SYSTEMATIC REVIEWS

What Guidance are Economists Given on How to Present Economic Evaluations for Policymakers? A Systematic Review

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ABSTRACT

Objectives: To systematically review health economic guidelines for information on how to present health economic evaluations and consider implications for nontechnical audiences such as policymakers. Methods: Electronic databases and supplementary sources were searched for economic evaluation guidelines. Guidelines were critically appraised. Descriptive characteristics, standard formats, supports for nontechnical audiences, presentation approaches, and common reporting recommendations were extracted. Frequencies were tabulated and trends identified. Results: Thirty-one guidelines were included. Twenty-two guidelines include a standard reporting format with some sample tables and graphs. Common presentation approaches include well-cited tables of data sources, transparent model diagrams and descriptions, disaggregated results, and tabular and graphical displays of sensitivity analyses. Despite most guidelines being funded by policymakers, only five guidelines provided advice on presenting economic evaluations to noneconomists. However, 11 guidelines included a glossary of economic terminology for non-technical readers. Common concepts that may require further explanation include differences in economic perspectives, appropriateness of time horizons, how economic outcomes such as quality-adjusted life-years relate to their component clinical outcomes, and choice of sensitivity analyses. Conclusions: Health economists have consistent presentation formats and common reporting elements that should be considered when developing user-friendly explanations for general audiences. These overlap with policymakers’ informational needs but may not be sufficient for understanding by nontechnical audiences. Developing presentation formats and tools that incorporate viewpoints of both economists and noneconomists will allow for better application of the results of economic evaluations and enhance the transparency and legitimacy of decision-making processes that are informed by economic evaluations.

Keywords: economic evaluation, guidelines, presentation formats, systematic review.

Introduction

Using cost-effectiveness analyses in health policy and reimbursement decisions has sometimes been questioned, and the policy impact of health economic evaluations is still uncertain after 20 years [1,2]. Enhancing the transparency and understanding of economic evaluations could increase confidence in and perceived legitimacy of health technology assessment decision-making processes [3,4]. Economic evaluations are not always provided in an accessible format, and more effective presentation of economic evaluations could increase understanding of how economic evaluations inform policy decisions. This would also enable policymakers to better defend decisions that are based, in part, on economic evaluations.

Health policy decision makers, and those affected by policy decisions such as the tax-paying public, patients, and health care providers, generally do not have the same technical expertise as health economists [5]. However, they are important end users of economic evaluations. Policymakers sometimes have limited training in health economics and may be unclear in how to practically apply the results of economic evaluations to actual decisions if results are not clearly presented [6,7].

Providing simple but robust explanations of economic evaluations to a nontechnical audience is challenging [8]. An appropriate balance of making information understandable while maintaining the completeness and technical accuracy of the economic evaluation must be achieved. Oversimplifying technical information may lose important nuances that are relevant for practical and consistent decision making. Therefore, considering how economists present their work to policymakers and other lay audiences merits further exploration. A number of studies have reported on policymakers’ use of economic evaluations. In general, policymakers want to be able to deconstruct analyses, identify key principles,
and understand how results practically apply to specific decisions [9–11]. It is unclear how this aligns with what economists consider important in economic evaluations.

Elements that economists report on are described in guidelines for conducting economic evaluations [12,13]. The general purpose of these guidelines is to increase both the methodological quality of economic evaluations and the transparency of how they are conducted. Although good reporting practices outlined in health economic guidelines are important to follow and can contribute to clarity, they may be insufficient for good communication to nontechnical audiences [5,14]. Although adequately reporting economic modeling details is a first essential step that provides a transparent description of the analysis and results to the reader, subsequently arranging this information in presentation formats that assist end users in their understanding and/or application of the information is also an important consideration. Developing tools and alternate presentation formats that enhance the accessibility of economic evaluations may be one approach to increasing their impact and value to clinicians and policymakers. Although standards for transparent health economic reporting may be consistent, regardless of the audience or topic, different presentation formats may be appropriate for different audiences or topics. It is unclear how much guidance economists are given with respect to presentation formats and tailoring presentation of their work to noneconomists such as policymakers.

A systematic approach to knowledge translation [15] and the development of economic tools that would enhance accessibility of health economics and confidence in health policy decision making would be of value. Incorporating guidance from economic guidelines on reporting and presentation standards would lead to knowledge translation tools that can robustly represent complex economic information.

The objective of this study was to systematically review guidelines to determine what guidance economists are provided on how to present economic evaluations and whether any of this guidance is targeted toward nontechnical end users such as policymakers. Our primary hypothesis was that guidance provided to health economists on presenting economic evaluations is not focused on the needs of nontechnical end users of economic evaluations. We also hypothesized that some elements commonly required for transparent reporting are technical concepts that may require further explanation for nontechnical audiences. Although economic guidelines are developed for multiple audiences including economists in academic settings, industry, or research organizations, our findings will be interpreted in the context of nontechnical audiences who apply the results of economic evaluations to policy decisions.

Methods

Systematic Review Protocol

A systematic review was conducted following Cochrane methodology [16]. Guidelines for conducting and/or reporting on economic evaluations of pharmaceuticals were included that primarily targeted economists and researchers who were providing economic evaluations for policymakers and other end users. Guidelines for assessing the quality of economic evaluations were excluded because they primarily target end users of economic evaluations and not economists who produce economic evaluations. Guidelines were excluded if they addressed only specific components of economic evaluations (e.g., modeling and willingness to pay) and not economic evaluations as a whole; if they addressed affordability (i.e., budget impact) rather than cost effectiveness; or if they advocated a disease-specific or technology-specific (e.g., diagnostic tests and medical devices) approach to economic evaluation. Editorials or opinion articles providing recommendations with no supporting evidence base or methodological process for developing the recommendations were excluded. Guidelines were also excluded if they were not directly linked to a decision-making or reimbursement process; this criterion limited the review to those guidelines most likely to provide approaches to presenting economic evaluations to nontechnical audiences such as policymakers. Finally, if more recent versions of the guidelines were available or if the guideline was developed before 2000, guidelines were excluded. The latter criterion was necessary given the methodological advances in the discipline. No language restrictions were applied. Outcomes of interest were the type and frequency of information on presentation formats and the type and frequency of key reporting recommendations.

Search Strategy

Databases searched included Medline (1996 to November 2013), EMBASE (1980 to November 2013), and the Cochrane Database of Systematic Reviews, using a date limit of 2000 but no language restriction. The search terms were “guidelines,” “health economics,” and “economic evaluation.” The gray literature was searched for unpublished studies using the Canadian Agency for Drugs and Technologies in Health Gray Matters checklist as a guide, in addition to other relevant economic and guideline resources, including Web sites for the International Society for Pharmacoeconomics and Outcomes Research (ISPOR), the Enhancing the QUAlity and Transparency Of health Research network, and the Guidelines International Network [17–20]. Studies were also selected through hand searching of selected journals, reviewing reference lists of potentially relevant studies, and suggestions from economic experts.

Study Selection

Citations were screened for relevance by one review author on the basis of the title and abstract of identified articles. Two review authors independently reviewed the full text of potentially relevant guidelines to assess exclusion or inclusion.

Critical Appraisal

Guideline quality was assessed using items identified in the Appraisal of Guidelines for Research & Evaluation (AGREE II) instrument [21]. The AGREE II instrument was designed to assess clinical practice guidelines and has six domains: scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence. The overall purpose of the AGREE II instrument is “to provide a framework to: assess the quality of guidelines; provide a methodological strategy for the development of guidelines; and inform what information and how information ought to be reported in guidelines” [21]. No instruments, however, currently exist to specifically assess either the quality of methodological guidelines or guidelines for economic evaluations. Therefore, minor modifications to items in the AGREE II instrument were made to apply the instrument to economic guidelines. Principles from a framework for communicating confidence in methodological recommendations for systematic reviews and meta-analyses were also incorporated into the assessment (for more details, see Appendix Table 1 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2015.06.007) [22]. These principles included consideration of different sources of evidence and approaches and criteria for selecting evidence that may differ in methodological guidelines. Because of these modifications, we did not feel it was appropriate to apply the standard AGREE II scoring system but used items in the instrument as a guide to identify potential limitations.
Data Extraction
The following data were extracted from guidelines (for detailed definitions of variables, see Table 2 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2015.06.007).

1. Descriptive characteristics: geographic location, publication year, author affiliations, guideline purpose, type of guideline, target audience.
2. Standard templates: whether a standard reporting template, sample tables, or sample figures were provided.
3. Supports for nontechnical end users: if a glossary was provided, whether advice was provided on presenting to noneconomists.
4. Presentation formats and approaches: details on how to present data sources, model, base-case results, and sensitivity analyses (deterministic and probabilistic). These four areas were selected as key components of an economic evaluation, and data extraction focused on the format for presenting the information, not just that the information be provided or reported (i.e., focusing on “how” to report not just “what” to report).
5. Recommendations for the conduct and transparent reporting of economic evaluations: perspective, target population, subgroup analyses, time horizon, assumptions required, modeling, preferred outcome measures, sensitivity analysis parameters, sensitivity analysis ranges, and methods for conducting sensitivity analyses. These elements were selected from variables in the ISPOR database [18,23]. Although some of these elements relate to the methodology and conduct of economic evaluations, they were included because they may influence the overall approach to presenting economic evaluations to nontechnical audiences.

Detailed guidance on how to conduct an economic evaluation was not extracted (e.g., analytic approaches and distributions to apply) and is not the focus of this systematic review. When available, guideline characteristics from the ISPOR database [18,23] were used, and were verified with source documents by one author. A second author verified disagreements. For all remaining data, including the guideline critical appraisal, one author extracted data, which were verified by a second author. A third reviewer resolved disagreements.

Data Analysis
The frequency of recommendations on reporting and presenting economic evaluations was tabulated and common trends were noted. More specifically, trends were considered on the basis of year of publication, geographic location, and critical appraisal domains (e.g., stakeholder involvement in guideline development).

Results
Of the 6099 citations identified, 32 reports, representing 31 guidelines, were included (see Appendix Figure in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2015.06.007) [13,24–54]. Approximately half were country-specific pharmacoeconomic evaluation guidelines recognized by decision-making bodies (54%, n = 17 of 31), 22% (n = 7 of 31) were submission guidelines identifying requirements for economic evaluations submitted to decision-making bodies, and 22% (n = 7 of 31) were published recommendations on economic evaluations. Descriptive characteristics of the guidelines are described in Table 1, with additional details provided in Appendix Table 3 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2015.06.007.

Critical Appraisal of Guidelines
Guideline quality was generally low when critically appraised. All guidelines had some limitations related to the rigor of their development and editorial independence. Guidelines varied with respect to the degree of stakeholder involvement and their focus on applicability and implementation. Guidelines from Brazil and Cuba, however, were well developed in both these domains. Common limitations were not conducting a systematic search for evidence and an unclear process for formulating recommendations. Although recommendations were clearly identified in most guidelines, differences in terminology when comparing across guidelines could create confusion and lead to lack of clarity. Decision makers and related organizations frequently provided funding for the guidelines; however, authors’ potential conflicts of interest were not reported in most of the guidelines. More details on the critical appraisal are provided in Appendix Table 4 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2015.06.007.

Standard Templates: Reporting Templates, Sample Figures, and Sample Tables
Most of the guidelines (71%, n = 22 of 31) provided a standard reporting format for an economic evaluation. The specific content of the report format varied across guidelines but generally addressed major components of the analysis including the design, methods, evidence summary, results, and interpretation. Some guidelines provided sample tables (32%, n = 10 of 31) and figures (16%, n = 5 of 31) for presenting economic evaluations. When all the guidelines were reviewed in detail, however, each provided some guidance on presenting various elements of economic evaluations and is included in the subsequent synthesis on how to present economic evaluations. Formal methods for assessing and designing the reporting structure, format, and content of economic evaluations were not identified in any of the guidelines, and none of the reporting templates specifically targeted policymakers or other nontechnical audiences.

Supports for Nontechnical End Users: Glossaries and Advice on Presenting to Noneconomists
Guidelines were most frequently developed by or in collaboration with policymakers (87%, n = 27 of 31) and targeted toward industry (90%, n = 28 of 31), policymakers (90%, n = 28 of 31), or researchers (77%, n = 24 of 31). Advice on presenting economic evaluations to nontechnical audiences was noted in 16% of the guidelines (n = 5 of 31). The American guideline suggested that model calculations should be clearly explained for noneconomists and results disaggregated for formulary committees [34]. The Thai guideline suggested that graphical presentations of results would assist general audiences [44]. Three guidelines (Brazil, Mexico, and Canada) recommended including an executive summary accessible to noneconomists [13,38,43] (for more details, see Appendix Table 5 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2015.06.007). In addition, 35% of the guidelines (n = 11 of 31) included a glossary of technical terms for those less familiar with health economics. No trends across geographic region or year of publication were identified for guidelines that included advice on presenting to noneconomists or that included a glossary. Four of the 5 guidelines that provided advice on presenting to noneconomists and 10 of the 11 guidelines with glossaries, however, were developed with good stakeholder involvement.
### Table 1 – Characteristics of economic evaluation guidelines.

<table>
<thead>
<tr>
<th>Country</th>
<th>Author affiliation</th>
<th>Target audience</th>
<th>Standard reporting format</th>
<th>Sample tables included</th>
<th>Sample figures included</th>
<th>Glossary included</th>
<th>Presenting to noneconomists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacoeconomic guidelines*</td>
<td>Columbia 2014 Decision makers, researchers</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>Yes</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>South Korea 2013</td>
<td>Decision makers</td>
<td>Industry, decision makers</td>
<td>–</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>–</td>
</tr>
<tr>
<td>Norway 2012</td>
<td>Decision makers</td>
<td>Industry, decision makers</td>
<td>No</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Ireland 2010</td>
<td>Decision makers</td>
<td>Industry, decision makers</td>
<td>–</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>–</td>
</tr>
<tr>
<td>Brazil 2009</td>
<td>Decision makers, researchers</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>–</td>
<td>–</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Germany 2009 Belgium 2008</td>
<td>Decision makers</td>
<td>Industry, decision makers</td>
<td>–</td>
<td>–</td>
<td>Yes</td>
<td>Yes</td>
<td>–</td>
</tr>
<tr>
<td>Mexico 2008</td>
<td>Researchers, decision makers</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>–</td>
<td>–</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Slovakia 2008</td>
<td>Decision makers, researchers</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>New Zealand 2007</td>
<td>Decision makers</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>Yes</td>
<td>–</td>
<td>Yes</td>
<td>–</td>
</tr>
<tr>
<td>Canada 2006 Taiwan 2006</td>
<td>Decision makers Researchers, industry</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>–</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>The Netherlands 2006</td>
<td>Decision makers, researchers</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Cuba 2003</td>
<td>Decision makers, researchers</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>–</td>
<td>–</td>
<td>Yes</td>
<td>–</td>
</tr>
<tr>
<td>France 2003</td>
<td>Researchers</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Sweden 2003</td>
<td>Decision makers</td>
<td>Industry, decision makers</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Baltic States 2002</td>
<td>Decision makers</td>
<td>Industry, decision makers</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Submission guidelines*</td>
<td>England &amp; Wales 2013 Decision makers</td>
<td>Industry, researchers</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Yes</td>
<td>–</td>
</tr>
<tr>
<td>Israel 2010</td>
<td>Decision makers</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>Yes</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Finland 2009</td>
<td>Decision makers</td>
<td>Industry, researchers</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Australia 2008 Thailand 2008</td>
<td>Decision makers Researchers, decision makers</td>
<td>Industry, decision makers</td>
<td>Yes</td>
<td>Yes</td>
<td>–</td>
<td>–</td>
<td>Yes</td>
</tr>
<tr>
<td>Scotland 2007</td>
<td>Decision makers</td>
<td>Industry, decision makers</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

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**Recommendations on Presentation Approaches and Formats**

Recommendations on how to present economic evaluations that appeared in at least 20% of the guidelines are provided in Table 2.

Presenting data sources

Sixty-eight percent (n = 21 of 31) of the guidelines provided direction on how to present data sources.

The most common suggestions for presentation approaches were providing appropriate cross-referencing and citations of sources (48%, n = 15 of 31) and providing detailed tables or a list of included variables and data (39%, n = 12 of 31). Guidance on which variables to include in the tables varied, with some requesting all variables, others requesting only the most important variables, and some indicating only that there should be sufficient transparency to reproduce the analysis. Presenting a list or table including resource use and costs was also sometimes recommended (26%, n = 8 of 31).

Less frequently recommended approaches for presenting data sources included having copies of original data sources or ensuring their availability (13%, n = 4 of 31), summarizing clinical trial data in tables (10%, n = 3 of 31), and including a quality assessment of the data sources (6%, n = 2 of 31). Three guidelines (10%, n = 3 of 31) also suggested providing more detailed information such as data collection forms or detailed data tables in appendices.

Presenting economic models

Sixty-eight percent (n = 21 of 31) of the guidelines provided suggestions on presenting the economic model. Many guidelines (39%, n = 12 of 31) emphasized the need for transparency and clarity in presenting the model description so that the analysis could be replicated and individuals can understand the justifications or why it is different from other existing models. It was noted that the presentation should allow individuals to follow the steps in the modeling and analysis and understand how the data move through the model. Similarly, a number of guidelines emphasized the need for clarity in presenting model assumptions (32%, n = 10 of 31). Figures commonly suggested included decision tree diagrams (29%, n = 9 of 31) or model structure diagrams (29%, n = 9 of 31). For the model structure diagrams, guidelines either requested traditional transition-state Markov model diagrams or did not specify details of the model diagram. Only one guideline specified that a less-detailed schematic diagram of the model be provided for noneconomists [34].

Presenting transition probabilities in a matrix was less frequently recommended (10%, n = 3 of 31).
Presenting base-case results

Ninety-four percent (n = 29 of 31) of the guidelines provided suggestions on how to present the base-case results. Although presenting incremental changes in results was predominantly recommended (61%, n = 19 of 31), many guidelines recommended that total costs and benefits also be presented (48%, n = 15 of 31) to aid in the interpretation of results. Some guidelines also specifically requested that uncertainty around the incremental cost-effectiveness ratio be presented using either confidence intervals or a range for the incremental cost-effectiveness ratio (13%, n = 4 of 31). Some guidelines (10%, n = 3 of 31) recommend presenting results using natural clinical units before converting to quality-adjusted life-years (QALYs) (e.g., heart attacks, cirrhosis, and adverse events avoided). Some guidelines (10%, n = 3 of 31) also suggested presenting costs and benefits at a per-patient level, not just a population level.

Many guidelines recommended reporting results in disaggregate as much as possible, leading up to aggregate responses (61%, n = 19 of 31). Examples of disaggregating results included presenting costs and effects separately for each intervention and presenting results for different subpopulations, disease states, model cycles, or health care settings. In addition, some guidelines recommended separately reporting QALYs and life-years when there was a survival benefit (13%, n = 4 of 31). Some guidelines (13%, n = 4 of 31) indicated that results should be presented in a way to allow verification or reproducibility. Two guidelines (6%) also indicated that the limitations and/or quality of the results should be described for transparency purposes.

Presenting probabilistic sensitivity analyses

Forty-two percent (n = 13 of 31) of the guidelines provided suggestions on how to present probabilistic sensitivity analyses. The most frequently recommended formats were the cost-effectiveness acceptability curve (35%, n = 11 of 31) and the scatter plot for the cost-effectiveness plane (32%, n = 10 of 31). Less frequent recommendations included presenting in a tabular format (10%, n = 3 of 31), presenting expected value of information analyses (3%, n = 1 of 31), and identifying the percentage of simulations that are cost saving (3%, n = 1 of 31).

Recommendations for Conducting and Transparently Reporting Economic Evaluations

Recommendations for conducting and transparently reporting economic evaluations that appeared in at least 20% of the guidelines are provided in Table 3. Less frequent recommendations are outlined in Appendix Table 6 in Supplemental Materials found at http://dx.doi.org/10.1016/j.jval.2015.06.007.

The perspectives most frequently recommended were that of the health care payer and the societal. Some guidelines suggested...
presenting multiple perspectives, and in some guidelines, even though one perspective was recommended as the base case, other perspectives were identified as optional.

The approved indication (61%, n = 19 of 31) or a clearly specified target population (42%, n = 13 of 31) was the most frequently recommended population. Subgroup analyses were requested or permitted (65%, n = 20 of 31), but common guidance across guidelines on which subgroup analyses should be conducted was not provided.

Use of a time horizon that could account for all the outcomes and consequences was most frequently recommended (61%, n = 19 of 31). Considering the disease characteristics when selecting parameters, ranges) are chosen to be conducted. Best practices and educational resources for communicating these concepts to non-technical audiences could be further explored.

Common guidance was not provided for either aspect except to indicate that choices should be justified and transparently described.

Outcome measures most frequently preferred were QALYs (84%, n = 26 of 31); natural clinical measures (71%, n = 22 of 31; e.g., adverse events avoided and heart attacks) that could be converted to QALYs, life-years, or mortality (65%, n = 20 of 31); and quality of life (35%, n = 11 of 31).

The most frequent methods of conducting sensitivity analyses were one-way (68%, n = 21 of 31), multiway (55%, n = 17 of 31), and probabilistic (52%, n = 16 of 31). Uncertain parameters were most frequently explored in sensitivity analyses (58%, n = 18 of 31). The parameter values used in sensitivity analyses were most frequently based on confidence intervals (26%, n = 8 of 31), extreme best-case and worst-case scenarios (23%, n = 7 of 31), and those representing a full or credible range of variability (26%, n = 8 of 31).

### Table 3 – Approaches for conducting and transparently reporting economic evaluations recommended in at least 20% of the guidelines.

<table>
<thead>
<tr>
<th>Guideline element</th>
<th>Recommendations on conduct and reporting</th>
<th>Guidelines (N = 31), n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary perspective</strong></td>
<td>Health care payer 19 (61)</td>
<td>14 (45)</td>
</tr>
<tr>
<td>Target population</td>
<td>Approved indication 19 (61)</td>
<td>Clearly specified target population 13 (42)</td>
</tr>
<tr>
<td>Subgroup analyses</td>
<td>Requested/permitted but no specific guidance 20 (65)</td>
<td>Long enough to cover consequences and benefits 19 (61)</td>
</tr>
<tr>
<td>Time horizon</td>
<td>Disease characteristics considered 8 (26)</td>
<td></td>
</tr>
<tr>
<td>Assumptions required</td>
<td>Yes 21 (68)</td>
<td></td>
</tr>
<tr>
<td>Modeling permitted</td>
<td>Yes, requires details 12 (39)</td>
<td>Yes, details not specified 7 (23)</td>
</tr>
<tr>
<td>Preferred outcome measures</td>
<td>Quality-adjusted life-years 26 (84)</td>
<td>Natural, clinically relevant or patient-relevant units 22 (71)</td>
</tr>
<tr>
<td>Sensitivity analyses—Parameters</td>
<td>Life-year gained or mortality 20 (65)</td>
<td>Quality of life 11 (35)</td>
</tr>
<tr>
<td>Sensitivity analyses—Range</td>
<td>Parameters with greatest uncertainty 18 (58)</td>
<td></td>
</tr>
<tr>
<td>Sensitivity analyses—Methods</td>
<td>Confidence intervals 8 (26)</td>
<td>Representing full or credible range of variability 8 (26)</td>
</tr>
<tr>
<td>Sensitivity analyses—Other</td>
<td>Extreme or best/worst-case values 7 (23)</td>
<td></td>
</tr>
<tr>
<td>Sensitivity analyses—Scenarios</td>
<td>One-way or univariate 21 (68)</td>
<td>Multiway or multivariate scenario analyses 17 (55)</td>
</tr>
<tr>
<td>Sensitivity analyses—Probabilistic</td>
<td>16 (52)</td>
<td></td>
</tr>
</tbody>
</table>

*Note. Multiple recommendations could be made in each guideline. For more details, see ISPOR Guideline Tables*[18] and Appendix Table 6 in Supplemental Materials. ISPOR, International Society for Pharmacoeconomics and Outcomes Research.*

### Discussion

**Key Findings**

Most guidelines offer some advice on how to present economic evaluations, and many include a standard reporting format with examples of tables and graphs to be included. None of the reporting templates used formal methods for their design or assessment, and none of the reporting templates specifically targeted policymakers or nontechnical audiences. Common ideas across guidelines include presenting well-cited tables of data sources, transparent model descriptions and diagrams, disaggregated results, and tabular and graphical displays of sensitivity analyses. However, despite most guidelines being funded by policymakers for the purpose of developing economic evaluations for policymakers, only five guidelines provided specifics on how to present economic evaluations to non-economists. Some guidelines included a glossary of economic terminology for non-technical readers. Those guidelines that provided advice for presenting to non-economists or that included glossaries were more likely to have good stakeholder involvement in their development. Common elements that are required for transparent reporting of economic evaluations and that may require further explanation for non-economists include differences between the societal and health care payer perspectives, adequacy of time horizons that cover the period of costs and effects while appropriately considering aspects of the disease, how economic outcomes such as QALYs and life-years relate to their component clinical outcomes such as heart attacks or adverse events, and how sensitivity analyses (methods, parameters, ranges) are chosen to be conducted. Best practices and educational resources for communicating these concepts to non-technical audiences could be further explored.

### Comparison with Other Literature

When considering whether this guidance is sufficient for presenting economic evaluations to nontechnical audiences, these findings should be considered in light of 1) what policymakers want from economic evaluations, and 2) frequent limitations in economic models. Finding common ground between how economists present economic evaluations and what policymakers need to understand from an economic evaluation is essential for creating economic evaluations that adequately balance both rigor and accessibility for those who must understand their implications for real-world decisions. A recent ISPOR task force partially attempted to address this gap by developing a
questionnaire for decision makers to assess the relevance and credibility of economic modeling studies [55].

The recommendations for presentation formats and reporting elements identified in these 31 guidelines sometimes overlap with issues raised by policymakers when applying the results of economic evaluations to policy decisions. Some similarities include ensuring transparency of methods and disaggregation of results. For example, policymakers have indicated that being able to deconstruct the economic analysis [9] and clearly outlining model assumptions that contribute to an incremental cost-effectiveness ratio [10] can facilitate their understanding. However, policymakers have also focused on understanding the relevance of economic evaluation results to practical decisions and implementation issues. For example, being aware of opportunity costs and appreciating the difference between theoretical versus real-world cost saving are important considerations for policymakers. However, only a few guidelines emphasized the importance of presenting the cost saving or other factors related to implementation and adoption feasibility. Even when specific suggestions were provided on how to present information to target audiences, these centered on enhancing clarity and transparency, not on identifying relationships to real-world decisions.

Across guidelines, there were no common recommendations on details to include when reporting on modeling and assumptions. However, these are important concepts when understanding the limitations of economic evaluations. Common limitations identified in submissions of economic evaluations for reimbursement include uncertainty in clinical estimates or flaws in constructing the economic model [56–58]. Ensuring that sufficient detail regarding the methods is provided to allow for consistent decision making but doing so without overwhelming nontechnical users requires some consideration. Some guidelines recommended presenting more detailed tables or technical information on modeling in appendices, which could help audiences focus on the most relevant information in the reports. Given established practices in economic evaluations, greater consistency across economic guidelines than what was observed in our present analysis would be desirable. Although consensus documents such as the Consolidated Health Economic Evaluation Reporting Standards statement did not meet the inclusion criteria for our systematic review [12], initiatives such as this could offer consistency and a potential structure for guiding the translation of economic evaluations for less technically oriented audiences.

**Strengths and Limitations**

This is the first work to systematically review the guidance economists are given on how to present economic evaluations and consider this in the context of policymakers and other nontechnical audiences. The consistency of recommendations across 31 guidelines suggests that key concepts were captured in this systematic review. Guidelines were focused on the conduct of health economic evaluations; however, other supportive documents or resources may exist in various countries or through international collaborations (e.g., European network for Health Technology Assessment) that provide insights on presenting economic evaluations to nontechnical audiences. However, guidelines are tools that are frequently accessed by economists. To manage the scope of the review, we limited our review to guidelines that are directly linked to decision-making and/or drug reimbursement processes, for which it may be reasonable that presentation approaches targeting noneconomists were addressed.

Methodological guidelines to critically appraise the quality of economic evaluations do not exist, and a tool for critically appraising clinical practice guidelines was adapted. Therefore, concepts unique to methodological guidelines may have been missed. To supplement the AGREE II approach to assessing clinical practice guidelines, principles from a framework for communicating methodological recommendations for systematic reviews and meta-analyses were incorporated [22]. This included allowing for different sources of supporting evidence in guidelines (e.g., simulation studies and methodological case studies) and considering the context in which the guidelines would be applied (e.g., setting, target audience, and outcomes to be optimized by the guidelines). Despite the limitations of adapting these approaches to the current systematic review, the appraisal allowed identification of some key issues in the quality of the guidelines. For example, few guidelines reported that a systematic search for evidence was conducted or identified a rationale for the evidence upon which the guideline recommendations were based. Without this level of transparency, it is unclear whether or how guideline developers considered alternative options when formulating recommendations. In addition, not all guidelines reported authors’ affiliations and/or financial or intellectual conflicts of interest, which may have influenced guideline recommendations. The quality of most guidelines was low around these aspects and should be considered in future if more efforts are devoted to enhancing guidelines on how to present economic evaluations for different end users. Extracting qualitative data from a wide variety of guideline documents requires judgment. However, this task was facilitated by the use of a pre-existing database of guideline characteristics [18,23].

**Policy Implications/Interpretation**

Economists have consistent presentation formats and reporting elements that should be considered when providing information to policymakers. However, tailoring information to noneconomists is also important to enhance the accessibility of economic evaluations and their legitimacy in health policy decision making. Although policymakers have influenced how economic evaluations are conducted, less work has been done on how best to present and communicate economic evaluations to noneconomists. Some considerations for enhancing presentation formats are outlined in the following section:

1. Presentations of economic evaluations are currently targeted to technical users. Policymakers have reported challenges understanding technical concepts such as QALYs and current graphics such as cost-effectiveness curves [59–61]. Linking technical concepts to ideas that have practical relevance in a decision-making context and that are already familiar to policymakers could be valuable. In addition, ensuring educational resources and initiatives are in place for policymakers to gain a better understanding of commonly reported technical elements is important.
2. Policymakers have indicated that disaggregating results and focusing on the practical relevance of results is important. Although disaggregation is important, on its own, it may be insufficient for enhancing policymaker’s understanding. Following frameworks on how to communicate science to the lay public could guide audiences toward a better understanding these technical concepts (e.g., judicious choice of content, structuring and organizing knowledge, and use of analogies to explain novel concepts and use of narratives) [62].
3. Even when reporting guidelines are followed, there will always be complex methodological and modeling decisions that are open to interpretation and their relevance to decision-making context should be considered. For example, limitations in the clinical evidence base and uncertain extrapolations of these data frequently influence the results of economic evaluations [56–58]. Ensuring these uncertainties
and potential limitations are clearly explained to noneconomists is important for enhancing credibility and consistency in health policy decision making.

**Future Research and Conclusions**

Knowledge translation approaches have frequently been applied to enhancing the understandability and accessibility of clinical trial evidence for policymakers, health care providers, and patients [63–65]. Some of these initiatives engage policymakers in developing systematic review or clinical practice guideline summaries to ensure relevance for stakeholders. However, these approaches have not been applied in the field of health economics and could be used to develop technically accurate but more simplified explanations of economic evaluations for general audiences. For example, in addition to providing technical reports and scientific publications of economic evaluations, decision support tools could be developed for complex decisions. These tools could also be used to support educational initiatives or as supplementary resources for nontechnical audiences. With further development of presentation formats that are tailored to noneconomists, individuals will be able to apply the results of economic evaluations to policy decisions and enhance the transparency and legitimacy of decision-making processes.

Source of financial support: This research was supported through a grant from the Canadian Institute of Health Research Drug Safety and Effectiveness Network (funding reference no. 116573).

**Supplemental Materials**

Supplemental material accompanying this article can be found in the online version as a hyperlink at http://dx.doi.org/10.1016/j.vhl.2015.06.007 or, if a hard copy of article, at www.valueinhealthjournal.com/issues (select volume, issue, and article).

**References**


