reviewer. Any differences in assessment should be discussed. Where differences cannot be resolved, an independent reviewer will arbitrate to reach an agreed quality assessment. Validation by a third researcher experienced in literature review is highly recommended as part of the quality assessment process.

Given the lack of general guidance on quality criteria applicable to complex evidence, it is recommended that records are kept about the appraisal process. Strengths and weaknesses of studies and other sources in the review should be recorded so that this information can be used in analysing and interpreting the results (step 7).

2.6 STEP 6 – DATA EXTRACTION

RATIONALE

In order to accurately extract information on relevant features and results of selected studies, a data extraction form should be designed. Since HSR topics are often studied with different research methodologies, different data extraction forms may be helpful. Because each review is different, data extraction forms will also vary across reviews. However, there are similarities regarding types of information that are important. A data extraction form provides a visual representation of the review question(s) and assessment of included studies. The form also provides a historical record of decisions occurring during the review process.

CONTENT

The analysis of the results (step 7) will be based on the data extraction forms. The form should contain general information (e.g. name of the reviewer extracting the data, bibliographic details of the study, the source of information) and specific information (about the study population, study design, outcome measures, factors affecting the

^g The quality evaluation tool used in the article is available from [npccrdc](#) (Study Evaluation 2007).

validity of the results). The specific information allows to re-verify study eligibility at the time of data extraction. Appendix 4 of this document and Appendix 3 of the CRD Report 4 (*Undertaking systematic reviews of research on effectiveness: CRD's guidance for those carrying out or commissioning reviews 2001*) provide some examples of data extraction forms for different types of studies.

METHOD

Several reviewers should pilot the extraction forms on a small number of studies before a final form is decided upon.

Since data extraction requires subjective judgement, where feasible, it should be performed independently by at least two reviewers. Disagreements between reviewers should be discussed and resolved by consensus or by arbitration by an additional independent reviewer. If time factors do not allow duplicate data extraction, a second reviewer should check the first reviewer's work.

2.7 STEP 7 – ANALYSING AND INTERPRETING RESULTS

This step describes the process of synthesizing extracted data. Specific to reviews of HSR topics is the complex and heterogeneous nature of the evidence. There is no single, agreed framework for synthesizing complex evidence. In general there are two approaches to synthesize the evidence: a descriptive or non-quantitative synthesis and a quantitative synthesis (Phase 7 of the CRD Report 4 (*Undertaking systematic reviews of research on effectiveness: CRD's guidance for those carrying out or commissioning reviews 2001*)).

The objective of a descriptive synthesis is to collate and present the extracted data so that information about the characteristics and results of the studies are summarised in a meaningful way. This is best done by tabulation. The tables should be structured to highlight the similarities and differences between included studies. Decisions about how data are to be grouped and tabulated should be based on the questions that the review is addressing. Mays et al. (Mays, Pope, and Popay 2005) offer four basic approaches (plus a lot of interesting references) for synthesis of both quantitative and qualitative evidence. In table 2 of the article the authors relate the choice for a particular approach to the aim and the questions of the review. Lucas et al. (Lucas et al. 2007) present worked examples of two narrative approaches, namely a thematic and a textual narrative synthesis^h.

The possibility and appropriateness of performing a quantitative analysis (meta-analysis) should be determined. Since studies in literature reviews in HSR are very heterogeneous, in many cases it will be impossible to combine them to perform a quantitative assessmentⁱ. Gemmill et al. (Gemmill, Costa-Font, and McGuire 2007) offer an interesting application of meta-regression analysis to elasticity estimates of demand for prescription drugs.

^h Interested readers are also referred to CCSR (Popay 2005).

ⁱ See Phase 7 of the CRD Report 4 (*Undertaking systematic reviews of research on effectiveness: CRD's guidance for those carrying out or commissioning reviews 2001*) and the GCP Process Note (Step 6) for a quantitative analysis of the results.

3 **TEMPLATE FOR THE REPORTING OF A LITERATURE SEARCH**

A literature search should be reproducible and therefore explicitly documented. The report of a literature search should contain the following items:

1. Description of the search methodology:
 - a. Search protocol
 - i. Search question
 - ii. Searched databases
 - iii. Search terms, their combinations and the restrictions used (e.g. language, date)
 - iv. In- and exclusion criteria for the selection of the studies
 - b. Quality appraisal methodology
 - c. Data extraction methodology
2. Description of the search results:
 - a. Number of retrieved articles, in- and excluded studies, and reasons for exclusion; use of flow chart
 - b. Results of quality appraisal

4 INTERNATIONAL COMPARISONS

Whether a cross-country comparison is structured around the topics or rather around countries, depends on the research question. If one wants to compare some specific topics between countries, which are similar for all other characteristics, a comparison around the topics is justifiable. If very divergent countries are to be compared, a country-by-country comparison is more appropriate.

4.1 SELECTION OF THE COUNTRIES

The selection of countries primarily depends upon the objectives of the study:

- If the objective is to explore a range of (characteristics of) health systems as broad as possible, the choice of countries is primarily governed by the purpose of maximising diversity.
- If the objective is to compare (some characteristics of) the health system of one country with a selection of comparator countries, the choice of country may be driven by similarity.

The selection criteria should be explicitly stated. Differences and similarities between countries should be identified according to the health care characteristics structured in appendix I. The research team determines the number of most relevant countries, based on a first assessment of the literature.

4.2 SELECTION OF THE VARIABLES

A descriptive analysis, comparing health system characteristics in different countries, should be based on a checklist of items to be included in the comparison. A minimum list of key variables comprises those dimensions that justify the selection of countries in the comparison, e.g. role of main actors, private versus public financing or provision of services. In addition, (a selection of)ⁱ the underneath list of variables should be included in the comparison. Deviations from this list should be motivated and discussed with KCE. The checklist is based on the WHO-template and should at least contain (a selection of) the following variables:

- Total health expenditure as a percentage of GDP and per capita in US\$ PPA
- Public versus private expenditures as a percentage of GDP and per capita in US\$ PPA
- Percentage of total health expenditure according to source of revenue or main financing sources
- Main payment methods for relevant providers and services
- Percentage of population covered by public or private insurance
- Percentage of population not covered (nor by public, nor by private insurances)
- Evolution of public (and private if available) expenditures during the last decade per category of expenditure (e.g., hospitals, drugs, physicians).

The general overview of the health system, based on the variables in the checklist, should have the same structure for each country in the comparison.

4.3 AWARENESS OF IMPLICIT HYPOTHESES

International comparisons are sensitive to the choice of countries, years or variables. The choice of countries, years or variables should be motivated (see section 4.1 and 4.2) and implicit hypotheses guiding the relation between the research question and a country's health system, the year(s) of comparison and the selected variables should be made explicit or should be removed.

ⁱ The relevance of the variables depends on the research topic. Some variables are only relevant if a general overview of the health system at the macro-level is required.

5 APPENDICES

APPENDIX I

Organizational structure

The organizational structure of a health system refers to the role of the central and other governments, the main actors in the system and their roles and responsibilities in the regulation and management of the system. The organizational structure of a health system covers a broad range of topics (see the definitions, guidelines and questions in chapters 2, 4 and 5 of the WHO-template).

Examples of topics:

- Bodies responsible for financing, planning, administration, regulation and provision of health services
- Benefits package^k
- Organization according to the state of decentralization
- Choice of patients
- Organization of primary care (e.g. gatekeeping regulations or not)
- Regulation of quality of care
- Legal issues
- Planning of health care personnel

Most characteristics of the organizational structure of a health system will be described from the perspective of the community. Some topics are only relevant from the perspective of specific groups or institutions, e.g. ABC-costing in hospitals.

Financing

Financing or funding a health system involves the sources of revenue collection to fund the system, pooling arrangements and purchasing methods (Adapted from chapter 3 of the WHO-template).

Revenue collection

Revenue collection refers to the sources collected to pay for health care services. Revenue collection mechanisms are: general taxation, payroll taxes (e.g. employer/employee contributions), risk-rated contributions (premiums) and out-of-pocket payments. Each method of revenue collection is associated with a particular way of pooling funds and purchasing methods. In most countries the health care system is financed by a mix of the revenue collections mechanisms. Since the relative importance of the different mechanisms varies largely across countries, countries are classified according to the dominant revenue collection mechanism.

A distinction can be made between compulsory sources of financing, voluntary health insurance, out-of-pocket payments and other sources of financing.

- Recommended typology for compulsory and voluntary health insurance:
 - The taxonomy for health insurance models and mixes, (Colombo 2004), chapter 3
- Recommended typologies for voluntary health insurance:
 - WHO-template, section 3.3.2
 - A taxonomy of functions of private health insurance, (Colombo 2004), chapter 4
- Recommended typology for cost sharing arrangements:

^k The benefits package is also related to the way a health system is financed and the provision of services.

- WHO-template, section 3.3.3 – Box 4

Pooling arrangements

Risk pooling refers to the collection and management of revenues in such a way to ensure that the risk of having to pay for health care is borne by all members of the pool and not by each contributor individually. Revenue collection must be distinguished from fund pooling, as some forms of revenue collection do not enable financial risks to be shared. If collection and pooling are integrated, the resource allocation mechanism is implicit. Examples of this include social health insurance contributions collected by funds and retained by them and national, regional or local taxes that are collected and retained. If different agents carry out the collection and pooling function, a mechanism is required to distribute resources from the collection agent to the pool. If there are multiple pools (e.g. insurance funds), allocation is increasingly being adjusted according to the risk profile of the population covered by each pool. This process is referred to as 'risk adjustment'. (Adapted from Mossialos et al. (Mossialos 2002) and WHO-template, figure on P47).

Purchasing methods and purchaser-provider relations

The organizational relationship between purchasers and providers is based on two models: integrated or contract (WHO-template, section 3.5 or (Colombo 2004), section 41).

- Indemnity insurance: No contractual arrangements exist between insurers and providers under "pure" indemnity insurance models.
- Selective contracting: Insurers negotiate agreements with certain doctors, hospitals, and health care providers to supply a range of services to insurees at reduced cost. Selective contracting is widely applied in managed care options.
- Integration with providers: Insurers and providers are vertically integrated. Providers are not independent, but are rather salaried workers of the insurer, or may be otherwise integrated under certain contractual arrangements.

The interacting between purchasers and providers is related to the remuneration of providers.

Payment for services and remuneration of providers

A distinction should be made between paying for health services and for providers (WHO-template, section 3.6).

A distinction should be made between retrospective and prospective payment mechanisms. The distinction between retrospective and prospective systems refers to the relation between payment and the cost for providing the service. In practice, most payment methods are mixed methods. Another distinction should be made between fixed and variable systems. This refers to the relation between payment and activity.

Reimbursement systems for health care providers can be classified according to the unit of reimbursement. Units of reimbursement which are frequently used include (a combination of) per item-of-service, patient-day or diem, case, patient and period.

- Recommended typology: see Jegers et al. (Jegers et al. 2002) -Figure 3

Provision of services and the benefits package

The provision of services and the benefits package in public and private insurance are closely related. Chapter 6 of the WHO-template (sections 6.1-6.14) provides an overview of the main areas of service provision in health care. Most HSR studies concentrate on one care sector or on the relation between two sectors (e.g. primary and secondary care, primary care and emergency care).

The availability of services within a care sector in the benefits package of the statutory system differs between countries. Dental care, physiotherapy and psychiatric care are

typical examples. This question of priority setting in health care is directly related to the revenue collection mechanism of a country.

NOTE to Appendix I

1. Some typologies integrate characteristics of two or more domains (e.g. financing and health care provision).
2. The above typologies provide a structured approach to describing characteristics of health care systems. They are not suited to assess the performance of the system¹.

¹ See Nolte et al. (Nolte, McKee, and Wait 2005) and Murray et al. (Murray and Frenk 2000).

APPENDIX 2: DOCUMENTING A SEARCH STRATEGY

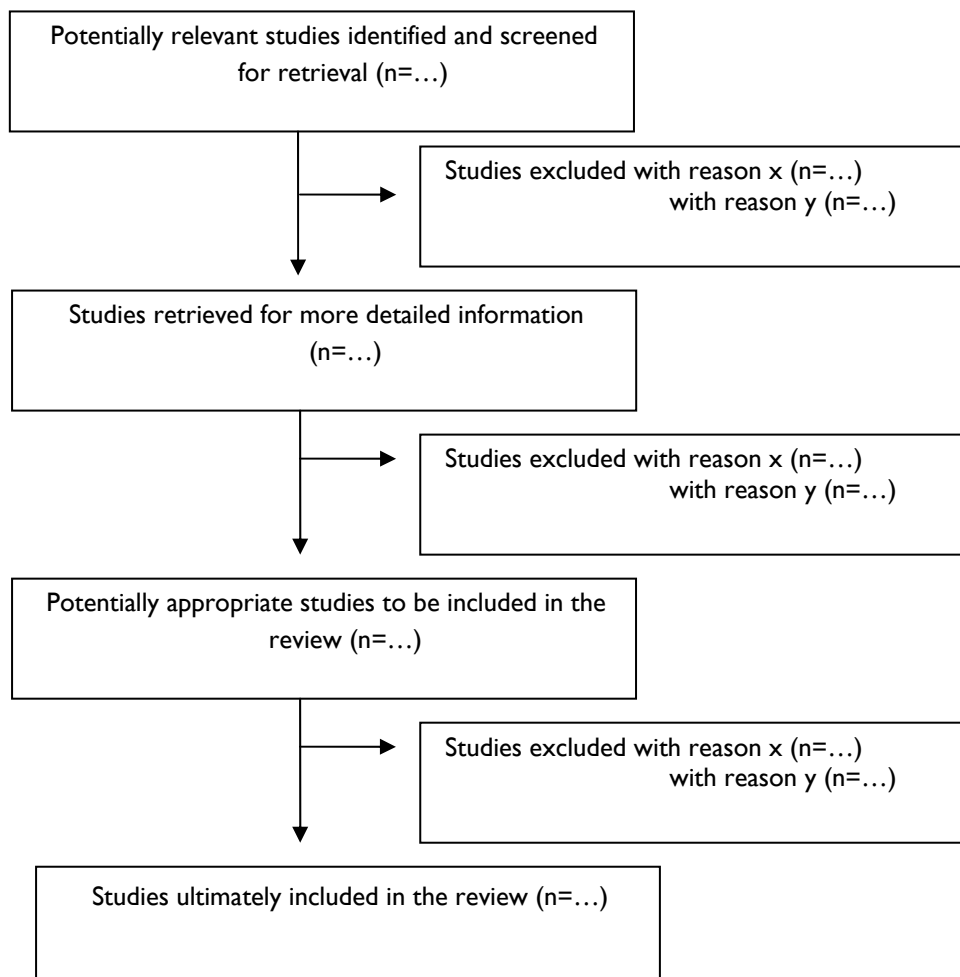
Author	
Name	
Project number	
Project name	
Keywords	

Date (day month year)	
Database (name +provider ; eg Medline OVID)	
Search Strategy (attention, for PubMed, check « Details »)	
Note	

The second table must be copied as many times as necessary.

APPENDIX 3: FLOW DIAGRAM OF STUDY SELECTION PROCESS

From QUOROM statement (Moher et al. 1999)



APPENDIX 4: EXAMPLE OF DATA EXTRACTION FORM

ID number		
Source of Reference		
Bibliographic details	Names of authors	
	Date of publication	
	Title of paper	
	Title of journal/book/volume	
	Page numbers	
	Language of paper	
Research setting	Description of context	e.g. country, year, insurance system
Study design		
Population studied	Description of participants	e.g. total population, elderly
Aims of study		
Methodology		e.g. probit, IV, dependent/independent variables
Main findings		
Other comments		
Reviewer name and date		

6 REFERENCES AND USEFUL LINKS

6.1 REFERENCES

- Academy Health. 2007. *Health Economics Core Library Recommendations* [Home Page on the Internet]. National Information Center on Health Services Research and Health Care Technology (NICHSR), sep. 28 2004 [cited sep.20 2007]. Available from <http://www.nlm.nih.gov/nichsr/corelib/hecon.html>.
- . 2007. *Health Services Research: Building a Common Framework A Toolkit for Voluntary Health Agencies* [Home Page on the Internet]. Academy Health 2007 [cited sept. 20 2007]. Available from <http://www.academyhealth.org/toolkit/introduction.html#hsr>.
- Alborz, Alison, and Rosalind McNally. 2004. Developing methods for systematic reviewing in health services delivery and organization: an example from a review of access to health care for people with learning disabilities. Part 2. Evaluation of the literature--a practical guide. *Health Info Libr J* 21 (4):227-36.
- Colombo, Francesca. 2004. *Proposal for a taxonomy of health insurance*. OECD Health Project. Paris: Organisation for Economic Cooperation and Development (OECD). Available from:<http://www.oecd.org/dataoecd/24/52/31916207.pdf>
- Critical Appraisal Skills Programme (CASP). 2007. *Critical Appraisal Tools* [Home Page on the Internet]. Public Health Resource Unit (PHRU) 2005 [cited 2007]. Available from http://www.phru.nhs.uk/casp/critical_appraisal_tools.htm#qualitative.
- Gemmill, Marin C., Joan Costa-Font, and Alistair McGuire. 2007. In search of a corrected prescription drug elasticity estimate: a meta-regression approach. *Health Econ* 16 (6):627-43.
- Greenhalgh, Trisha, and Richard Peacock. 2005. Effectiveness and efficiency of search methods in systematic reviews of complex evidence: audit of primary sources. *Review of Evid Based Dent*. 2006;7(1):19. PMID: 16557254. *BMJ* 331 (7524):1064-5.
- GreyNet. 1999 Paper read at New frontiers in grey literature: fourth international conference on grey literature, 4-5 October, at Washington D.C.
- Higgins, Julian PT, and Sally Green. 2006. *Cochrane Handbook for Systematic Reviews of Interventions*. 4.2.6 ed. Vol. Issue 4, *The Cochrane Library*. Chichester, UK: John Wiley & Sons.
- Jegers, Marc, Katrien Kesteloot, Diana De Graeve, and Willem Gilles. 2002. A typology for provider payment systems in health care. *Health Policy* 60 (3):255-73.
- Lucas, Patricia J., Janis Baird, Lisa Arai, Catherine Law, and Helen M. Roberts. 2007. Worked examples of alternative methods for the synthesis of qualitative and quantitative research in systematic reviews. *BMC Med Res Methodol* 7:4.
- Mays, Nicholas, Catherine Pope, and Jennie Popay. 2005. Systematically reviewing qualitative and quantitative evidence to inform management and policy-making in the health field. *Review of J Health Serv Res Policy*. 2005 Jul;10 Suppl 1:49-50. PMID: 16053583
- McNally, Rosalind, and Alison Alborz. 2004. Developing methods for systematic reviewing in health services delivery and organization: an example from a review of access to health care for people with learning disabilities. Part 1. Identifying the literature. *Health Info Libr J* 21 (3):182-92.
- Moher, D., D. J. Cook, S. Eastwood, I. Olkin, D. Rennie, and D. F. Stroup. 1999. Improving the quality of reports of meta-analyses of randomised controlled trials: the QUOROM statement. Quality of Reporting of Meta-analyses. *Lancet* 354 (9193):1896-900.
- Mossialos, Elias. 2002. *Funding health care : options for Europe*, *European Observatory on Health Care Systems series*. Buckingham ; Philadelphia: Open University Press.
- Mossialos, Elias, Sara Allin, and Josep Figueras. 2007. *Health Systems in Transition: Template for analysis*. Copenhagen: WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies. Available from:<http://www.euro.who.int/Document/E88699.pdf>
- Murray, C. J., and J. Frenk. 2000. A framework for assessing the performance of health systems. *Bull World Health Organ* 78 (6):717-31.

- Nolte, E, M McKee, and S Wait. 2005. Describing and evaluating health systems. In *Handbook of health research methods : investigation, measurement and analysis*, edited by A. Bowling and S. Ebrahim. Maidenhead, England ; New York, NY: Open University Press.
- Petticrew, Mark, and Helen Roberts. 2006. *Systematic reviews in the social sciences : a practical guide*. Malden, MA ; Oxford: Blackwell Pub.
- Popay, Jennie. *Developing Methods for the Narrative Synthesis of Quantitative and Qualitative Data in Systematic Reviews of Effectiveness* [Home Page on the Internet]. Cathie Marsh Centre for Census and Survey Research 2005 [cited sep. 20 2007]. Available from <http://www.ccsr.ac.uk/methods/projects/posters/popay.shtml>.
- Richardson, W. S., M. C. Wilson, J. Nishikawa, and R. S. Hayward. 1995. The well-built clinical question: a key to evidence-based decisions. *ACP J Club* 123 (3):A12-3.
- Study Evaluation*. 2007. National Primary Care Research & Development Centre. Available from: <http://www.npcrdc.ac.uk/publications/Quality%20Evaluation%20Tool.doc>
- Thompson, Diane , and Dean Giustini. 2006. *Finding the Hard to Finds: Searching for Grey Literature*. Available from: http://weblogs.elearning.ubc.ca/googlescholar/greylit_manual_May11.pdf
- Undertaking systematic reviews of research on effectiveness: CRD's guidance for those carrying out or commissioning reviews*. 2001. *CRD Reports* Vol. 4. York: University of York. Available from: <http://www.york.ac.uk/inst/crd/report4.htm>
- Wildridge, Valerie, and Lucy Bell. 2002. How CLIP became ECLIPSE: a mnemonic to assist in searching for health policy/ management information. *Health Info Libr J* 19 (2):113-5.

6.2 USEFUL LINKS

Cochrane: www.cochrane.org

CRD: <http://www.york.ac.uk/inst/crd/report4.htm>

QUORUM statement: <http://www.consort-statement.org/QUORUM.pdf>

Quality appraisal checklists

- <http://www.york.ac.uk/inst/crd/report4.htm>
- http://www.phru.nhs.uk/casp/critical_appraisal_tools.htm#qualitative

Sources of information

- <http://www.nlm.nih.gov/nichsr/corelib/hecon.html>
- http://weblogs.elearning.ubc.ca/googlescholar/greylit_manual_May11.pdf
- http://www.info.doh.gov.uk/doh/refr_web.nsf/Home
- <http://www.nrr.nhs.uk/>
- <http://www.oaister.org/>
- <http://www.ala.org/ala/acrl/acrlpubs/crlnews/backissues2004/march04/graylit.htm>
- <http://www.nlm.nih.gov/archive//2060905/nichsr/ehta/chapter10.html>
- <http://www.nlm.nih.gov/nichsr/corelib/hecon.html>

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Process notes

KCE Process notes

Searching for Evidence and Critical Appraisal

- Good Clinical Practice (GCP)
- Health Technology Assessment (HTA)
- Health Services Research (HSR)