

Assessing the Impact of Economic Evidence on Policymakers in Health Care—A Systematic Review



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Assessing the Impact of Economic Evidence on Policymakers in Health Care—A Systematic Review

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The information in this report is intended to help health care decisionmakers—patients and clinicians, health system leaders, and policymakers, among others—make well-informed decisions and thereby improve the quality of health care services. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new health care technologies and strategies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

To improve the scientific rigor of these evidence reports, AHRQ supports empiric research by the EPCs to help understand or improve complex methodologic issues in systematic reviews. These methods research projects are intended to contribute to the research base in and be used to improve the science of systematic reviews. They are not intended to be guidance to the EPC program, although may be considered by EPCs along with other scientific research when determining EPC program methods guidance.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the health care system as a whole by providing important information to help improve health care quality. The reports undergo peer review prior to their release as a final report.

We welcome comments on this Methods Research Project. They may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850, or by email to epc@ahrq.hhs.gov.

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Assessing the Impact of Economic Evidence on Policymakers in Health Care—A Systematic Review

Structured Abstract

Background: Many health care experts are demanding greater use of economic evidence in the assessment of new and existing health technologies.

Objectives: To assess whether and how economic evidence has an impact on health care decisionmaking in the United States and in other countries and to identify antecedents or obstacles for use in health policy.

Data Sources: Searches of MEDLINE, EconLit, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Embase[®], and ISI Web of ScienceSM from 1991 until January 2012.

Review Methods: The review included original studies that applied a quantitative or qualitative method for evaluating use of economic evidence in any country. We excluded articles that were opinion- or experience-based without newly generated data. Paired reviewers independently determined whether articles met eligibility criteria and then extracted data from eligible studies. Reviewers also assessed the quality of each study and graded the strength of the body of evidence using an adaptation of the grading of recommendations assessment development and evaluation (GRADE) recommendations, indicating study limitations, quality, strength of findings, and the type of data available.

Results: Of 19,127 titles initially screened, 43 studies were included, with all but five published since 2000. The most frequently studied countries were the United Kingdom (15), and Australia, Canada, and the United States (5 each). Most studies (27 studies) considered national-level policy and examined the key health actors involved. Important decisionmaking topics were reimbursement and health package decisions, and priority setting in program development.

Thirty studies found evidence that use of economic evidence had a “substantial” impact on health care policymaking, 27 of which emphasized at least one other criterion, such as equity considerations, usually ill-defined (14 studies), clinical effectiveness, budget impact, ethical reasons, and advocacy arguments. The 30 studies confirmed the acceptance of economic evidence as having an impact on either general policy or specific decisions, such as reimbursement decisions. In 11 of the studies, the use of economic evidence had only a “limited” impact on health policy decisions. In two studies, economic evidence had no impact on health policymaking.

A few factors played a key role in the use of economic evidence: (1) quality and transparency of the studies that provided the economic evidence was a promoting factor (7 studies) in the case of a good study and a strong obstacle in the case of a poorly presented study (18 studies); (2) transparency and quality of the decisionmaking process was important in the acceptance or rejection of the decision (10 studies for acceptance, 13 studies for rejection); and (3) clarity of the economic information and the way it was communicated were promoting factors (7 studies), while lack of clarity was an obstacle in accepting evidence (17 studies).

Of the 37 observational studies of policy impact, 11 (30%) received a favorable rating on more than three of the 8 items on the study quality checklist. Five of the studies had a comparison group and provided intermediate quality evidence that economic evidence is useful in general health policymaking.

Conclusions: The body of evidence on the use of economic evidence in policy is small and patchy. It shows that the utility of economic evidence, alone or in combination with systematic reviews, is influenced by technical issues, such as transparency and clarity, as well as by the transparency of the decisionmaking process.

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Introduction

Economic evidence contributes to the organization of efficient health care and to the promotion of the best health outcomes within budgetary constraints.¹ Despite some inherent limitations,^{2,3} its importance has increased across the globe amid growing concern over the rise in the costs of health care.^{4,5} In the United States, this is coupled with a Federal presence in health policy regulation and financing, leading to reconsideration of the role of economic and clinical evidence in decisionmaking by leading actors.⁶⁻¹⁸

In the United States, the comparative effectiveness of medical interventions undergoes rigorous evaluation. However, there is limited use of economic data in comparing health interventions and creating rational policy in the United States when compared with best practices in other high-income countries. This is despite repeated calls for integrating economic evaluation data routinely into the U.S. health care policy process.¹⁵⁻¹⁸

The economic evidence about health care interventions refers to such characteristics as cost, price elasticity, efficiency, and value data, either collected empirically or synthesized in economic modeling.¹⁹ Economic evaluation combines economic data, such as cost-utility ratios, net monetary benefit, and total budget impact estimates, leading to summary economic information on the characteristics of interventions. Examples are a cost-utility ratio, a cost-effectiveness ratio, the net monetary benefit, or a total budget impact estimate. Cost-effectiveness analysis is a specific type of formalized economic evaluation commonly used in the consideration of economic evidence in health care. It typically focuses on the incremental changes in costs and health benefits after the introduction of a medical intervention as compared to an initial situation, and is meant to aid rational decisionmaking. This type of analysis has become the most common mechanism for generating economic evidence in decisionmaking both inside and outside the United States.^{6,8-20}

Evidence from systematic reviews of clinical outcomes presently plays an established role in determining the comparative effectiveness of medical interventions and is useful in developing clinical practice guidelines, making efficacy-based coverage decisions, and in formulating general health policy. The processes of searching for and summarizing the results of studies have been standardized with the goal of demonstrating clinical efficacy and effectiveness in a uniform way, using all available information. Systematic reviews may also be valuable in evaluating the economic impact of introducing interventions.²¹ Around the world, standardized guides have been developed to conduct state-of-the-art economic evaluations, to include economic data in systematic reviews, to systematically review economic data, and to use systematic reviews to inform economic evaluations.^{22 23} In the United States, however, the systematic inclusion of economic outcomes and the review of economic data in systematic reviews to inform health policy is not standardized as is already the case for clinical outcomes.

We conducted a systematic review of published studies to assess what is known about how economic evidence from cost-effectiveness analysis or cost-utility analysis makes an impact on health care decisionmaking in the United States and in other countries.

Methods

Our systematic review aimed to identify all articles that reported original studies on the use of cost-effectiveness information in health care decisionmaking. The terms, concepts, and questions used are guided by our report on a framework for the inclusion of economic evidence in systematic reviews.¹⁹ That framework describes when inclusion of economic evidence may be useful and when this type of evidence is of less interest. Selected relevant components of such a framework, as well as a number of health economics concepts, are defined below.

Key Questions and Definition of Terms

In this systematic review, we used the above mentioned framework by Frick¹⁹ to define: (1) the different forms of economic data, (2) the various stakeholders that may use economic data, (3) the types of decisions that might be affected by economic evidence and analysis, (4) the types of economic evaluation that are standardized and might be used, and (5) the summary measurements of equity and efficiency that can be used as criteria for decisionmaking. The leading Key Question (KQ) that we addressed is listed below, followed by additional KQs.

KQ 1. Impact of Economic Data or Analyses on Policy Decisions in Health Care

KQ 1. Do economic data or analyses as reported in economic evaluation studies, including those as part of health technology assessments, comparative effectiveness research, or technology appraisals, impact policy decisions in health care?

Economic data is defined as information on interventions based on the empirical findings from various types of health economics research or the results of economic evaluations using economic modeling. Impact is defined as a documented effect on decisionmaking that can either be quantifiably or qualitatively assessed. The leading KQ focuses on the use of findings from cost-effectiveness research in health policy.

The more specific additional KQs of this review are related to: (1) trends in the use of economic evidence, (2) characteristics of actual decisionmaking, (3) types of economic evidence and types of use in decisionmaking, and (4) factors modifying use in health policy.

KQ 2. Trends in the Use of Economic Evidence

KQ 2a.What is the evidence that U.S. policymaking is differentially affected by the inclusion of economic data and analysis in systematic reviews as compared with international counterparts?

Here, U.S. policymaking is defined as all health policy settings in and across U.S.-based jurisdictions. The international counterparts are those policymakers in comparable and other positions in international settings such as the United Nations or in any other country.

KQ 2b.What is the evidence that the impact on decisionmakers of including economic data in systematic reviews has changed over the past two decades within health care policymaking in the United States or in other countries?

The period under consideration is 1991 to the present, beginning when Australia became the first country to formally include economic evidence in national health policymaking. There are a wide variety of policymakers and many types of policy decisions that may be made at national, regional, or local levels. Trends will be different depending on the countries, actors, health areas, and policymaking levels involved. The specific elements considered in our review are defined below with the corresponding specific KQs.

KQ 3. Characteristics of Actual Decisionmaking

KQ 3a. Which types of decisionmakers are likely to be influenced by the inclusion of economic data and analysis in systematic reviews?

The definitions of decisionmaker are taken from our previously cited framework.¹⁹ At the national level, there may be regulators, such as the Food and Drug Administration, and in non-U.S. settings there may be agencies such as the European Medicines Agency. There may also be public third-party payers, such as Medicare and Medicaid, and public health planners. The latter may include local health departments, and State and/or Federal agencies. There are private sector decisionmakers, such as private third-party payers like private health insurance companies. Health care organizations include provider groups such as physicians and other professionals. They should be distinguished from health care facilities such as hospitals and nursing homes. Manufacturers are producers of pharmaceutical products and medical devices. Health policymakers may be based within particular societal groups such as patient and consumer organizations. All have their specific perspective on the use of economic evidence.

KQ 3b. What is the evidence regarding the impact of the inclusion of economic data in systematic reviews across the various types of decisions?

The types of health care decisions are also defined in our cited framework.¹⁹ They may concern very specific policy implementation mechanisms, such as formulary decisions that focus on the coverage of pharmaceutical products, or health package decisions that focus on the

combination of services that should be covered. These may involve a private or public third-party payer, professional providers, or health facilities. Likewise, decisions may include specific conditions related to insurance coverage. Related are decisions on reimbursement rates that include many types of payment mechanisms. Another set of decisions takes place in clinical settings and may involve practice guidelines and clinical management of patients. Lastly, decisions can be in the more general area of health policymaking that do not relate to specific disease areas, or clinical settings.

KQ 3c. What is the evidence on the impact of economic information on multiple assessments across diseases as compared with multiple assessments in a specific disease area?

General use is defined as the use of economic evidence in comparisons across diseases and interventions. Here, it is assumed that the economic data in single studies are fit to be used for broad comparisons. This is facilitated by the inclusion of generic outcomes such as quality-adjusted life years or standardized budget impact estimates. In assessments of interventions in specific areas or in relation to single diseases, the outcome measures may be very specific for the area of study and may not be comparable to outcome measures used in other areas.

KQ 3d. What is the evidence on the impact of economic data included in multiple or single technology assessments across multiple areas as compared with the assessments of single technologies in specific disease areas?

In comparison with KQ 2c, this question focuses on assessment of technologies, instead of disease areas. Studies may focus on a single technology and make use of a variety of outcome parameters. The outcome parameters may not be comparable across studies, thereby limiting their usefulness in comparative effectiveness reviews. Other studies may compare various technologies in a variety of settings and disease areas, using more generic outcome measures that are easier to synthesize in a review of comparative effectiveness.

KQ 4. Types of Economic Evidence and Types of Use in Decisionmaking

KQ 4a. What is the evidence of the impact of specific standardized economic methods (cost-effectiveness analysis, cost-utility analysis, or budget impact analysis) on decisionmakers?

Cost-effectiveness analyses are meant to be standardized evaluations that compare the changes in societal or health care costs with the changes in health outcomes as quantified by any type of health-related measurement. They are to be distinguished from cost-utility analysis where a utility value is given to particular health states and the cost estimates are seen as expressing a value of the resources consumed. A budget impact analysis usually provides estimates on the

total additional budgetary consequences within the health care sector or a particular part of the health care setting.

KQ 4b. What is the evidence that decisionmakers are applying economic criteria using summary measures for efficiency and equity?

The definitions of measures of equity and efficiency are also described in the previously cited framework.¹⁹ Cost of illness is a measure of the financial costs of having a condition. Burden of disease is a measure of the total costs and/or loss of years of healthy life attributable to a condition during a year or over a lifetime. Quality of life assessments are broad measures assessing the impact on a person's functioning and well-being. Budget impact estimates reflect monetary outcomes for a specific organizational level, which could be local or national. Incremental cost-effectiveness or cost-utility ratios compare the extra costs with the extra value obtained from an intervention, procedure, or technology. In the cost-utility approach, as defined above, a particular method to value quality of life involves assessment of health status preferences. The net-benefit measurement includes all outcomes valued in dollars. Disparities measurements include distributional measures of any kind of group level differences in outcomes among subsets of a population.

KQ 5. Factors Modifying Use in Health Policy

KQ 5. What modifying factors have been important promoters and barriers for the use of economic data in health care decisionmaking?

The modifying factors are those factors that are seen as the promoters or barriers in the consideration of economic evidence while making health care decisions at the policy level. The framework we used to define these factors is the Accountability for Reasonableness Framework by Daniels and Sabin.²⁴ This framework is already used in the evaluation of policy processes in both high- and low-income settings^{25,26} and distinguishes transparency, relevance, reinforcement options, and a proper legal process (see Box 1). The effects of these factors can be defined as influencing health policy in either direction by: (1) promoting the use of evidence in case the findings on the factors are positive, or (2) obstructing the use of evidence in policy settings because they are perceived as negative. For this review, we extracted information from eligible studies on potential modifying factors, using a thematic synthesis as recommended by a critical review of qualitative reviews²⁷ that is described in detail by a separate paper,²⁸ using the themes as described in the Daniels and Sabin framework.

Box 1. Summary conditions for a fair process

Relevance: Rationales for priority setting decisions must rest on reasons (evidence and principles) that “fair-minded” people can agree are relevant in the context. Fair-minded people seek to cooperate according to terms they can justify to each other—this narrows, but does not eliminate, the scope of controversy, which is further narrowed by specifying that reasons must be relevant to the specific priority setting context.

Publicity: Priority setting decisions and their rationales must be publicly accessible—justice cannot abide secrets where people’s well-being is concerned.

Revisions/Appeals: There must be a mechanism for challenge, including the opportunity for revising decisions in light of considerations that stakeholders may raise.

Enforcement: There is either voluntary or public regulation of the process to ensure that the first three conditions are met.

Source: Daniels, 2008²⁴

Quality of the Reviewed Studies and Grading the Evidence

We used two types of quality-of-research assessment scales that fit the types of studies we found. One scale was used to assess the quality of observational studies²⁹⁻³¹ and another was used to assess the quality of survey studies.³²⁻³⁴ The former assessment was limited to questions about: (1) the use of a transparent research process, (2) the description of the setting and the inclusion of the sample population, (3) the inclusion or exclusion criteria, (4) the description of the characteristics of study participants at enrollment, (5) the type of economic evidence, and (6) the presence of at least one identifiable outcome on the use of economic evidence. The quality of the surveys was assessed by answering questions about: (1) the setting or sample of the study population, (2) the eligibility criteria, (3) the characteristics of study participants at enrollment, (4) the survey completion rate, and (5) the validity and reliability of the survey instrument.

The grading of the overall strength of evidence was done in a narrative way, taking into consideration the assessments of the quality of the studies. We considered the criteria specified in the grading of recommendations assessment development and evaluation (GRADE) assessment methodology³⁵ and included in our final assessment those criteria that were most relevant to the types of evidence included in this review.²⁰ The grading took into account the number of studies, number of subjects, and their origin, and distinguished four domains of evidence strength: (1) risk of bias and other design issues, (2) the consistency of findings across studies, (3) the evidence of a direct link between a policy decision and the economic evidence, and (4) the probability of actually studying a real-life decision.

Description of the Review Methodology

We reviewed studies that have documented the use of economic evidence from cost-effectiveness analysis or cost-utility analysis by health care institutions and health policymakers in the United States and elsewhere. We focused on the use of cost-effectiveness analysis or cost-utility analysis because we wanted to understand how these formal and relatively labor-intensive methods of economic evaluation are being used by health care policymakers. The key inclusion criterion of our review was the presence of a quantitative or qualitative research method

generating original data about the use of such economic evidence by health care policymakers. We excluded articles of an editorial nature, either opinion- or experience-based commentaries by groups or individuals and without newly generated data. We looked for studies that used one or multiple systematic research methods leading to original data collection, including randomized or nonrandomized controlled designs, surveys, and observational case studies. Secondary articles using data from other studies were excluded. Our review included U.S.-based studies, foreign studies on the United States, and foreign studies of the situation in other countries, including high-income countries and low-income countries. The review also included studies of national-, state-, and local-level policymaking that were published in the peer-reviewed literature. It included the types of empirical evidence, if any, supporting the use of specific criteria for making decisions and the types of barriers and promoting factors that play a role in the decisionmaking process.

Literature Search and Study Selection

We conducted the systematic review, consistent with standard systematic review guidelines,²⁰ the recommended 11-point AMSTAR assessment tool for the review of qualitative studies,²⁸ and the procedures of the Johns Hopkins University Evidence-based Practice Center. We searched the databases of MEDLINE, EconLit, CINAHL, Embase, and ISI Web of Science for relevant articles (Appendix A). The searches were conducted from 1991 through January 2012. The search strings by database are provided in Appendix A. The search was conducted in a stepwise manner, reviewing article titles, abstracts, and then full article texts to find studies meeting the eligibility criteria. We identified additional studies from reference lists of eligible articles and relevant reviews, as well as from technical experts.

The results of the initial searches (through September 2009) were downloaded into ProCite[®] version 5.0.3 (ISI ResearchSoft, Carlsbad, CA). Duplicate articles retrieved from the multiple databases were removed prior to initiating the review. From ProCite, the articles were uploaded to SRS 4.0 (TrialStat[®] 2003-2007). SRS is a secure, Web-based collaboration and management system designed to speed the review process and introduce better process control and scientific rigor. In February of 2009, the SRS system was transferred to new owners, Mobius Analytics (Ottawa, Canada). Functionality of the system was unchanged. We used this database to store full articles in portable document format (PDF) and to track the search results at the title review, abstract review, article inclusion/exclusion, and data abstraction levels. The updated search (October 2009 through January 2012) was managed using a different systematic review software system: DistillerSR (Evidence Partners, Ottawa, Ontario, Canada). All procedures were the same and forms used in DistillerSR were identical to those used in the TrialStat software. Management systems changed due to the fact that at the time of the update TrialStat was no longer being used by this EPC.

Title Review

The study team screened all of the titles retrieved. Two independent reviewers conducted title screens in a parallel fashion. For a title to be eliminated at this level, both reviewers had to indicate that it was ineligible. If the first reviewer marked a title as eligible, it was promoted to the next review level, or if the two reviewers did not agree on the eligibility of an article, it was automatically promoted to the next level (Appendix B).

The title review phase was designed to capture as many studies as possible that reported on either the impact of economic evidence on health care decisionmaking or the guidelines/checklists used to evaluate best practices for conducting economic evaluations in health care (the latter type of studies were included in a separate report). All titles that were thought to address the above criteria were promoted to the abstract review phase.

Abstract Review

The abstract review phase was designed to identify articles that applied to the leading question on the use of economic evidence for health policy or any of the specific KQs. An abstract was excluded at this level if it met one of the following exclusion criteria: does not apply to economics; no original analysis or data (this includes systematic reviews, commentary, or editorials); limited case study of a single policy decision; study focused on a single condition without any assessment of health care decisionmaking or policymaking or any description of the methods for assessing health care decisionmaking); methods only; or decisionmaking was at the individual clinician level only. Articles written in a language other than English were not excluded but tagged for further evaluation if the abstract had been translated into English and it appeared to apply to one of the questions (Appendix C).

Abstracts were promoted to the article review level if both reviewers agreed that the abstract could apply to one or more of the questions and did not meet any of the exclusion criteria. Differences of opinion were resolved by discussion between the two reviewers.

Article Review

Full articles selected for review during the abstract review phase underwent another independent review by paired investigators to determine whether they should be included in the full data abstraction. At this phase of review, investigators determined which of the questions each article addressed (Appendix D). Reasons for exclusion were the same as those for the abstract review level with the addition of the following: no cost-effectiveness analysis component; cost-effectiveness analysis only, without an assessment of impact on health care decisionmaking; study of cost predictors; or costing study. If articles were deemed to have applicable information, they were included in the data abstraction. Differences of opinion regarding article eligibility were resolved through consensus adjudication.

Data Abstraction

Once an article was included at this level, reviewers were given a final option to include or exclude the article in this review. Senior investigators met to reach a consensus decision on each article at this level of review.

Once an article was included, information from the articles was extracted using a four-page data collection form (Appendix E). We used a sequential review process to abstract data from the final pool of articles. In this process, the primary reviewer completed all the relevant data abstraction forms. The second reviewer checked the first reviewer's data abstraction forms for completeness and accuracy.

For all included articles, reviewers extracted information on general study characteristics, study design, location, disease of interest, inclusion and exclusion criteria, decisionmaking bodies, level of policymaking, types of clinical areas and decisionmaking, the criteria used in decisionmaking, economic evaluations used, and the promoters and barriers to use of the economic evaluation.

The information from the selected articles was grouped by primary characteristics such as country, study period, and design. Next, we grouped the studies by the type of health organization that was studied (professional groups, academics, general public), the type of economic evaluation (e.g., cost-effectiveness, cost-utility, cost-benefit), the level of policymaking (e.g., insurer, State program, Federal program), and the clinical area (e.g., general, cardiovascular, arthritis, etc.). The review then summarized the evidence of the use or non-use of different types of economic outcome data in the particular clinical area at the particular level of decisionmaking.

The review extraction form also included the identification of reported promoters and barriers to the incorporation of economic data into decisionmaking. We defined a priori a list of potential factors that might facilitate or hinder the use of economic data. Likely barriers included concerns about the quality and credibility of studies, the relevance of information, and the transparency of studies. The project group classified factors as barriers or promoting factors by consensus using the accountability of reasonableness framework.²⁴ This information was extracted by two independent, experienced reviewers who were not participating in the final analyses and write-up. The information collected in data extraction forms and entered in the electronic database was reviewed by a more senior researcher, with attention given to the classification of study design and correct extraction of the textual information on the barriers and promoting factors.

Two additional extraction forms were designed to objectively assess the quality of the evaluation research in the selected articles. Several criteria lists have been used previously for assessing the quality of observational research and surveys.³²⁻³⁴ To simplify the assessment, these were shortened and addressed only two categories of research: one form was designed to evaluate the survey-based evaluations, and a second form was used to assess the qualitative observational research (Appendix F). The studies based on discrete choice experiments were grouped together with qualitative observational studies.

The results were not filtered by country name or geographical area. We limited our analysis to evaluations published in peer-reviewed scientific journals. Appendix G lists the articles excluded after review of full articles, with the reasons for exclusion. We tallied the outcomes or factors of interest by times mentioned in the selected articles for each KQ. Due to the marked heterogeneity of the studies, we did not perform statistical analyses or any formal assessment of potential publication bias.

Peer Review

Throughout the project, the core team sought feedback from the internal advisors and technical experts. A draft of the report was sent to the technical experts and peer reviewers. In response to the comments from the technical experts and peer reviewers, we revised the evidence report and prepared a summary of the comments and their disposition for submission to the Agency for Healthcare Research and Quality.

Results

The systematic search initially identified 24,984 potential articles; 5,857 were removed from this initial list because they were duplicates, leaving 19,127 titles to be reviewed (Figure 1). At the title-screening level, 15,685 titles were excluded, leaving 3,442 abstracts for review. At the abstract-screening level, 2,756 abstracts were removed, leaving 686 articles to be screened for eligibility for the questions addressed in this review. At the article-review level, 43 articles met the eligibility criteria (see Figure 1). The studies used a variety of study designs and were conducted in many countries (see Table 1). The country where the greatest number of studies was performed is the United Kingdom. Only five of the studies were performed in the United States, too few to support a separate analysis of U.S.-focused studies for each of our Key Questions (KQs). We decided to combine the information across countries, still accounting for specific situations, while formulating our conclusions.

Findings

KQ 1. Do economic data or analyses as reported in economic evaluation studies, including those as part of health technology assessments, comparative effectiveness research, or technology appraisals, impact policy decisions in health care?

In 30 of the 43 studies, the reviewers found evidence that use of economic evidence had a “substantial” impact on health care policymaking, either in general health policy or in specific policy topics such as individual reimbursement decisions or in relation to specific interventions or specific drugs used in particular diseases or conditions (see Table 2). The nature of this evidence varied by study design and varied from actual observations during decisionmaking in formal decisionmaking bodies, to recordings in formal documents such as economic dossiers, to verbal reports by responding decisionmakers, to answers to surveys. In 11 studies, the reviewers found evidence that use of economic evidence had only a “limited” impact on decisionmaking in health policy settings. In two studies, economic evidence had no impact on health care decisionmaking.

KQ 2a. What is the evidence that U.S. policymaking is differentially affected by the inclusion of economic data and analysis in systematic reviews as compared with international counterparts?

It seemed inappropriate to make a one-to-one comparison between results in the United States and results in any other country because most reports from other countries included the formal use of economic evidence while those from the United States did not. As shown in Table 1, 15 studies were performed in the United Kingdom. Five studies were performed in each of

three countries: Australia, Canada, and the United States. No other country had more than three studies. The study of the use of economic evidence in health policy is scarce in the United States in relation to the numbers of economic evaluations reported, population size, or size of the health care budget. The number of studies in each country seemed to reflect the formal arrangements to include economic evidence in formal decisionmaking. Countries such as the United Kingdom and Australia have formally incorporated economic evidence in the decisionmaking process for over a decade.

All but one of the studies concerned policymaking within the context of the health care system in a single nation or setting. Only two studies, one by Zwart-van Rijkom³⁶ and one by Bloom, 2004³⁷ covered multiple countries, with both researchers carrying out surveys in four high-income countries. The Zwart-van Rijkom study was funded through a European grant. Ten articles did not name any funding source, while the others were funded either by general health funding agencies or other public health agencies or were self-financed. The research in Nepal and Ghana was carried out with support from external donor agencies. The research in two articles was reported to be co-funded by a pharmaceutical organization and took place in a U.S. setting.

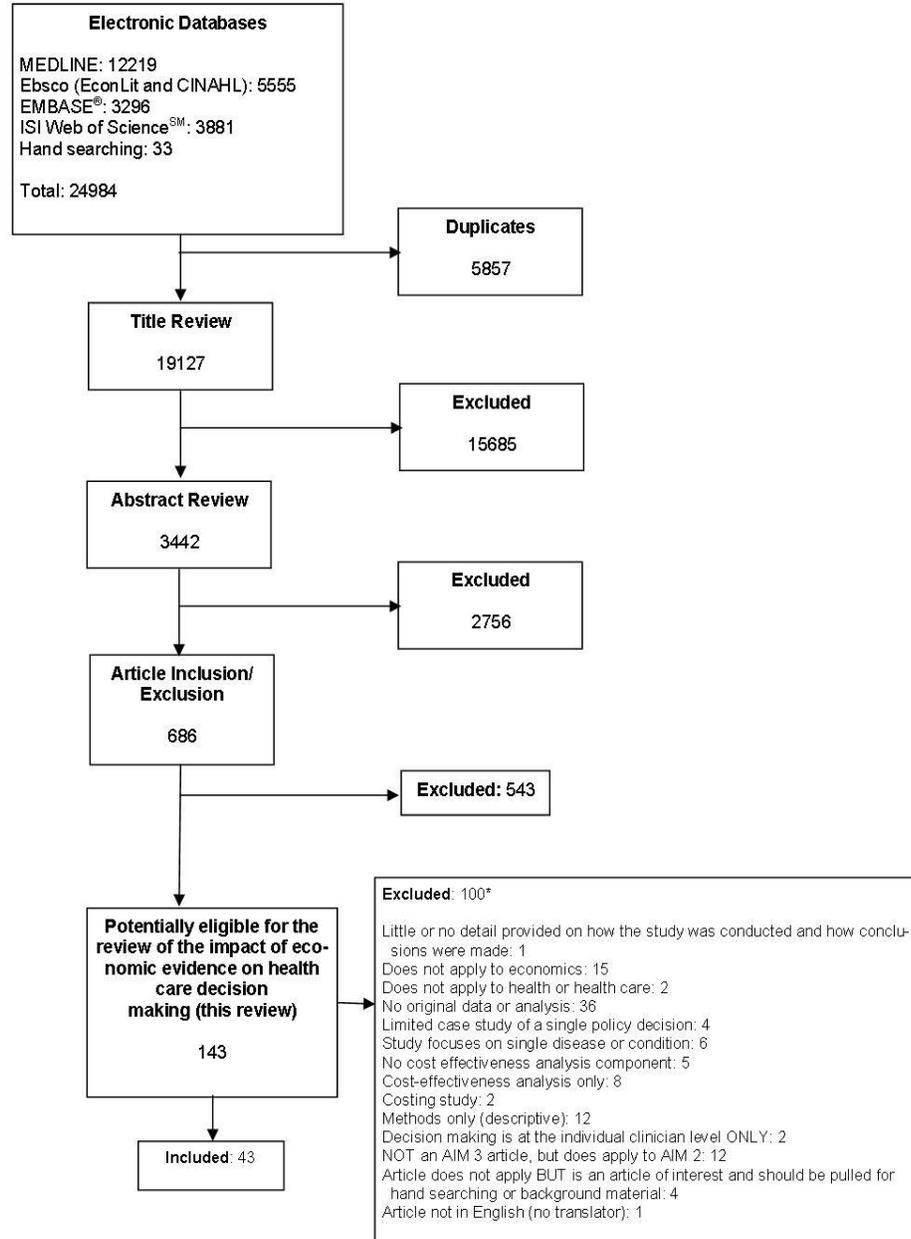
In a comparison of the international results with the five U.S.-based studies, one can see that the five U.S. studies were very heterogeneous in the policymakers, policy settings, and health organizations addressed. One study by Gold³⁸ focused on the understanding of economic evidence by the general public. This was the only study focusing on use by the general public. Two U.S. studies were done from the perspective of a pharmaceutical company. A study by Wallace³⁹ reported the limited use of economic evidence in medical and other health professional guidelines. Watkins⁴⁰ examined the use of economic evidence from a diabetes model in a policy setting. The study by Bloom³⁷ involved 104 policymakers and professionals from a self-selected, convenience sample in four countries, including the United States. It is unclear how many U.S.-based respondents were included and how this was done. The heterogeneous nature of the U.S. studies made it difficult to compare the results with those for other countries. All five studies did not relate to any specific health policy context in the United States that formally incorporated economic evidence in decisionmaking.

KQ 2b. What is the evidence that the impact on decisionmakers of including economic data in systematic reviews has changed over the past two decades within health care policymaking in the United States or in other countries?

The evidence was insufficient to support any strong conclusion about temporal trends in the impact of economic evaluations on health care decisionmaking, with very little evidence on changes related to the use of economic data in systematic reviews. Out of 43 studies, only four (9%) were published before the year 2000. Fourteen studies (33%) were published between 2000 and 2005, and 25 studies were published after 2005 (58%). Although the formal and institutionalized use of economic evidence has increased,⁴¹ the study of the policy impact of economic evidence has not been increasing at the same rate or may even be lagging behind. The number and nature of the studies was too limited and too patchy by level and types of care, to observe time trends in health policy relevance. For some high-income countries, time series on the number of economic dossiers do exist (e.g., Australia, the United Kingdom). The rate of

submission of economic dossiers fluctuated over time and might depend upon the number of new drugs or other interventions that are ready for market entry.

Figure 1. Results of the literature search



* Number of excluded articles sum is greater than 100 because articles could be excluded for more than one reason

CINAHL = Cumulative Index to Nursing and Allied Health Literature

KQ 3a. Which types of decisionmakers are likely to be influenced by the inclusion of economic data and analysis in systematic reviews?

The majority of the study populations (22 studies) consisted of organized national-level or sub-national policymakers that were members of formal committees involved in decisionmaking. The subjects were included in surveys, focus groups, interviews, observational research, or, indirectly via document analyses. The population groups varied from national and local formal health committee members, the general public, groups of policymakers with positions in various health agencies, staff of companies, and specific professional groups. Eight studies involved health professionals or the general public. Next in number were the study populations with individual policymakers that held a position in health agencies but were not selected because of membership in a decisionmaking body (7 studies). Some of the study samples included health professionals. Four studies involved local decisionmakers in a formal position (2 studies) or in an informal way. Two studies included staff members of pharmaceutical companies.

As the majority of the studies concluded that economic evidence does impact decisionmaking, it is difficult to distinguish particular groups of policymakers that may be more inclined to use this type of evidence. It might be significant that, among the few studies including local-level policymakers, there was the one study with a negative conclusion. According to the reporting researchers, this was inherent to the limited room for local decisionmaking and the lack of power to change central health decisions to adapt to the local context.

KQ 3b. What is the evidence regarding the impact of the inclusion of economic data in systematic review across the various types of decisions?

There was high variability in the types of decisions impacted by economic data. A total of 24 studies involved general decisionmaking in the health fields related to package and/or reimbursement discussions and decisions. Seven studies were limited to issues related to the supply of pharmaceuticals. Six studies were focused on a particular clinical domain such as oncology or stage of disease (acute, rehabilitation, or end-of-life) and usually involved health professionals. The remaining studies focused on public health (2 studies) or used a particular clinical case as an example (2 studies).

Twenty six studies focused on taking specific, identifiable reimbursement or health package decisions, while 15 studies had a wider focus on making choices in health care and in health policy in general. One study focused on the use of economic evidence in professional health guidelines, while in two cases the focus could not be established.

Distinguishing central or national-level policymaking from any other types of policymaking, the findings indicated that economic evidence was more likely to be used at the national level than at the local level. The majority of the studies (27 studies) dealt with central, national-level policymaking. Within this group, eight studies also included more local levels of policymaking. Five studies dealt with policymaking at the State level and five studies focused on decisionmaking in clinical practice in general; the latter studies were all in Canada. Three studies dealt with local decisionmaking only while three studies dealt with Federal policymaking only and they were conducted in either Australia or Canada.

KQ 3c and KQ 3d. What is the evidence on the impact of economic information on multiple assessments across diseases as compared with multiple assessments in a specific disease area? What is the evidence on the impact of economic data included in multiple or single technology assessments across multiple areas as compared with the assessments of single technologies in specific disease areas?

Although the majority of studies (28 of 43) examined the impact of economic evidence from general assessments across diseases or clinical areas, a sizeable percentage of the studies (15 of 43) focused on the impact of economic evidence from assessments in a specific disease area, and 9 of those focused on a single technology. The use and impact of economic evidence did not differ substantially between the general assessments and the disease-specific or technology-specific assessments. The findings therefore suggested that economic evidence can have an impact on health care decisionmaking regardless of whether the economic evaluation included multiple diseases or multiple technologies, or a single disease or single technology.

KQ 4a. What is the evidence of the impact of specific standardized economic methods (cost-effectiveness analysis, cost-utility analysis, or budget impact analysis) on decisionmakers?

Most (34 of 43) of the studies were performed exploring the use of cost-effectiveness information (see Table 2). This may be a consequence of being one of the search terms and an inclusion criterion. Yet, a large number of studies also mentioned other types of economic information as the object of study. These mainly concerned budget (13 studies) and cost (8 studies) information, but also specifically cost-utility analyses that incorporated quality-adjusted life-years (QALYs). In some studies, the lack of transparency of the QALY approach was mentioned as an obstacle in the use of economic evidence for health decisionmaking.

KQ 4b. What is the evidence that decisionmakers are applying economic criteria using summary measures for efficiency and equity?

Among the 34 studies that reported results of the impact of cost-effectiveness outcomes as a formal decisionmaking criterion to select health interventions, only two studies focused *exclusively* on the cost-effectiveness criterion. The remaining 32 studies indicated that at least one other economic decisionmaking criterion was important. Often these involved equity considerations, usually ill-defined (14 studies). Other frequently cited decisionmaking criteria included: clinical effectiveness (3 studies); budget impact (13 studies); ethical reasons (1 study); advocacy (4 studies) (see Table 2).

KQ 5. What modifying factors have been important promoters and barriers for the use of economic data in health care decisionmaking?

Four modifying factors have played a key role in how economic data were used in health care decisionmaking: quality, transparency, clarity and communication. Table 3 lists the number of times that particular factors have been mentioned in the selected studies as particularly favorable or unfavorable in promoting the use of economic evidence in health policy decisions.

Most often mentioned, in about half of the studies, were the quality and transparency of the original economic studies that provided the economic evidence for the decisionmaking process. What is striking is that study quality and transparency were seen as important promoting factors (7 studies) in the case of a well-presented study and as strong obstacles in the case of a badly presented study (18 studies). The transparency and quality of the decisionmaking process itself was a related factor. The selected studies mentioned this as a key characteristic in the use or rejection of the evidence in about the same frequency (10 and 13 studies respectively). The third factor was the clarity of the economic information itself and the way it was communicated. Six studies reported good communication as an important promoting factor. Communication barriers were reported in 17 of the studies. The principle of acceptance of an economic approach (e.g., the political will or ethical acceptance to use economic information) was another important factor.

Two of the studies did not mention any modulating factors at all. This is the consequence of the retrospective review: these factors were actually not part of the research questions of the selected study and, likely, not part of the original research. There were other types of obstacles listed nine times; all were listed only once (see Table 3).

It is striking that there were many more obstacles listed than promoting factors, in spite of the fact that the majority of studies reported that use of economic evidence had an impact on health care decisionmaking. Barriers that were frequently mentioned were the absence of economic information, the lack of relevance, and, less frequently, the size of the patient population, the transaction cost, and the reputation of the involved research agency or decisionmaking agency.

Quality of Individual Studies and Grading of the Body of Evidence

Given the varying quality and the lack of control studies, we qualify these studies as presenting a low level of evidence. The methods in each study varied and were often a combination of various methods (see Table 1). Mostly qualitative research was combined with one or two other research methods (19 studies in total). The latter always included semi-structured interviews. Five studies used postal surveys only to collect information, while seven other studies combined one or multiple surveys with another method. Another four studies used discrete choice experiments to elicit opinions on economic evidence from policymakers at varying levels. Three studies analyzed documents with or without a contribution from focus group research. Two studies applied statistical methods to a qualitative evaluation of the decisionmaking process. Two studies used four different methods (survey, focus groups, document analyses, and structured interviews) to collect primary data.

Table 4 summarizes the quality of the studies. One can observe a huge range in the assessments of the observational studies (Table 4a) and the surveys (Table 4b). Only 11 out of the 37 observational studies (30%) received positive ratings for more than three items on the checklist. The quality ratings among the surveys had a less skewed distribution. It was difficult to draw conclusions from these studies because of how few there were.

Table 5 provides a narrative overview of the grading of the body of evidence using the format as recommended in the Agency for Healthcare Research and Quality manual²⁰ and using the study quality assessment as one of the criteria. The grading distinguishes three levels of policy use: specific reimbursement decisions, general reimbursement decisions, and general policymaking in all sorts of health decisionmaking. A qualitative summary statement is made in the last column, taking into account the body of real-life decisions studied, if any, and the reported preference of study subjects for using economic evidence.

Five observational studies used discrete choice experiments. This approach provided policymakers a comparison option in every discrete choice made. These are actually the only studies that incorporated some formal comparison option in the assessment of the importance of economic information. All the studies with experimental designs were done for policymaking at the general health policy level and not in relation to specific and general reimbursement situations. All five of these observational studies were done in non-U.S. settings. This finding, coupled with the modest number of U.S. studies, led to the conclusion that the available level of evidence for the United States is of lesser quality than the intermediate quality of studies from other countries. In the group of studies on actual reimbursement decisions, we only identified observational non-controlled studies on the use of economic evidence, considering single, multiple, even many (in Australia) reimbursement dossiers.

Table 1. Types of studies assessing the impact of economic evidence on policymakers in health care

Country	N	Study Design	Reference
Argentina	1	Survey	Rubinstein, 2007 ⁴²
Australia	5	Document review	Harris, 2008 ⁴³ O'Malley, 2006 ⁴⁴ George, 2001 ⁴⁵
		Qualitative case study	O'Malley, 2006 ⁴⁴ George, 2001 ⁴⁵ Weekes, 1996 ⁴⁶ Ross, 1995 ⁴⁷
		Surveys and focus groups	Weekes, 1996 ⁴⁶
		Structured interviews	Ross, 1995 ⁴⁷
Canada	5	Qualitative case study	Singer, 2000 ⁴⁸ Martin, 2001 ⁴⁹ PausJenssen, 2003 ⁵⁰ Anis, 1998 ⁵¹
		Documents review	Martin, 2001 ⁴⁹ Anis, 1998 ⁵¹ Rocchi, 2008 ⁵²
		Focus group	Rocchi, 2008 ⁵²
		Interviews	Martin, 2001 ⁴⁹
Germany	1	Qualitative case study, surveys, focus groups, directed interviews	Hoffmann, 2000 ⁵³
Ghana	1	Discrete choice experiment	Jehu-Appiah, 2008 ⁵⁴
Hungary	1	Statistical analysis	Grof, 2007 ⁵⁵
Italy	1	Surveys	Fattore, 2006 ⁵⁶
Nepal	1	Discrete choice experiment	Baltussen, 2007 ⁵⁷
the Netherlands	2	Structured interviews	Zwart-van Rijkom, 2000 ³⁶
		Qualitative case study	IJzerman, 2003 ⁵⁸
		Surveys	Zwart-van Rijkom, 2000 ³⁶ IJzerman, 2003 ⁵⁸
		Semi-structured interviews	IJzerman, 2003 ⁵⁸
Norway	1	Qualitative case study and structured interviews	Pedersen, 2008 ⁵⁹
Sweden	3	Qualitative case study	Jansson 2007 ⁶⁰ Anel, 2005 ⁶¹
		Surveys	Anel, 2005 ⁶¹ Jansson, 2007 ⁶⁰
		Document reviews	Anel, 2005 ⁶¹
Thailand	1	Structured interviews	Teerawattananon, 2008 ⁶²

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Anell, 2005 ⁶¹	Swedish Institute for Health Economics, Sweden	National policymakers	National, Local	General pharmaceuticals	Reimbursement decision	Cost-effectiveness/efficiency; Also focus on marginal utility principle; Budget impact; Equity: Principle of human dignity; Size of target population	Substantial
Anis, 1998 ⁵¹	Department of Health Care and Epidemiology, University of British Columbia, Centre for Health Evaluation and Outcome Sciences, St Paul's Hospital, Vancouver, British Columbia, Canada	Subnational/regional policymakers	State, Provincial	General pharmaceuticals	Reimbursement decision	Cost-effectiveness/efficiency; Budget impact; Coverage, Cost-Minimization; Cost comparison/cost-consequence	Substantial
Baltussen, 2007 ⁵⁷	Department of Public Health, Radboud University Medical Center Nijmegen, the Netherlands	National program managers in Nepal	National	Lung health programs involving pneumonia, TB, COPD, and asthma; HIV/AIDS; Maternal and child health	Reimbursement decision	Cost-effectiveness/efficiency; Equity: Poverty reduction; Individual health benefits and number of potential beneficiaries; Age of target group; Stage of disease; Clinical effectiveness	Substantial

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Bloom, 2004 ³⁷	Departments of Medicine and Health Care Systems and the Leonard Davis Institute of Health Economics, University of Pennsylvania, Philadelphia, U.S.A.	Policymakers, Technical experts, Public and Private payers	National	General surgical, and pharmaceutical interventions	Reimbursement decision; General policy and attitude on health; General policy or attitude on health financing; Research resource allocation	Benefits; Benefit/cost ratios; Timeliness	Substantial
Bryan, 2007 ⁶³	Health Economics Facility, University of Birmingham, U.K., and Center for Health Policy, Stanford University, U.S.A.	National health board	National	General health technology appraisals	Reimbursement decision	Cost-effectiveness/efficiency; Equity	Substantial
Chen, 2007 ⁶⁴	School of Pharmacy and Pharmaceutical Sciences, University of Manchester, U.K. and Ministry of Education, Taiwan	Local medical management committees	Local	General managed entry of new drugs, with focus on cost-effectiveness of parecoxib versus ketorolac.	General policy and attitude on health	Cost-effectiveness/efficiency; Budget impact	Limited
Dakin, 2006 ⁶⁵	Abacus International, U.K.	National health board	National	General	Reimbursement decision, Package decisions in general	Cost: Net Costs; Cost-effectiveness/efficiency; Burden of Disease; Uncertainty Surrounding ICER	Substantial

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
DiMasi, 2001 ⁶⁶	Director of Economic Analysis, Tufts Center for the Study of Drug Development, Tufts University, Boston, Massachusetts, U.S.A.	Pharmaceutical research and development departments	Internal/professional	General pharmaceutical research and development	Reimbursement decision; Research resource allocation	Cost: Cost-containment policy; Budget impact: Total % of budget allocated to pharmacoeconomics	Substantial
Duthie, 1999 ⁶⁷	Global Health Outcomes, Glaxo Wellcome Research and Development, Greenford Road, Greenford, Middlesex, U.K.	General practitioners, Purchasers	Professional/practice	General practice	Reimbursement decision; General policy and attitude on health; Purchasing,	Cost: Cost-effectiveness/efficiency; Budget impact: Horizon Scanning	Substantial
Eddama, 2008 ⁶⁸	National Perinatal Epidemiology Unit, University of Oxford, Department of Social Medicine, University of Bristol, U.K.	Policymakers and key public	Local	General	General policy and attitude on health	Cost: Cost-effectiveness/efficiency; Equity	None

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Fattore, 2006 ⁵⁶	CERGAS-SDA, Bocconi University, Milan, Italy	Health care professionals	National, Local	Surgical intervention; Prevention services; Drugs; Diagnostic service; Rehabilitation	General policy and attitude on health	Cost-effectiveness/efficiency; Equity; Social demographics of participants; Perceptions of use of economic evaluations among health care professionals; Extent of use of economic evaluations of health care organizations for clinical and managerial decisionmaking; Participants perceived knowledge of economic evaluation.	Substantial
George, 2001 ⁴⁵	Centre for Policy and Practice, University of London School of Pharmacy, London, U.K.	National health board	National, The Commonwealth Government of Australia, Pharmaceutical Benefits Schedule	General pharmaceuticals	Reimbursement decision	Cost: Cost/QALY, Incremental cost-effectiveness ratio	Substantial

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Gold, 2007 ³⁸	Department of Community Health and Social Medicine, The Sophie Davis School of Biomedical Education, New York, U.S.A.	General public, Randomly selected members of New York jury pool	National, Medicare	Primary care and acute care, including Treatment for erectile dysfunction; Physician counseling for smoking; Total hip replacement; Outreach for influenza and pneumonia vaccinations; Treatment of major depression; Gastric bypass surgery; Treatment for osteoporosis; Screening for colon cancer; Implantable cardioverter defibrillator; Lung-volume reduction surgery; Tight control of diabetes; Treating elevated cholesterol; Resuscitation after in-hospital cardiac arrest; Left ventricular assist device	Reimbursement decision; Package decisions in general; General policy and attitude on health; General policy on health care	Stage of disease: disease severity; Rule of rescue; Tradeoffs between quality and quantity of life; "Fair-innings"	Substantial
Grof, 2007 ⁵⁵	StratMed Kft., Pecs, Hungary	Policymakers and clinicians	National	Oncology	Package decisions in general; General policy and attitude on health; General policy on health care; Research resource allocation	Cost-effectiveness/efficiency; Equity; Distributive justice, Evidence-based medicine; Constitutional and human rights; Lay opinion	Substantial

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Harris, 2008 ⁴³	Monash University, Victoria, Australia	National health board	National	Not specified	Reimbursement decision	Cost: Cost to government; Cost-effectiveness/efficiency: Economic model validity, Incremental cost per QALY, uncertainty of cost per QALY; Stage of disease; Level of Evidence; Quality of studies, Previous consideration by PBAC; Modeled cost; Modeled outcome	Substantial
Hoffmann, 2000 ⁵³	Universitaet Hannover, Institut fuer Versicherungsbe-triebslehr, Hannover, Germany	National health board and national policymakers	National, State, Local, Professional/ Practice	General decisions in clinical practice; pharmacy, and hiring	General policy and attitude on health; General policy or attitude on health financing	Primarily cost benefit analysis	Limited
Hoffmann, 2002 ⁶⁹	Centre for Health Economics, University of York, United Kingdom	Local level policymakers	National, Local	General	General policy and attitude on health	Cost: Cost-effectiveness/efficiency	Limited
IJzerman, 2003 ⁵⁸	Roessingh Research and Development, Enschede, the Netherlands	Local level	National and local	Rehabilitation medicine; Primary care	Reimbursement decision; General policy or attitude on health financing	Budget impact; Stage of disease; Quality of life	Substantial

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decision making Criteria	Impact of Economic Evidence on Decisionmaking
Jansson, 2006 ⁷⁰	The Swedish Institute for Health Economics	National health board and sub-national policymakers	Local	General drug prescriptions	Reimbursement decision	Cost-effectiveness/efficiency; Budget impact; Cost minimization	Limited
Jansson, 2007 ⁶⁰	The Swedish Institute for Health Economics, Sweden	National health board	National, centralized review process to assist in making drug coverage decisions	General pharmaceuticals	Reimbursement decision; Subsidies	Cost-effectiveness/efficiency; Principle of human dignity; Principle of need and solidarity	Substantial
Jehu-Appiah, 2008 ⁵⁴	Policy Planning Monitoring and Evaluation Division, Ghana Health Service, Accra, Ghana	Informal national group or institution	National, Ghana	General primary care and acute care, including vaccines, childhood diseases, communicable diseases, reproductive health, and injuries	Package decisions in general; General policy and attitude on health; General policy on health care	Cost: Cost-effectiveness/efficiency; Age: children, women of reproductive age, older people; Stage of disease: Severity of disease; Other: Number of potential beneficiaries; Poverty reduction	Substantial
Martin, 2001 ⁴⁹	Departments of Health Policy, Management and Evaluation and Public Health Sciences and the Joint Centre for Bioethics, University of Toronto, Ontario, Canada	Regional authority	State, Provincial	Cancer	General policy or attitude on health financing	Equity; Benefit	Limited

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Milewa, 2006 ⁷¹	Brunel University, U.K.	Patient/family/consumer group; Advocacy research group; Research specialists; Health economists	National	General, including multiple sclerosis, growth hormone use, Non-Hodgkin's lymphoma, menstrual bleeding, rheumatoid arthritis, primary care; Public health	Package decisions in general; General policy on health care	Cost: Cost-effectiveness/efficiency; Advocacy; Hidden costs; Credibility	Substantial
O'Malley, 2006 ⁴⁴	Medical Intelligence, 13 Cudjee Street, Turramurra, Australia	Federal and national policymakers	Federal	General medical procedures and new technologies	Reimbursement decision	Cost-effectiveness/efficiency, Clinical effectiveness; Safety	Limited
PausJensen, 2003 ⁵⁰	Department of Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, Canada	Regional authority	State, Provincial	General formulary	Reimbursement decision	Cost: Cost-effectiveness/efficiency; Budget impact; Unit cost; Cost comparison	Substantial
Pedersen, 2008 ⁵⁹	Department of General Practice and Community Medicine, Section for Medical Ethics, University of Oslo, Oslo, Norway	Health care professionals	Clinical	End of life care	General policy on health care; Resource allocation	Moral/Ethical; Medical/Scientific	None
Prosser, 2005 ⁷²	The Infirmary, Liverpool, U.K.	Professionals; Pharmacists	National, Local	General primary care and public health	Package decisions in general; General policy and attitude on health; General policy on health care; General policy or attitude on health financing	Cost: Cost-effectiveness/efficiency; Equity; Ethnicity; Stage of disease	Substantial

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Rocchi, 2008 ⁵²	Axia Research, Hamilton, Ontario, Canada	Health economics and health policy specialists	Federal, National	Oncology	Reimbursement decision	Cost: Cost-effectiveness/efficiency; Budget impact: Affordability, appropriate use; Equity; Preferred outcomes; Extent of benefit; Data limitations	Substantial
Ross, 1995 ⁴⁷	Centre for Health Economics Research and Evaluation, Department of Community Medicine, Westmead Hospital, Westmead, Australia	National and regional policymakers	Federal and regional health authorities	General pricing of new drugs; decisions on breast cancer screening and cervical cancer screening; low osmolar contrast media radiological examinations; optimal sizes of cardiac surgery and renal transplant units; out-patient accident and emergency services decision on whether or not to install a CT scanner; capital works over \$2 million	General policy and attitude on health; General policy or attitude on health financing	None	Limited
Rubinstein, 2007 ⁴²	Institute for Clinical Effectiveness and Health Policy, Buenos Aires, Argentina	Pharmaceutical manufacturer; Patient/family/consumer group	National	General primary care, acute care, and public health	Package decisions in general; General policy and attitude on health; General policy on health care; General policy or attitude on health financing	Cost: Cost-effectiveness/efficiency; Equity; Advocacy	Substantial

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Schlander, 2007 ⁷³	Institute for Innovation and Valuation in Health, Eschborn, Germany	National health board	National	Disease specific: ADHD treatment with methylphenidate atomoxetine, and dexamphetamine.	Evaluation of performance and robustness of NICE technology appraisal processes	Transparency; Relevance; Appeals; Enforcement	Substantial
Singer, 2000 ⁴⁸	University of Toronto Joint Centre for Bioethics, Toronto, Ontario, Canada	Regional authority	State, Provincial	Cardiac conditions; Cancer	General policy or attitude on health financing	Cost: Cost-effectiveness/efficiency; Equity; Benefit; Evidence; Pattern of death	Limited
Tappenden, 2007 ⁷⁴	School of Health and Related Research, The University of Sheffield, Sheffield, U.K.	National health board	National	General health technologies	Package decisions in general	Cost-effectiveness/efficiency; Age; Baseline health-related quality of life; Availability of other therapies; Uncertainty	Substantial
Taylor-Robinson, 2008 ⁷⁵	Division of Public Health, University of Liverpool, Liverpool, U.K.	Patient/family/consumer group; Senior academics with direct experience in policymaking; Directors of finance, Director of a public health observatory	National, Local	General: Primary care and public health	General policy on health care	Cost: Cost-effectiveness/efficiency; Advocacy; Perceptions of models	Substantial
Teerawattanon, 2008 ⁶²	Health Intervention and Technology Assessment Program, Ministry of Public Health, Nonthaburi, Thailand	Policymakers	National	Gall bladder disease; chronic kidney disease	Package decisions in general; General policy and attitude on health; General policy on health care	Cost: Cost-effectiveness/efficiency; Budget impact; Equity; Stage of disease	Limited

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Towse, 2002 ⁷⁶	Office of Health Economics, London, U.K.	National policymakers	National	General technology and pharmaceutical	Reimbursement decision	Cost-effectiveness/efficiency; Budget impact; Equity; Cost per QALY; Clinical effectiveness	Substantial
Wallace, 2002 ³⁹	NR	Health care professionals	General/clinical	General clinical, including acute care, chronic therapy, risk factor reduction, screening, and surgical therapy	Clinical guideline development	Cost: Cost-effectiveness/efficiency	Limited
Watkins, 2006 ⁴⁰	Pharmacy manager, Formulary development, at Premera Blue Cross and University of Washington, U.S.A.	State authority, Formulary review	State	Type II Diabetes	Reimbursement decision	Cost-effectiveness/efficiency; cost/per QALY; Projected treatment costs; Age; Ethnicity; Stage of disease; Gender	Substantial

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Weekes, 1996 ⁴⁶	New South Wales Therapeutic Assessment Group Inc., Sydney, Australia	Regional authority	The Drug and Therapeutics Committee is the pivotal policymaker at institutional levels	Internal medicine; nursing; pharmacy	Drug expenditures	Cost-effectiveness/efficiency; Efficient management of resources and quality of therapeutics	Substantial
Williams, 2007 ⁷⁷	Health Economics Facility, Health Services Management Centre, School of Public Policy, University of Birmingham, Birmingham, U.K.	National health board	National	Clinical conditions, including colorectal cancer, breast cancer, bipolar disorder, menstrual bleeding, non-Hodgkin's lymphoma, chronic myeloid leukemia, angina, and myocardial infarction.	Reimbursement decision	Cost-effectiveness/efficiency	Substantial
Williams, 2008 ⁷⁸	University of Birmingham, U.K.	National health board	National, Local	General: Primary care, acute care, and public health	Package decisions in general; General policy and attitude on health; General policy on health care; General policy or attitude on health financing	Cost-effectiveness/efficiency; Budget impact; Equity; Advocacy	Substantial

Table 2. Details of studies addressing the impact of economic evidence on policymakers in health care (continued)

Author, Year	Affiliation	Decisionmaking Body/Societal Actors	Policy Level	General or Disease Specific	Type of Decisionmaking Targeted	Type of Decisionmaking Criteria	Impact of Economic Evidence on Decisionmaking
Wilson, 2007 ⁷⁹	Health Economics Support Programme, Health Economics Group, School of Medicine, Health Policy & Practice, University of East Anglia, Norwich, U.K.	Local policymakers	National	General primary and acute care, including Introduction of a community-based echocardiography service in the diagnosis of chronic heart failure; Introduction of a 'hospital at home' service for managing acute exacerbations of COPD; Use of Drotrecogin-alpha for severe sepsis in intensive care patients; Introduction of an opportunistic screening program for trachoma; IVF; Implementation of case management to prevent emergency admissions	General policy and attitude on health	Cost-effectiveness/efficiency; Budget impact; Burden; Equity and fairness; Deliverability; Engagement; Acceptability	Substantial
Zwart-van Rijkom, 2000 ³⁶	Erasmus University, Institute for Medical Technology Assessment, Rotterdam, the Netherlands	Policymakers and experts/professionals	National	Obesity	Package decisions in general; General policy and attitude on health; General policy on health care	Cost-effectiveness/efficiency; Knowledge of cost-benefit analysis/cost-utility analysis; Safety; Politics	Limited

ADHD = attention deficit, hyperactivity disorder; COPD = chronic obstructive pulmonary disease; CT = computerized tomography; ICER = International Centre for Economic Research; IVF = in-vitro fertilization; NICE = National Institute for Clinical Excellence; NR = not reported; QALY = quality-adjusted life-years; TB= tuberculosis; U.K. = United Kingdom

Table 3. Modulating factors: Promoters and obstacles in health policy and times mentioned

Factor	Mentioned as Promoter (Articles)	Mentioned as Barrier (Articles)	Times Not Mentioned at All as Promoter or Barrier
Quality/transparency of the economic studies leading to the assessment.	Jehu-Appiah, 2008 ⁵⁴ Williams, 2007 ⁷⁷ Watkins, 2006 ⁴⁰ Bryan, 2007 ⁶³ Jansson, 2007 ⁶⁰ Rocchi, 2008 ⁵² Hoffmann, 2002 ⁶⁹	Watkins, 2006 ⁴⁰ Bryan, 2007 ⁶³ Hoffmann, 2002 ⁶⁹ Williams, 2008 ⁷⁸ Rubinstein, 2007 ⁴² Teerawattananon, 2008 ⁶² Taylor-Robinson, 1998 ⁷⁵ Bloom, 2004 ³⁷ Fattore, 2006 ⁵⁶ Baltussen, 2007 ⁵⁷ Schlander, 2007 ⁷³ Singer, 2000 ⁴⁸ O'Malley, 2006 ⁴⁴ Ijzerman, 2003 ⁵⁸ Towse, 2002 ⁷⁶ Hoffmann, 2002 ⁶⁹ Anis, 1998 ⁵¹ Ross, 1995 ⁴⁷	18
Quality/transparency of the decisionmaking process.	Watkins, 2006 ⁴⁰ Rocchi, 2008 ⁵² Teerawattananon, 2008 ⁶² Fattore, 2006 ⁵⁶ Baltussen, 2007 ⁵⁷ Schlander, 2007 ⁷³ Harris, 2008 ⁴³ Gold, 2007 ³⁸ Jansson, 2006 ⁷⁰ Milewa, 2006 ⁷¹	Jehu-Appiah, 2008 ⁵⁴ Williams, 2007 ⁷⁷ Bryan, 2007 ⁶³ Rubinstein, 2007 ⁴² Schlander, 2007 ⁷³ Towse, 2002 ⁷⁶ Harris, 2008 ⁴³ Milewa, 2006 ⁷¹ Eddama, 2008 ⁶⁸ Chen, 2007 ⁶⁴ Wilson, 2007 ⁷⁹ Dakin, 2006 ⁶⁵ Duthie, 1999 ⁶⁷	20
Communication (including lack of knowledge)	Williams, 2007 ⁷⁷ Rocchi, 2008 ⁵² Hoffmann, 2002 ⁶⁹ Fattore, 2006 ⁵⁶ Gold, 2007 ³⁸ Jansson, 2006 ⁷⁰	Bryan, 2007 ⁶³ Jansson, 2007 ⁶⁰ Williams, 2008 ⁷⁸ Rubinstein, 2007 ⁴² Teerawattananon, 2008 ⁶² Taylor-Robinson, 1998 ⁷⁵ Bloom, 2004 ³⁷ Fattore, 2006 ⁵⁶ Hoffmann, 2002 ⁶⁹ Ross, 1995 ⁴⁷ Milewa, 2006 ⁷¹ Eddama, 2008 ⁶⁸ Chen, 2007 ⁶⁴ Prosser, 2005 ⁷² Zwart-van Rijkom, 2000 ³⁶ PausJenssen, 2003 ⁵⁰ DiMasi, 2001 ⁶⁶	20
Trust/reputation of the group or agent.	Williams, 2008 ⁷⁸ Harris, 2008 ⁴³	Jehu-Appiah, 2008 ⁵⁴ Bloom, 2004 ³⁷ Anis, 1998 ⁵¹ Ross, 1995 ⁴⁷	37

Table 3. Modulating factors: promoters and obstacles in health policy and times mentioned (continued)

Factor	Times Mentioned as Promoter	Times Mentioned as Barrier	Times Not Mentioned at All as Promoter or Barrier
Acceptance/Bias (for example, political will).	Williams, 2007 ⁷⁷ Bryan, 2007 ⁶³ Bloom, 2004 ³⁷ Towse, 2002 ⁷⁶ Hoffmann, 2002 ⁶⁹ Anis, 1998 ⁵¹ Harris, 2008 ⁴³ Jansson, 2006 ⁷⁰ Duthie, 1999 ⁶⁷ PausJenssen, 2003 ⁵⁰ DiMasi, 2001 ⁶⁶ Tappenden, 2007 ⁷⁴ Weekes, 1996 ⁴⁶ Anell, 2005 ⁶¹ George, 2001 ⁴⁵	Jehu-Appiah, 2008 ⁵⁴ Jansson, 2007 ⁶⁰ Teerawattananon, 2008 ⁶² Bloom, 2004 ³⁷ O'Malley, 2006 ⁴⁴ Jansson, 2006 ⁷⁰ Milewa, 2006 ⁷¹ Eddama, 2008 ⁶⁸ Chen, 2007 ⁶⁴ Wilson, 2007 ⁷⁹ Duthie, 1999 ⁶⁷ Zwart-van Rijkom, 2000 ³⁶ Anell, 2005 ⁶¹ George, 2001 ⁴⁵ Pedersen, 2008 ⁵⁹ Wallace, 2002 ³⁹	12
Size of target group.	Rocchi, 2008 ⁵² Anell, 2005 ⁶¹	Teerawattananon, 2008 ⁶² IJerman, 2003 ⁵⁸ Zwart-van Rijkom, 2000 ³⁶ Tappenden, 2007 ⁷⁴ Anell, 2005 ⁶¹	36
Formalized decisionmaking process.	Jehu-Appiah, 2008 ⁵⁴ Towse, 2002 ⁷⁶ PausJenssen, 2003 ⁵⁰ Weekes, 1996 ⁴⁶ Anell, 2005 ⁶¹	Jansson, 2007 ⁶⁰ Baltussen, 2007 ⁵⁷ IJerman, 2003 ⁵⁸ Wilson, 2007 ⁷⁹ Prosser, 2005 ⁷² Tappenden, 2007 ⁷⁴	33
Lack of economic information	Dakin, 2006 ⁶⁵ Weekes, 1996 ⁴⁶	Hoffmann, 2002 ⁶⁹ Williams, 2008 ⁷⁸ Taylor-Robinson, 1998 ⁷⁵ Schlander, 2007 ⁷³ IJerman, 2003 ⁵⁸ Ross, 1995 ⁴⁷ Prosser, 2005 ⁷² Zwart-van Rijkom, 2000 ³⁶ Wallace, 2002 ³⁹ Martin, 2001 ⁴⁹	31
Lack of relevance		Williams, 2007 ⁷⁷ Jansson, 2007 ⁶⁰ Hoffmann, 2002 ⁶⁹ Ross, 1995 ⁴⁷ Eddama, 2008 ⁶⁸ Chen, 2007 ⁶⁴ Dakin, 2006 ⁶⁵ Duthie, 1999 ⁶⁷ Prosser, 2005 ⁷² PausJenssen, 2003 ⁵⁰ Tappenden, 2007 ⁷⁴	32

Table 4a. Quality ratings for the selected observational studies

Author, Year	Has the Author Rendered Transparent the Process by Which Data Have Been Collected, Analyzed, and Presented?	Did the Study Describe the Setting/ Population From Which the Study Sample Was Drawn?	Were the Inclusion or Exclusion Criteria Described?	Does the Study Describe the Key Characteristics of Study Participants at Enrollment/ Baseline?	Was the Type of Economic Evidence Described?	Do the Authors Report at Least One Objective Outcome From the Use of Economic Evidence?	Number of Items With Affirmative Ratings
Prosser, 2005 ⁷²	1	1	1	1	1	1	6
Urdahl, 2006 ⁸⁰	1	1	1	1	1	1	6
Taylor-Robinson, 1998 ⁷⁵	1	1	1	1	1	1	6
Harris, 2008 ⁴³	1	1	1	1	1	1	6
Teerawattananon, 2008 ⁶²	1	1	0	1	1	1	5
Chen, 2007 ⁶⁴	1	1	0	1	1	1	5
Watkins, 2006 ⁴⁰	1	1	0	1	1	1	5
Williams, 2008 ⁷⁸	1	1	0	0	1	1	4
Eddama, 2008 ⁶⁸	1	1	0	1	1	0	4
Williams, 2007 ⁷⁷	1	1	0	1	0	1	4
Rocchi, 2008 ⁵²	0	1	1	1	1	0	4
Vuorenkoski, 2008 ⁸¹	1	0	0	0	1	1	3
Pedersen, 2008 ⁵⁹	1	1	0	1	0	0	3
Towse, 2002 ⁷⁶	1	1	0	0	1	0	3
Wallace, 2002 ³⁹	1	0	0	0	1	1	3
Rubinstein, 2007 ⁴²	1	0	0	0	1	0	2

Table 4a. Quality ratings for the selected observational studies (continued)

Author, Year	Has the Author Rendered Transparent the Process by Which Data Have Been Collected, Analyzed and Presented?	Did the Study Describe the Setting/ Population From Which the Study Sample Was Drawn?	Were the Inclusion or Exclusion Criteria Described?	Does the Study Describe the Key Characteristics of Study Participants at Enrollment/ Baseline?	Was the Type of Economic Evidence Described?	Do the Authors Report at Least One Objective Outcome From the Use of Economic Evidence?	Number of Items With Affirmative Ratings
Jansson, 2007 ⁶⁰	1	1	0	0	0	0	2
O'Malley, 2006 ⁴⁴	1	1	0	0	0	0	2
Bryan, 2007 ⁶³	1	0	0	0	1	0	2
IJzerman, 2003 ⁵⁸	1	0	0	0	0	1	2
Baltussen, 2007 ⁵⁷	1	0	0	0	0	0	1
Wilson, 2007 ⁷⁹	1	0	0	0	0	0	1
Schlender, 2007 ⁷³	1	0	0	0	0	0	1
Milewa, 2006 ⁷¹	1	0	0	0	0	0	1
Weekes, 1996 ⁴⁶	1	0	0	0	0	0	1
Singer, 2000 ⁴⁸	1	0	0	0	0	0	1
Martin, 2001 ⁴⁹	1	0	0	0	0	0	1
PausJenssen, 2003 ⁵⁰	1	0	0	0	0	0	1
Anell, 2005 ⁶¹	0	0	0	0	0	0	0
Wallace, 2002 ³⁹	1	1	0	0	0	0	2
George, 2001 ⁴⁵	1	0	0	0	1	0	2
Hoffmann, 2000 ⁵³	1	0	0	0	0	0	1
Duthie, 1999 ⁶⁷	1	0	0	0	0	0	1
Anis, 1998 ⁵¹	1	0	0	0	1	0	2
Ross, 1995 ⁴⁷	1	0	0	0	0	0	1

"1" = Yes, with detailed description

"0" = Yes, with some description, or no

Table 4b. Quality ratings for the selected survey studies

Author, Year	Did the Study Describe the Setting or Population From Which the Study Sample Was Drawn?	Were the Inclusion/ Exclusion Criteria Described?	Does the Study Describe Key Characteristics of Study Participants at Enrollment/ Baseline?	Is There a Survey Completion Rate?	Is There Discussion of the Validity and Reliability of the Survey Instrument?	Number of Items With Affirmative Rating
Tappenden, 2007 ⁷⁴	1	1	1	1	1	5
Bloom, 2004 ³⁷	1	1	1	1	0	4
Dakin, 2006 ⁶⁵	1	1	1	0	1	4
Jansson, 2006 ⁷⁰	1	0	1	1	1	4
Williams, 2008 ⁷⁸	1	1	1	0	0	3
Gold, 2007 ³⁸	1	1	1	0	0	3
Fattore, 2006 ⁵⁶	1	1	0	1	0	3
Chen, 2007 ⁶⁴	1	1	1	0	0	3
DiMasi, 2001 ⁶⁶	1	0	0	1	0	2
Weekes, 1996 ⁴⁶	1	0	0	0	0	1
Jehu-Appiah, 2008 ⁵⁴	0	0	0	0	0	0
Zwart-van Rijkom, 2000 ³⁶	0	0	0	0	0	0

"1" = Yes, with detailed description

"0" = Yes, with some description, or no

Table 5. Strength of evidence on the impact of economic evidence in different types of health care decisions

Number of Studies and Subjects	Domains of Strength of Evidence				Strength of Evidence Supporting an Impact
	Design/Quality	Consistency	Directness	Precision	
Specific reimbursement decisions					
9 studies; 10–30 policymakers	Observational studies of varying quality	Consistent	Direct	Precise	Low
General reimbursement decisions					
19 studies; 10–104 policymakers	Surveys and observational studies of varying quality	Consistent	Direct	Imprecise	Low
General policy decisions					
15 studies; 15–104 policymakers	Five studies with control options; Surveys and observational studies of varying quality	Consistent	Indirect	Imprecise	Intermediate

Consistency: agreement among studies; **Directness:** evidence of effect on real-life decisions; **Precision:** evidence of direct, one-to-one effect on real-life decisions; **Risk of Bias:** measure of individual study quality.

Strength of Evidence: High confidence means that the evidence reflects the true effect. Further research is very unlikely to change confidence in the estimate of effect. **Intermediate confidence** means that the evidence reflects the true effect. Further research may change confidence in the estimate of effect and may change the estimate. **Low confidence** means that the evidence reflects the true effect. Further research is likely to change the confidence in the estimate of effect and is likely to change the estimate. Insufficient evidence

Discussion

The observed distribution of studies over time supports the observation that more attention has been paid to the use of economic evidence in policymaking during the past decade than before. Despite this and given the tens of thousands of economic studies and involvement of agencies in many countries, one can conclude this type of evaluation has been a neglected topic for the two decades that economic evidence has officially been introduced to policymakers. The United Kingdom had the most studies, although Australia, Canada, and Sweden also have an established tradition in the use of economic dossiers. Given the number of economic studies, it is rather surprising that there were so few U.S. or international studies on the use of economic information. We have found only one study in Latin America and only two in Asia.

However, it is not particularly surprising that these studies do not appear more frequently and are of lower quality in the U.S., given the limited structures and political will within the U.S. to deal with priority setting. Indeed, most health care policy settings in the world have hardly been evaluated for their use of economic evidence in conjunction with effectiveness and safety information.

We conclude that the use of economic evidence is recent and the proof of its actual use is patchy, limited, and of uneven quality. At best, the identified evidence fills only a very limited number of types of economic evidence distinguished within the overall framework that lists various policy levels, types of decisions (reimbursements, health packages, general health priorities), types of policymakers, professional and consumer groups, types of disease areas, and types of decision criteria.

The large majority of the identified studies do affirm that there has been use of economic evidence in health policy decisions. They report a limited list of barriers and promoting factors that influence use for decisionmaking. The majority of these are technical and transparency issues as is indicated by the formal application of the framework for reasonableness in the study by Schlander⁷³ on the functioning of the United Kingdom-based National Institute for Clinical Excellence (NICE). Giving attention to barriers such as lack of transparency could lead to better use in health policy, at least in the areas that have been researched.

Methodological Aspects

Our review is limited by the quality of the original studies and the overall paucity of research on the topic. Although we eliminated a large number of articles that did not report original data, we did include relevant studies using any quantitative or qualitative study design. This review is further limited to include only studies whose major focus, as identified in the title or abstract, is the impact of economic evidence in decisionmaking rather than a distal component.

Ideally, a systematic review of this kind seeks to provide an answer to the question: Is economic evidence influencing policymaking and what are the influential factors? An ideal way to do this would be using a randomized design. In all the selected studies there has been no comparison with decisionmaking without explicit economic evidence. It very well may be that economic arguments come up in any kind of decisionmaking context and are considered of importance or even guide the final decisions. The precise question then would be on the added value of evidence from formalized, systematic economic research.

The study findings and the review findings might be subject to various types of selection biases that may include both funding and publication processes. In addition to the quality of the studies and the design issues, there are, of course, various selection biases in reporting the use of economic evidence: selection biases while choosing the topics of study and the population of subjects; biases in the selection of the research groups; and, not least, publication bias, leading to a greater selection of positive studies. These biases may very well partly explain the overall positive conclusions of the studies.

Generalizability and Transferability of Results—Limitations

A majority of articles concluded that economic arguments do play a role in decisionmaking, and only two articles reported a negative conclusion. Most of the articles based their findings on surveys among actors in the field or by studying existing policy practices.

Two other issues deserve attention. We found that the total body of evidence is of only intermediate strength. Only a few studies included comparison situations, in some way. In reality, we have not found attempts to compare health policy outcomes both with and without economic evidence (the highest level of evidence in the GRADE system).⁸²

A second limitation is that most studies did not make a distinction between using economic arguments and using economic, research-based evidence. Here, one can only conclude that the added value of economic research, as compared to economic arguments, is based on its scientific quality.

These limitations indicate a need for additional original research on the usefulness and impact of economic evaluations. Such research could include surveys, focus group analyses, and case studies.

Despite these limitations, the body of literature reviewed favors the inclusion of economic evidence in policymaking in a variety of jurisdictions and specific policy areas. However, these findings are rather patchy evidence across the whole field when one considers the enormous number of possible areas and settings in health policymaking.

It is obvious that the effectiveness of economic evidence to influence policymaking will differ between countries, given the differences in cultural, economic, political, and infrastructural characteristics of the various health systems. These differences can already be observed in the variety of health care systems in which the scarce case studies in the various high-income countries took place.

Strategies to Improve the Use of the Economic Evidence

One can make some conclusions based on the fact that there were four clear factors that promote or discourage health policy use of economic evidence. The review concludes that the use of economic evidence in real-life policymaking would be enhanced by improving the quality and transparency of the original economic studies, the quality and transparency of the decisionmaking process itself, and the clarity of the economic information itself and the way it is communicated. Communication has also been emphasized in other reviews of the use of economic evaluation in decisionmaking with one article suggesting the importance of researchers not ignoring the context of the decisions that will be made based on their results and taking the time to discuss how decisionmakers can use the economic evaluation results.⁸³ Of course, the formalization of these processes in the various countries has been and will have to continue to be tailored to fit the existing national and local health policymaking processes and societal and organizational cultures. There are examples including Thailand, South Korea, and Taiwan, in which although there was not a formal study meeting our inclusion criteria, their systems for both generating and using cost-effectiveness data have been described and can be used as exemplars for other cases.⁸⁴ While these three countries provide example of using cost-effectiveness information, it is also important to recognize that economic evaluation is confined only to cost-effectiveness but can also include budget impact which is of the most direct relevance to many decisionmakers including, in one example also not included in our review, in the Netherlands in cases related to cardiovascular risk management.⁸⁵

We based our review approach on the Daniels and Sabin, 2008²⁴ framework for accountability of reasonableness which says that better quality, accessibility, and transparency of the information promotes a fair and accepted process (see Box 1). In addition, use is promoted by fairness and transparency of the decisionmaking process in health policy itself. In the past decade, this framework has been used to evaluate policy processes in a number of settings. This turns out to be feasible both in high-income settings^{25,86} and in other settings.²⁶

Increased transparency of economic evaluation and the decisionmaking process will have to be built on best standards for good practices, a common framework for the use of economic evidence for the possible actors involved,¹⁹ and more guidance on how to include this in the systematic review processes. Our findings indicate that any improvement to arrive at transparent economic evaluations and a transparent policy process would contribute to better use of economic studies.

Conclusion/Discussion

We found relatively weak evidence on the use of economic evidence in the United States for policymaking, but intermediate strength of evidence in other high-income and some low-income

countries. The literature supports the conclusion that the utility of economic evidence is influenced by technical issues, such as transparency and clarity, as well as by the transparency of the decisionmaking process.

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Appendix A. Search Strategies

Search strategies

Database	Search			Results
PubMed	A	B	C	
	"Cost –benefit analysis"[mh] "Cost of illness"[mh] "economic evaluation"[tiab] "economic outcomes"[tiab] (analysis[tiab] AND (cost[tiab] OR economic[tiab])) "cost effectiveness"[tiab]	"decision making"[mh] "Health Policy"[Mesh] "Decision Making"[tiab] reimbursement[tiab] "Evidence-Based Medicine"[mh] "Evidence-Based Medicine"[tiab] "Technology Assessment, Biomedical"[mh] "Technology Assessment"[tiab] formularies[mh] guideline*[tiab] recommend*[tiab]	Evaluations[tiab] "evaluation"[tiab] "qualitative"[tiab] "focus group"[tiab] Interview[tiab] observation[tiab] outcomes[tiab] analysis[tiab] analyses[tiab]	
	A and B and C (limited 1991 to present)			12219
EconLit and Cumulative Index to Nursing and Allied Health Literature (CINAHL)	A	B	C	
	TX "cost-benefit analysis" TX "cost of illness" TX "economic evaluation" TX "economic outcomes" TX "cost effectiveness" TX "cost analysis" TX "economic analysis"	TX "Decision making" TX "health policy" TX reimbursement TX "evidence-based medicine" TX "Technology assessment" TX formulary TX guideline	TX evaluation TX qualitative TX "focus group" TX interview TX observation TX outcome TX analysis	
	A and B and C (limited 1991 to present)			5555
Embase	A	B	C	
	'cost of illness':ti,ab 'cost benefit analysis':ti,ab 'economic evaluation':ti,ab 'economic outcomes':ti,ab ('analysis':ti,ab AND ('cost':ti,ab OR economic:ti,ab)) 'cost effectiveness':ti,ab AND [humans]/lim	'decision making':ti,ab 'health care policy':ti,ab 'evidence based medicine':ti,ab formulary:ti,ab reimbursement:ti,ab 'technology assessment':ti,ab guideline:ti,ab AND [humans]/lim	evaluation:ti,ab evaluations:ti,ab qualitative:ti,ab 'focus group':ti,ab interview:ti,ab observation:ti,ab outcome:ti,ab analysis:ti,ab AND [humans]/lim	
	A and B and C (limited 1991 to present)			3296
ISI Web of Science	A	B	C	
	TS=("cost benefit analysis" OR "cost of illness" OR "economic evaluation" OR "economic outcome" OR "cost effectiveness")	TS=("decision making" OR "health policy" OR "reimbursement" OR "evidence based medicine" OR "technology assessment" OR "formulary" OR "guideline" OR "recommendation")	TS=(evaluation OR qualitative OR "focus group" OR interview OR observation OR outcomes OR analysis)	
	A and B and C (limited 1991 to present)			3881
	TOTAL			24984
	overlap between databases			5857
	Reviewed total			19127

Appendix B. Title Review Form*

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

[Submit Form](#) and go to [Previous](#) or [Skip to Next](#)

1. Does this article POTENTIALLY apply to Aim 2 or Aim 3?

Aim 2. Systems that have been used to evaluate best practices for conducting economic evaluations in health care.
Aim 3. Studies addressing the issues of using economic outcomes in policy and decision making.

- Potentially eligible for Aim 2 or Aim 3
 - Definitely not eligible for Aim 2 or Aim 3
 - Unclear
- [Clear Response](#)

[Submit Form](#) and go to [Previous](#) or [Skip to Next](#)

* Screening forms and data abstraction forms appearing in appendices B-F were recreated using Distiller SR for the purposes of illustration

Appendix C. Abstract Review Form

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

BACKGROUND: Skateboarding has been a popular sport among teenagers even with its attendant associated risks. The literature is packed with articles regarding the perils of skateboards. Is the skateboard as dangerous as has been portrayed?

METHODS: This was a retrospective study conducted over a 5 year period. All skateboard related injuries seen in the Orthopaedic unit were identified and data collated on patient demographics, mechanism & location of injury, annual incidence, type of injury, treatment needed including hospitalisation.

RESULTS: We encountered 50 patients with skateboard related injuries. Most patients were males and under the age of 15. The annual incidence has remained low at about 10. The upper limb was predominantly involved with most injuries being fractures. Most injuries occurred during summer. The commonest treatment modality was plaster immobilisation. The distal radius was the commonest bone to be fractured. There were no head & neck injuries, open fractures or injuries requiring surgical intervention.

CONCLUSION: Despite its negative image among the medical fraternity, the skateboard does not appear to be a dangerous sport with a low incidence and injuries encountered being not severe. Skateboarding should be restricted to supervised skateboard parks and skateboarders should wear protective gear. These measures would reduce the number of skateboarders injured in motor vehicle collisions, reduce the personal injuries among skateboarders, and reduce the number of pedestrians injured in collisions with skateboarders.

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1. **Does this article POTENTIALLY apply to Aim 2 or Aim 3?**

Aim 2. Systems or Guidelines that have been used to evaluate best practices for conducting economic evaluations in health care.

Aim 3. Studies addressing the issues of using economic outcomes in policy and decision making. Include clinical decision making if the decision is not made on the individual clinician level.

- Yes
 - 2. this article potentially applies to
 - Aim 2
 - Aim 3
 - No
 - Unclear or no abstract available
- [Clear Response](#)

[Submit Form](#) and go to [or Skip to Next](#)

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

BACKGROUND: Skateboarding has been a popular sport among teenagers even with its attendant associated risks. The literature is packed with articles regarding the perils of skateboards, is the skateboard as dangerous as has been portrayed?

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1. **Does this article POTENTIALLY apply to Aim 2 or Aim 3?**

Aim 2. Systems or Guidelines that have been used to evaluate best practices for conducting economic evaluations in health care.

Aim 3. Studies addressing the issues of using economic outcomes in policy and decision making. Include clinical decision making if the decision is not made on the individual clinician level.

- Yes
- No

3. this abstract does not apply to Aim 2 and Aim 3 for the following reason(s):

- Does not apply to economics
- No original analysis or data (this exclusion includes systematic reviews, commentary, or editorials)
- Limited case study of a single policy decision: exclude only if there is insufficient information about how the economic data was used in decision making process
- Study focuses on a single condition: no decision making component, policy making component, or quality of the methods discussion
- Cost-effectiveness analysis only: no decision making component
- Other (specify)
- Methods only (descriptive)
- Decision making is at the individual clinician level ONLY

Unclear or no abstract available
[Clear Response](#)

[Submit Form](#) and go to or Skip to Next

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.

Rethnam U, Yesupalan RS, Sinha A.

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1. Does this article POTENTIALLY apply to Aim 2 or Aim 3?

Aim 2. Systems or Guidelines that have been used to evaluate best practices for conducting economic evaluations in health care.

Aim 3. Studies addressing the issues of using economic outcomes in policy and decision making. Include clinical decision making if the decision is not made on the individual clinician level.

- Yes
 No
 Unclear or no abstract available

4.

- Unclear. Cannot determine if article applies to Aim 2 or Aim 3. INCLUDE (move to next level)
 In a language other than English (specify)
 No abstract available. Title appears to apply to Aim 2 or Aim 3, OR can not be determined
[Clear Response](#)

[Clear Response](#)

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Appendix D. Article Inclusion/Exclusion Forms

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

[Submit Form](#) and go to [or Skip to Next](#)

1. Does this article **APPLY** to Aim 2 or Aim 3?

Aim 2. Systems or Guidelines that have been used to evaluate best practices for conducting economic evaluations in health care.

Aim 3. Studies addressing the issues of using economic outcomes in policy and decision making. Include clinical decision making if the decision is not made on the individual clinician level.

Yes

2. this article potentially applies to

Aim 2

Aim 3

No

[Clear Response](#)

4. Comments:

[Submit Form](#) and go to [or Skip to Next](#)

]

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

Submit Form and go to or Skip to Next

1. Does this article APPLY to Aim 2 or Aim 3?

Aim 2. Systems or Guidelines that have been used to evaluate best practices for conducting economic evaluations in health care.

Aim 3. Studies addressing the issues of using economic outcomes in policy and decision making. Include clinical decision making if the decision is not made on the individual clinician level.

- Yes
- No

3. this articles does not apply to Aim 2 and Aim 3 for the following reason(s):

- Does not apply to economics
- Does not apply to health or health care
- No original analysis or data (this exclusion includes systematic reviews, commentary, or editorials)
- Limited case study of a single policy decision: exclude only if there is insufficient information about how the economic data was used in decision making process
- Study focuses on a single condition: no decision making component, policy making component, or quality of the methods discussion
- No cost effectiveness analysis component
- Cost-effectiveness analysis only: no decision making component
- Study of cost predictors
- Costing study
- Methods only (descriptive)
- Decision making is at the individual clinician level ONLY
- Other (specify)
- Article does not apply (reasons above) BUT is an article of interest and should be pulled for hand searching or background material.

[Clear Response](#)

4. Comments:

Submit Form and go to or Skip to Next

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

Submit Form and go to or Skip to Next

Aim 3: Final inclusion/exclusion

1. New Question

2. Level of study detail

- Details provided on how study was conducted
 - Details provided on how conclusions were made
 - Details provided on both how the study was conducted and how conclusions were made
 - Little or no detail provided on how the study was conducted and how conclusions were made
- Clear Response

3. External examination/feedback on study

- Feedback provided by stakeholders on study
 - No external feedback provided by stakeholders on study
- Clear Response

4. Data Collection

- Focus group
 - Survey or Discrete Choice Experiment
 - Review of documents
 - Other
- Clear Response

5. Case studies

- Anecdotal
 - Detailed methods used in case study outlined
- Clear Response

6. Level of policy

- Policy discussion is generalizable
 - Policy discussion is on the local scale and can not be generalized
- Clear Response

7. Exclude for the following reasons(s)

- Does not apply to economics
- Does not apply to health or healthcare
- No original data or analysis (systematic reviews, commentary, editorials)
- Limited case study of a single policy decision: exclude only if there is insufficient information about how the economic data was used in decision making process
- Study focuses on a single condition: no decision making component, policy making component, or quality of the methods discussion
- No cost effectiveness analysis component
- Cost-effectiveness analysis only: no decision making component
- Study of cost predictors
- Costing study
- Methods only (descriptive)
- Decision making is at the individual clinician level ONLY
- Article does not apply (reasons above) BUT is an article of interest and should be pulled for hand searching or background material.
- NOT English--Identify Language
- NOT an AIM 3 article, but does apply to AIM 2

8. Comment:

Submit Form and go to or Skip to Next

Appendix E. Data Abstraction Form

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.

Rethnam U, Yesupalan RS, Sinha A.

and go to

Aim 3:

Objectives:

To review studies addressing the issues of using economic outcomes in policy and decision making. We will review studies that have documented the use of economic evaluations by health care financing organizations and other policy makers. The review will note whether the studies used have followed specific guidelines. Our objective will be to synthesize the results of US studies and to compare US studies to studies from OECD countries and compare the frequency and effectiveness of the use of economic data.

1. Were economic data used to influence policy-making decisions?

If "yes" proceed to the next question. If "no" or "unclear" contact Louis Niessen or Kevin Frick to discuss whether the article is truly applicable to AIM 3

Yes

2. Enter information about authors, affiliation, and funding source

Note: if the information is not provided answer with "NR"

Primary author name

Primary author affiliation

Funding source

3. Time study was conducted

Year of study (Completion year in not reported answer below)

If above information is not provided, enter year of publication

4. Geographical area

OECD or non-OECD

OECD Country (Organization for Economic Co-operation and Development)--see link above

Non-OECD country

5. Study design/type

Randomized or controlled design

Surveys

Qualitative case study

Commentary, editorial, opinion piece

Other

6. Type(s) of decision making body (ies) (population--define who is doing the decision making)

Regulator, type:

Private third party payer, type:

Public third party payer, type:

Public health planner, type:

Health care professional, type:

Health care facility, type:

Employer, type:

Manufacturer, type:

Patient/family/consumer group, type:

Research group, type:

Other, define

7. Level of policy making

These can be through general agencies like governments or through specific organizations. These may include one of the actor groups and combinations of various groups e.g. insurances, HMO, providers, professional societies, disease specific orientated agencies.

- International
- Federal
- National
- State
- Local
- Other

8. Type(s) of clinical area(s)

check all that apply

- General
- Disease specific
- Primary Care
- Acute care
- Vaccines
- Public health
- Other

9. Type(s) of decision making

- Reimbursement decision (limited to payment and reimbursement)
- Package decisions in general (decisions on how/when/whom interventions are included)
- General policy and attitude (opinions on priority setting and use of EE) on health General policy on health care
- General policy or attitude (opinions on priority setting and use of EE) on health financing
- Research resource allocation
- Other

10. Type(s) of decision making criteria, components, characteristics included in the policy study

- Cost
- Cost-effectiveness / efficiency
- Budget impact
- Coverage
- Equity
- Advocacy
- Age
- Ethnicity
- Stage of disease
- Other
- Other
- Other

11. Type(s) of economic evaluation(s) considered

- Cost-effectiveness analysis
- cost-utility analysis
- costing
- Other

Identify **Promoting Factors** and/or **Barriers** of the policy study outcome(s), and provide supporting evidence in the dialogue box.

Policy study outcome	Promoter (describe)	Barrier (describe)
Quality/transparency of the economic studies leading to the assessment.	12.	13.
Quality/transparency of the decision making process.	14.	15.

Communication (including lack of knowledge)	16.	17.
Trust/reputation of the group or agent.	18.	19.
Acceptance/Bias (for example, political will).	20.	21.
Size of target group.	22.	23.
Formalized decision making process.	24.	25.
Lack of economic information: is the data sufficient to support the policy decision?	26.	27.
Lack of relevance: the clinical benefit, or safety data overrules the economic data.	28.	29.
Transaction cost.	30.	31.
32. Other (define)	33.	34.
35. Other (define)	36.	37.
38. Other (define)	39.	40.
41. Other (define)	42.	43.
44. Other (define)	45.	46.

- No
 - To a certain extent
 - Comment
- Clear Response

47. Comment:

and go to or

Appendix F. Study Quality Form

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

Submit Form and go to or Skip to Next

QUALITY FORM JADAD (quality of controlled trials)

1. Was the study described as randomized (this includes the use of words such as randomly, random, and randomization)? In other words, was the allocation concealed?
 - Yes (go to question 2)
 - No (-1)
 - Unspecified (0)

[Clear Response](#)
2. If the answer to question #1 was "yes," then answer the following:
 - Was the method used to generate the sequence of randomization described and was it appropriate? (+1)
 - Was the method of randomization described but inappropriate? (-1)
 - unspecified (0)

[Clear Response](#)
3. Was the study described as double blind? In other words, were the outcome assessors blind in addition to the patients?
 - Yes (go to question 4)
 - No (-1)

[Clear Response](#)
4. If the answer to #3 is "Yes" then answer the following:
 - The method of double blinding was described and appropriate (+1)
 - the study was described as being blind, but the method of blinding was inappropriate (-1)
 - unspecified (0)

[Clear Response](#)
5. Was there a description of withdrawals and dropouts?
 - Yes (+1)
 - No (-1)

[Clear Response](#)

Submit Form and go to or Skip to Next

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

Submit Form and go to or [Skip to Next](#)

QUALITY FORM Survey

1. What data collection methods were used in the study?

- Self-administered questionnaire
- Mailed questionnaire
- Group-administered setting
- Face-to-face interviews
- Telephone interviews
- Computer or computer assisted device (CAD)
- Other/unclear

2. Did the study describe the setting or population from which the study sample was drawn?

- No
 - To some extent
 - Yes, with detailed description: setting (e.g., clinic), location, and dates
- [Clear Response](#)

3. Were the inclusion/exclusion criteria described?

- No
 - To some extent
 - Yes, with detailed description: methods for selection of participants, or inclusion/exclusion criteria, or diagnostic criteria for enrollment
- [Clear Response](#)

4. Does the study describe key characteristics of study participants at enrollment/baseline?

- No
 - To some extent
 - Yes, with detailed description: age, sex, gender, etc.)
- [Clear Response](#)

5. What is the survey completion rate?

- Can't calculate
 - N/n
 - %
- [Clear Response](#)

6. Is there discussion of the validity and/or reliability of the survey instrument?

- No
 - Yes, only poor discussion of validity OR good discussion with poor validity
 - Yes, good definition and high validity
- [Clear Response](#)

7. Comment

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A

and go to [or Skip to Next](#)

QUALITY FORM
Qualitative Research

1. How was the data generated?

- Field/participant observation
- In-depth interview
- Focus groups
- Document analysis
- Other

2. Is there a description of how and why these participants were selected?

- No
- To some extent
- Yes, with detailed description: how these people are expected to contribute, conditions which make them eligible for the study.
- NA

3. Has the author rendered transparent the process by which data have been collected, analyzed and presented (can be audited, verified)

- No
 - Yes, to some extent
 - Yes, detailed description of theoretical, methodological, and analytic decisions
- [Clear Response](#)

and go to [or Skip to Next](#)

Refid: 12, Skateboards: Are they really perilous? A retrospective study from a district hospital.
Rethnam U, Yesupalan RS, Sinha A.

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QUALITY FORM
Observational/Qualitative/Structured Interviews

1. How was the data generated?

- Field/participant observation
- In-depth interview
- Focus groups
- Document analysis
- Other

2. Has the author rendered transparent the process by which data have been collected, analyzed and presented (can be audited, verified)

- No
 - Yes, to some extent
 - Yes, detailed description of theoretical, methodological, and analytic decisions
- [Clear Response](#)

3. Did the study describe the setting or population from which the study sample was drawn?

- No
 - To some extent
 - Yes, with detailed description: setting (e.g., clinic), location, and dates
- [Clear Response](#)

4. Were the inclusion or exclusion criteria described?

- No
 - To some extent
 - Yes, with detailed description: methods for selection of participants, or inclusion/exclusion criteria, or diagnostic criteria for enrollment
- [Clear Response](#)

5. Does the study describe the key characteristics of study participants at enrollment/baseline?

- No
 - To some extent
 - Yes, with detailed description: age, sex, genotype, relevant comorbidities which can influence outcomes
- [Clear Response](#)

6. Was the type of economic evidence described?

- NA
 - No
 - To some extent
 - Yes, with detailed description
- [Clear Response](#)

7. Do the authors report at least one objective outcome from the use of economic evidence?

- No
- To some extent

Yes, with description

NA

[Clear Response](#)

8. What was the percentage of participants who were lost to follow-up?

Not reported

N/n

%

NA

[Clear Response](#)

9. Comment

and go to [or Skip to Next](#)

Appendix G. Excluded Articles

German recommendations for health care economic evaluation studies. Revised version of the Hannover consensus. Hannover Consensus Group. Med Klin (Munich). 2000;95(1):52-5..No original analysis; Other.

German recommendations for health economic evaluation. Revised edition of the Hannoverian consensus. Hannoverian Consensus Group. Dtsch Med Wochenschr. 1999;124(49):1503-6. Other.

Adeoye S, Bozic KJ. Influence of economic evaluations on public health policy. Curr Opin Orthop. 2007;18(1):28-32., No original analysis.

Al MJ, Feenstra T, Brouwer WBF. Decision makers' views on health care objectives and budget constraints: results from a pilot study. Health Policy. 2004;70(1):33-48.Does not apply to Economics, Does not apply to health or healthcare.

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Amaro H, Blake SM, Morrill AC, et al. HIV prevention community planning: challenges and opportunities for data-informed decision-making. AIDS Behav. 2005;9(2):S9-27. No cost effectiveness analysis.

Anderson J. Clinical practice guidelines: review of the recommendations for colorectal screening. Geriatrics. 2000;55(2):67-74.Does not apply to Economics, Focuses on single condition.

Anderson SE, Chen YK. Applying economic analysis to the decision-making process. Cost Qual Q J. 1997;3(4):9.No original analysis.

Anderson WL, Kenney GS, Rabiner DJ. Adoption of retrospective Medicare maximization billing practices by state Medicaid home care programs. J Health Polit Policy Law. 2003;28(5):859-881. Limited case study, No decision making, Other.

Anell A. Priority setting for pharmaceuticals: the use of health economic evidence by reimbursement and clinical guidance committees. Eur J Health Econ. 2004;5(1):28-35.Article of interest, Does not apply to Economics, Does not apply to health or healthcare

Anis AH, Gagnon Y. Using economic evaluations to make formulary coverage decisions: so much for guidelines. Pharmacoeconomics. 2000;18(1):55-62. Not Aim 3 but applies to Aim 2

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Apostolakis GE, Pickett SE. Deliberation: Integrating analytical results into environmental decisions involving multiple stakeholders. Risk Anal. 1998;18(5):621-634..Does not apply to Economics, Does not apply to health or healthcare.

Appleby J, Devlin N, Parkin D. NICE's cost effectiveness threshold. BMJ. 2007;335(7616):358-359.. No original analysis.

Arnaboldi M, Lapsley I. Activity based costing in healthcare: a UK case study. Research in Healthcare Financial Management. 2005;10(1):61-75.Costing study.

Arnold RJ. Cost-effectiveness analysis: should it be required for drug registration and beyond? Drug Discov Today. 2007;12(21-22):960-5.No original analysis.

Arredondo A, Parada I. Trends on generation and reproduction of knowledge about economic evaluation and health. Rev Med Chil. 2001;129(8):925-34.No decision making, No original analysis, Other.

Arellano LE, Reza M, Blasco JA, et al. A content analysis of Health Technology Assessment programs in Latin America. Int J Technol Assess Health Care. 2009;570-6. Focuses on single condition with limited economic evaluation.

Asch DA, Hershey JC. Academic and clinic. Why some health policies don't make sense at the bedside. Ann Intern Med. 1995;122(11):846-850. Article of interest, No original analysis.

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Badia X, Rovira J, Segu JL, et al. Economic assessment of drugs in Spain. *Pharmacoeconomics.* 1994;5(2):123-129. No original analysis.

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Not Aim 3 but applies to Aim 2

Barbieri M, Hawkins N, Sculpher M. Who does the numbers? The role of third-party technology assessment to inform health systems' decision-making about the funding of health technologies. *Value Health.* 2008; Does not apply to Economics, Methods only.

Baron J, Ubel PA. Revising a priority list based on cost-effectiveness: the role of the prominence effect and distorted utility judgments. *Med Decis Making.* 2001;21(4):278-87. No original analysis, Other.

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Benson BL, Rasmussen DW. The context of drug policy: An economic interpretation. *J. Drug Issues.* 1998;28(3):681-699. No original analysis, Other.

Bentkover JD, Corey R. Effective utilization of pharmacoeconomics for decision makers: disease management and health outcomes. 2002;10(2):75-80. Methods only, No original analysis.

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