

Biomedical literature search protocols: Consensus statement from the documentation units of the Spanish health technology assessment agencies

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Objectives: The aims of this study were, first, to define the main advantages and disadvantages of using bibliographic search protocols; second, to define a series of criteria that could aid in prioritizing the information resources to be consulted for each research project; and third, to rank these criteria.

Methods: First, a survey was e-mailed to the Spanish Health Technology Assessment Agencies (AUnETS) group, with the aim of evaluating the usefulness of using bibliographic search protocols. Second, a consensus group meeting with the information specialists of the AUnETS group was organized, where SWOT analysis technique (strengths, weaknesses, opportunities, and threats) was used, also to discuss the utility of using search protocols. Third, the same group designed a final prioritization criteria questionnaire intended for Health Technology Assessment International's Information Resources Group (HTAi IRG), based on a draft version written by the information specialist from the Basque Office for HTA. Finally, this questionnaire was e-mailed to the HTAi IRG experts, and their responses were analyzed.

Results: Some of the advantages defined were systematization of the searches and transparency and repeatability of the process. The perceived disadvantages were inflexibility to be adapted to some situations, inability to establish time frameworks and the difficulty of incorporating experts' opinions into closed protocols. Five areas of prioritization criteria were defined: study topic; characteristics of the database and other information resources; database interface; characteristics of the organization; kind of research output for which the information is intended. A ranked list of prioritization criteria was established based on the responses of the HTAi IRG group.

Conclusions: The information specialists consulted agreed that search protocols are useful tools for guiding systematic searches. The twenty-one prioritization criteria defined will be used by the information specialists for determining, which databases to consult.

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Information is an essential instrument for decision making at the different levels of management in health. Currently, the use of scientific information in medicine runs into a serious problem related to the “explosion” of biomedical information. The biomedical information industry (editorials, scientific journals, and so on) does not respond to the supply and demand law. This dramatic growth in information has mainly been caused by the importance of publications for professional *résumés* and the proliferation of medical journals, as well as increased funding by both governments and pharmaceutical companies that has boosted research and increased the number of publications.

There are many sources where interesting biomedical information can be searched (1;9). Apart from the biomedical journals and databases, there are other resources such as monographs, text books, and bibliographic catalogues; gray literature (dissertation abstracts, congresses, ongoing clinical trials. . .); medical press (newspapers, gazettes. . .); the Internet (16); health directories and portals; information from the Health Technology Assessment agencies (14); Internet sources intended to inform patients’ families and patients’ associations, and so on. This makes it necessary to sieve and select the sources to consult, and to prioritize the order in which to access such sources, depending on their capacity to provide information relevant to our work (8). These problems are especially relevant for the professionals working in the documentation units in the Health Technology Assessment agencies.

The first step of drafting any Health Technology Assessment document is the bibliographic search. These searches should be systematic and comprehensive, especially in the context of evidence-based medicine or health technology assessment in health care (HTA), where information is retrieved to inform decisions. However, taking into account the information “explosion,” being exhaustive and rigorous becomes difficult and incompatible with finding a fast answer. There is a lack of systematization in all the different search strategies used for the same research question at different HTA units.

In fact, there is no consensus among HTA units or agencies concerning which resources should necessarily be searched when developing a review of the literature. There are two main obstacles to uniformity in this area, the first being that the possibilities for accessing databases and other resources differ between agencies, the second being the differences between the preferences of information specialists when selecting information resources. This means there are no clearly defined prioritization criteria for selecting sources of information. In some of the HTA agencies, there are specific written guidelines for prioritizing information resources (6;13;15). However, as far as we know, these guidelines are not uniform, at least not among Spanish agencies, and the

recommendations provided in these documents are not based on consultations or consensus but have been decided on the basis of other parameters, such as the own experiences of the documentation specialists, or just based on the accessibility to databases and other information resources.

Within the context of literature searching for the purposes of health technology assessment, a protocol is an explicit, structured process for tackling the task of gathering information. It outlines, in a detailed and transparent way, a logical set of steps to work through in the course of the search. Theoretically, another researchers could duplicate the search strategy and retrieve comparable results. The COSI (Core, standard, ideal) protocol from New Zealand is an approach for selecting the relevant information sources depending on the topic of research, the kind of study, the time framework, and the available human and technical resources (3). In addition to the COSI protocol, there are other proposals for selecting information resources (4–6;10;13;15). Nevertheless none of those approaches has been designed in an explicit or systematic way.

The rationale for the systematic search, as described in the COSI protocol (3) or other similar protocols (10;13;15) came from work by The Cochrane Collaboration and the evidence-based medicine movement, which drew attention to the bias inherent in using only published literature, and the need for common approaches to literature searching within HTA organizations. However, there is a lack of evidence to show what proportion of new documents would be discovered in an ideal search, and how much they add to, or challenge, the information already found in main sources. This question is of major significance, and there is currently much interest in investigating it. This could form the basis for another, related study.

Search protocols appear to constitute a good attempt to standardize and facilitate the documentation process. This is the main reason why a consultation about search protocols and a systematic approach to define them was performed by the documentation specialists of the Spanish Health Technology Assessment agencies.

OBJECTIVES

The main objective of the study was to consider the ideas and opinions of the Spanish Health Technology Assessment agencies in relation to health sciences search protocols. This consideration involved defining the main advantages and disadvantages of using search protocols, and evaluating the possible risks and benefits for the documentation process (this strategy corresponds to Methods A & B). The second aim was to develop a questionnaire to define a series of criteria that could aid in prioritizing the databases and information

resources to be consulted for each research project (Method C). The third aim was to rank this list of defined prioritization criteria (Method D).

METHODS

Context, Participants, and Data Collection

The information specialists within the Spanish Health Technology Assessment Agencies (AUnETS) group were asked to participate in the first three stages (Methods A, B, and C) of the project. Ten information specialists agreed to participate.

In the international context, nineteen information specialists from the Health Technology Assessment International's Information Resources Group (HTAi IRG) group collaborated in the final stage of the project (Method D). A flowchart summarizing the methodology of this study can be found in Figure 1.

Method A: Survey about Search Protocols. A survey was developed to evaluate experts' opinions in relation to the usefulness of bibliographic search protocols. The survey was sent to the information units of the various AUnETS agencies. Six different areas were explored; the first area was related to the utility of using a search protocol when developing a bibliographic search versus consulting the main information sources (databases, journals, or other resources) and continuing with strategies such as tracking from electronic references, being alert and asking around, or "snowballing" from the reference lists of the main articles. The second area explored was the transparency and repeatability of search protocols. The third area focused on discussing the flexibility of a search protocol and its capacity to fit properly into different thematic areas and situations. The fourth area was related to the usefulness of search protocols as a way of keeping the documentation research stage of projects within a defined time limit, by specifying a limited number of sources to consult (ie, the top n sources as ranked by the search protocol), depending on the time available for research. The fifth area attempted to evaluate experts' opinions about language bias caused by the limitations of using language in a standardized search protocol. The last area attempted to determine the importance of using experts' opinions (topic specific experts (cardiology, mental health, and so on), documentation experts, or methodology experts such as epidemiologists) when deciding on the sources to be accessed or defining the priority of accessing those sources.

Method B: SWOT Technique. A consensus group meeting was organized to further explore the advantages and disadvantages of using bibliographic search protocols. In total, ten information specialists participated; the discussion technique used during the meeting was SWOT analysis (strengths, weaknesses, opportunities, and threats). The participants were asked to outline the strengths, weaknesses, opportunities, and threats of bibliographic search protocols. All the responses were written down.

Method C: Nominal Group Technique. During the same consensus meeting, a rough draft of a questionnaire about prioritization criteria was presented. This questionnaire had previously been developed by the documentation specialists working at the Basque Office for Health Technology Assessment. The objective was to discuss the draft using the nominal group technique to come up with a final version of the questionnaire.

The draft questionnaire was divided into five areas of prioritization criteria: study topic, characteristics of the database, characteristics of the database interface, characteristics of the organization, and expert opinion. The nominal group technique was divided into two phases. During the first phase, the information specialists were asked to come up with ideas in five areas: modification of prioritization groups; the impact of the study topic on which information resources to access; the characteristics of the databases; the characteristics of the database interface; the human, material, and time resources of the organization. There were two rounds per area and each participant was allowed to present just one idea per round; all the ideas were noted down. During the second phase the participants were asked to vote on all the registered ideas, ranking them in order from one to ten.

Method D: Prioritization Criteria Questionnaire. The final version of the prioritization criteria questionnaire designed during the nominal group technique meeting was e-mailed to the experts of the HTAi IRG group.

Data Analysis

Analysis was carried out on the transcript of the responses from the survey, the SWOT analysis, and the nominal group technique. The data were processed in a qualitative manner. All the information experts from the AUnETS group took part in the analytical process and discussed the results.

Data derived from the survey were summarized as advantages and disadvantages of using search protocols. The results were consequently sent to the participants for any possible further input, which was also assessed and included in the analysis to improve its validity. The English translation of the survey was revised by the participants to ensure the adequacy of the translation of the verbatim.

The responses from the SWOT meeting were summarized in four areas: strengths, weaknesses, opportunities, and threats of using search protocols. When similar ideas or concepts appeared in one of these four areas, they were combined to produce a synthesis of the information.

For the purposes of analyzing the data from the nominal group technique, a cutoff point of thirty was set. All the ideas with a score greater than thirty were taken into account and incorporated into the final version of the prioritization criteria questionnaire intended for the HTAi IRG.

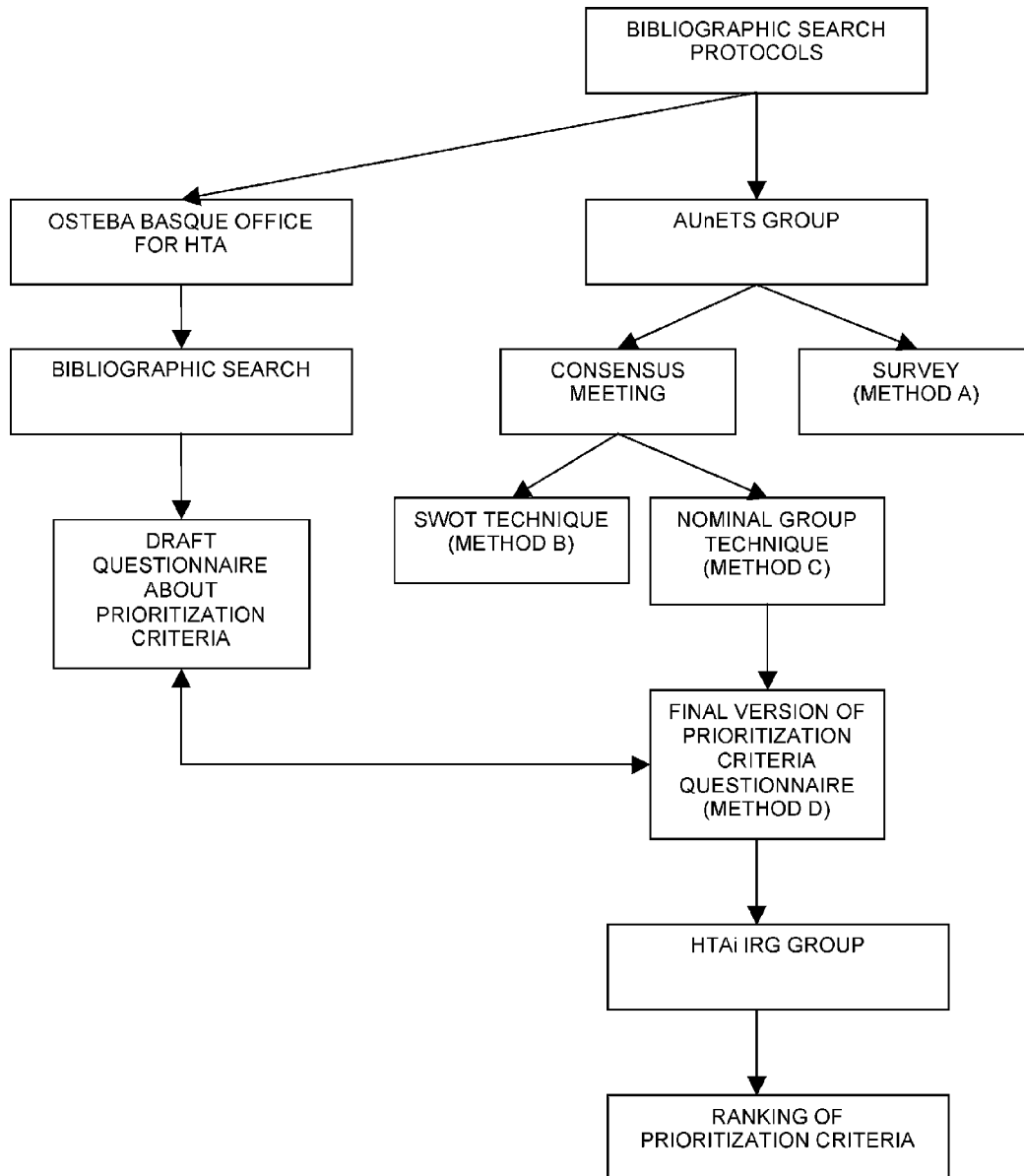


Figure 1. Methodology flowchart. AUnETS, Spanish Health Technology Assessment Agencies; HTA, health technology assessment; SWOT, strengths, weaknesses, opportunities, and threats; HTAi IRG, Health Technology Assessment International's Information Resources Group;

RESULTS

Results Derived From the Survey About Search Protocols (Method A)

The results obtained from six heads of the information units of the Spanish HTA agencies that completed the survey about search protocols are summarized below:

Six different areas were explored; the first area was related to the usefulness of using a search protocol when developing a bibliographic search versus nonsystematic approaches (such as tracking from electronic references). Three of the six experts considered search protocols more useful

compared with other possibilities. However, the other three participants considered that the utility of search protocols depends on the situation.

The second area explored was the transparency and repeatability of search protocols. All of the experts agreed that search protocols are transparent; however, their opinions differed regarding repeatability. Two experts thought that protocols were transparent but not repeatable. Four of the experts thought that search protocols were both transparent and repeatable.

The third area focused on discussing the flexibility of a search protocol and its capacity to suit different thematic

areas and situations. Four of the experts expressed the opinion that a search protocol is flexible enough (or at least it that should be) to be adapted to the different research topics and situations. Another expert thought that it should be adaptable to different topics (by being able to search different databases, using inclusion and exclusion criteria, and so on) but not to different situations. Finally, there was one expert who thought that it would be very difficult for a standardized protocol to be adaptable to all situations.

The fourth area was related to the usefulness of search protocols for helping to stay within established time frameworks for the documentation research stage of projects. Four of the participants did not consider that protocols were capable of fixing time frameworks. Another participant stated that he considered protocols necessary to be able to fix time frameworks, and the last one simply expressed the opinion that it might indeed be useful to talk about the number of hours spent on searches.

The fifth area attempted to evaluate experts' opinions in relation to the possible bias resulting from using language (i.e., key words) as a search criterion in a standardized search protocol. Five of the experts expressed the opinion that language is not a good variable for limiting searches. One expert said that English should be the search language.

The last area attempted to determine the importance of using expert opinion (topic-specific, documentation, or methodology experts) when deciding which sources should be accessed or defining the priority of accessing these sources. The vast majority of participants thought that experts' opinions in different areas were always a good basis on which to develop an information search.

Results Derived From the SWOT Technique (Method B)

After the meeting with the AUnETS group, the strengths, weaknesses, opportunities, and threats of using search protocols were determined (see Table 1).

Results Derived From the Nominal Group Technique Used During the Consensus Meeting (Method C)

The final version of the prioritization criteria questionnaire was designed based on the votes of the consensus meeting. This final version included five areas: study topic; characteristics of the database and other information resources; database interface; characteristics of the organization; kind of research output for which the information is intended. Twenty-one of fifty-eight prioritization criteria scored higher than the cutoff point of thirty and were assigned to the five areas mentioned above (see Table 2).

Results Derived From the Prioritization Criteria Questionnaire (Method D)

The responses from the HTAi IRG group were pooled together and a ranked list of criteria, from the most to the least relevant with the mean punctuation obtained, is presented in Table 3.

DISCUSSION AND CONCLUSIONS

Some authors have stated that a structured protocol acts as a framework and guide to information searches. It lists all the information sources to be searched for the assessment and ensures that the search proceeds in a structured manner. The advantages of such a protocol according to the literature (3;10;15) are consistency of information searching within the organization, ranking of sources within established time frameworks, flexibility to be adapted to different local situations, dynamicity, flexibility to be adapted to each individual topic, appropriateness of the sources to be searched, determination of agreed cutoff points within an organization, and transparency of the search process.

Wanke et al., 2006 (17) recently reported on an evaluation of HTA documents from different organizations on an international scale and observed a substantial level of heterogeneity between them. This kind of heterogeneity also exists between the information searches performed for different HTA documents about the same topic and with the same purpose, for which different search strategies are reported. A common approach and consensus between different organizations is necessary to make core information searches about the same topics and in the same areas as similar as possible.

In the present report, we have tried to define explicitly the advantages and disadvantages of using search protocols as assessed by the AUnETS group. The information specialists consulted agreed that search protocols were useful tools for guiding systematic searches. Some of the advantages defined were systematization of the searches and transparency and repeatability of the process. On the other hand, the disadvantages identified were inflexibility to be adapted to some situations, inability to establish time frameworks, and the difficulty of introducing experts' opinions into closed protocols.

When comparing our results with previous findings, we observed general agreement in terms of the advantages mentioned above, that is, systematization, repeatability, and transparency of the search process. Nevertheless, we identified disagreement in the following areas: flexibility to adapt to different situations and capability to establish time frameworks. The Spanish experts also pointed out that implementing protocols could be difficult due to the reluctance of some HTA organizations to accept them and the impossibility of accessing some important information resources requiring payment or passwords.

Table 1. Results Derived from the SWOT Technique

Strengths	Weaknesses
<ol style="list-style-type: none"> 1. Previous knowledge about systematization in the information area of the HTA agencies 2. Experience, intuition and methodology 3. If the protocol goes ahead it will be a product with scientific rigor, obtained through consensus 4. Protocol gathers knowledge and criteria 5. Systematization and standardization 6. Unifies the excess of information in biomedicine 7. Transparency, repeatability, and more accuracy in the search process 8. Saving time due to systematization 	<ol style="list-style-type: none"> 1. The documentation resources of the various HTA agencies are very different 2. Possibility of bypassing information (extremely open or closed search protocol) 3. Difficulties in designing a protocol adapted to different users (clinicians, researchers, and so on) 4. Difficulty to know where we will obtain the relevant cites in each research 5. Protocols or standards? 6. Organizational immaturity 7. Repetition of databases, do they add anything new? 8. Variability depending on the kind of question and the topic 9. Time framework 10. Maintaining and updating these protocols 11. Limited knowledge of the people that participate in the consensus 12. The problem of poor flexibility 13. Professionals may tend to perform searches without training, considering search protocols as a sufficiently effective method
Opportunities	Threats
<ol style="list-style-type: none"> 1. Utility of the tool (agencies that are starting) 2. Facilitates the searching work, and saves money 3. Recognition of the information specialists, their competency and work during the evaluation process 4. Searching process accessible to clinicians 5. Unify the human resources 6. To mobilize and request resources that are not available 	<ol style="list-style-type: none"> 1. Difficulties in following a protocol, pressures on decision makers 2. Evaluation of the quality and utility of these tools 3. No acceptance by other organizations, people, etc. 4. Overestimation of the effectiveness of the protocol 5. It is not enough to answer to a concrete question; there are some other aspects as ethical, economical, and organizational evaluation 6. Habits of the information specialist in their way of working 7. Reductionism of the information specialists' work

SWOT, strengths, weaknesses, opportunities, and threats; HTA, health technology assessment.

However, as defined by the opportunities and strengths reported in our results, search protocols can be considered as valuable tools for guiding systematic information searches. In fact, protocols facilitate the work of searching, making the whole process more efficient; incorporate the work of information specialists; and facilitate the work of the people involved in HTA, making it easier for those less trained in information skills. The joint work carried out by the HTA agencies and networks seemed to be a strength that could be used to develop well-designed protocols, which would provide better management of the excess of information, save time and in general, provide more accuracy in the search process.

Other experiences (2;7;11;12) indicate that, depending on the topic and purpose of the assessment, different cutoff points in the search process will probably be necessary. Similar conclusions have been found in our research; in fact, time

frameworks and cutoff points for the search process should be established by information specialists.

Our research has been the first attempt worldwide to establish explicit criteria for prioritizing information sources. The twenty-one identified criteria were assigned, based on the nominal group technique, to five areas: study topic; characteristics of the database and other information resources; database interface; characteristics of the organization; and kind of research output for which the information is intended. These criteria have been ranked in order of importance, according to the answers of the HTAi IRG group. In the near future, during a final phase of this project, the prioritization criteria and the information resources will be cross-linked to establish which information sources should be consulted. Our study shows one way in which a more uniform approach to the search process is being developed by the Spanish HTA agencies.

Table 2. Results Derived from the Nominal Group Technique

Areas	Prioritization Criteria Defined For Each Area
Study topic	<ul style="list-style-type: none"> ✓ Study topic ✓ The research question ✓ The clinical question ✓ The kind of studies we are looking for (systematic reviews, meta-analysis, economic evaluation studies, narrative review, and so on)
Characteristics of the database and other information resources	<ul style="list-style-type: none"> ✓ Free versus paid access ✓ Number or registers that can be accessed ✓ Number of fields it contains (publication year, journal; title, and so on) ✓ Kind of thesaurus ✓ Geographical coverage ✓ General versus specific topics
Database interface	<ul style="list-style-type: none"> ✓ Possibility of using methodological filters ✓ Possibility of introducing, modifying, and adapting the methodological filters externally ✓ Possibility of search history ✓ Possibility of saving search history ✓ Simple versus advanced search ✓ Boolean operators ✓ Possibility of downloading the search in different formats (html, txt, word, and so on)
Characteristics of the organization	<ul style="list-style-type: none"> ✓ Information resources ✓ Knowledge and/or skills ✓ Time framework in which to do the search
Kind of search output for which the information is intended	<ul style="list-style-type: none"> ✓ Health technology evaluation reports, brief reports, clinical practice guidelines, audits, fast responses

POLICY IMPLICATIONS

The present research project shows the need for consensus and a common methodological approach in the first step of drafting an HTA document, which is the bibliographic

search. This has been the first systematic approach to determine the prioritization criteria to be taken into account when deciding which sources of information should be searched. These criteria will be used to define the minimum shared core databases that should be searched systematically by Spanish

Table 3. Ranked List of Prioritization Criteria (Mean Value)

1. Research question (diagnostic, prognostic, etiology, treatment, prevention, economic evaluation, and so on) (4.46)
2. Time framework in which to do the search (4.25)
3. The kind of studies we are looking for (systematic review, meta-analyses, economic evaluation studies, narrative reviews, and so on) (4.20)
4. Personal background and skills (4.17)
5. Simple versus advanced search availability (4.17)
6. Study topic (allergology; telemedicine, and so on) (4.12)
7. Complexity of Boolean operators (4.12)
8. The clinical question (4.08)
9. Availability of information resources (4.04)
10. Possibility of using search history (3.87)
11. Kind of HTA products (brief reports, clinical practice guidelines, mini-HTA, and so on) (3.70)
12. Free versus paid access (3.68)
13. Geographical coverage of the information resources (3.68)
14. Possibility of downloading the search in different formats (3.64)
15. Possibility of saving history (3.63)
16. Type of controlled language (thesaurus) (3.52)
17. Possibility of introducing, modifying or adapting the methodological filters (3.41)
18. Number of registers that can be accessed (3.40)
19. Number of fields contained (title, year, journal, and so on) (3.40)
20. General versus specific search (3.32)
21. Possibility of using methodological filters (3.28)

HTA agencies when producing mini-HTAs, full-HTAs, and clinical practice guidelines. Based on these criteria, similar approaches could be followed up in other contexts.

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