

# Guidelines for reporting health economic evaluation studies

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## Introduction

Throughout this economic evaluation series, we have presented several methodological pieces on how to conduct cost-effectiveness studies. We have also discussed approaches on how to estimate costs and outcomes in health,<sup>1-3</sup> analytical models to inform the use of technologies,<sup>4</sup> how to deal with uncertainty<sup>5</sup> and how to estimate budget impact.<sup>6</sup> Each one of these approaches requires a description of methods, data collection and results analysis. Thus, reporting economic evaluation represents a challenge, given the extensive amount of relevant information needed to understand the study with the limited space given in scientific journals.

To support article preparation, the scientific community has developed guidelines to report research. There are hundreds of them.<sup>7</sup> They typically instruct authors regarding the information considered essential in a research article. The Consolidated Health Economic Evaluation Reporting Standards (CHEERS) is among the available guidelines,<sup>8</sup> and is described in this article. Here, we present the Portuguese version of the CHEERS checklist, which is intended for reporting

health economic evaluation studies. As a preamble, we provide some general information on research reporting.

## Standard structure of a scientific article

In most scientific journals, research reports are standardized.<sup>9</sup> The format IMRaD – introduction, methods, results and discussion – is typically adopted. This structure allows a better understanding of the report and its content analysis. Each part of the manuscript must provide information so the reader can understand what has been done. In the introduction, the authors present the subject studied, justification for the investigation and the objective of the report. In the methods, the type of research adopted is presented. The authors may also describe the study context, the characteristics of the investigated sample, the procedures for data collection and analysis, and the ethical aspects. In the results, as the name suggests, the main findings of the research are presented, along with statistical analysis, if applicable. Finally, in the discussion, results are interpreted, with authors typically comparing them with the literature, discussing the study's limitations and providing a conclusion.

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The conclusion represents the view of the author regarding the research objective. When readers have access to well-reported research, they can decide on the reliability and credibility of the conclusion. If they consider the conclusion reliable, it will influence their professional and personal behaviour.

Besides preparing an IMRaD, as described, there are important parts of a research article, including the title, abstract and bibliographic references.

### Guidelines for reporting health economic evaluation studies

The final version of the 24 items described in the original CHEERS Statement<sup>8</sup> was the result of a four stage approach, described below:

The first stage consisted of a systematic review of checklists and guidelines related to reporting economic evaluations, in which the researchers selected potential items to consider in the CHEERS guidelines.

The second stage was based on the use of a modified Delphi panel, by which specialists across several areas (academia, clinical practice, industry, government, and the editorial community) evaluated the relevance of the items selected in the previous stage.

The third stage comprised a face-to-face consensus meeting with the members of ISPOR Task Force (International Society for Pharmacoeconomics and Outcomes Research). The specialists' comments on the modified Delphi panel were revised and a preliminary version of the guidelines was drafted.

The fourth stage included a presentation of the preliminary version at the ISPOR 17<sup>th</sup> Annual International Meeting. The document was revised based on the comments of the event participants. After that, the revised version was circulated to the members of ISPOR Task Force and once again to the participants

of the modified Delphi panel, who developed the final version of the checklist.

### Brazilian version of CHEERS

In order to produce a Portuguese version of CHEERS, the following procedure was adopted: i) an economist in health (ENS) and with ten years of experience in the area of economic evaluation translated CHEERS to Portuguese, which was then revised by another researcher (MTS), who has similar experience in economic evaluation; ii) from this draft Portuguese version, a third person (TSAP), a professional with experience in translating scientific articles, and who work for the journal Epidemiology and Health Services – RESS, back-translated the text from Portuguese to English; iii) this back-translation was revised by two authors of the original CHEERS manuscript (FA and DH), from which the final version is being published in this article. This procedure aimed to ensure that the Portuguese and English versions had the same meaning. The final checklist is presented in Figure 1.

### Conclusion

Articles on reporting economic evaluations must be written in IMRaD format. The checklist is intended to increase transparency in reports, because information on each of the 24 items should be contained in the article. It is important to highlight that the checklist contains instructions concerning the title, abstract, introduction, methods, results and discussion. And a last reminder: good research reports are more likely to be accepted when submitted for journal publication. The continued use of these guidelines is certainly a step toward improving the quality of reports in economic evaluation studies.

Section/item	Item No.	Recommendation	Reported on page No./line No.
<b>Title and abstract</b>			
Title	1	Identify the study as an economic evaluation, or use more specific terms, such as "cost-effectiveness analysis", and describe the interventions being compared.	
Abstract	2	Provide a structured summary with the objectives, perspective, context, methods (including the study design and the inputs), results (including the base-case and uncertainty analyses), and conclusions.	

Figure 1 – CHEERS<sup>a</sup> checklist: items to include when reporting economic evaluations of health interventions

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Section/item	Item No.	Recommendation	Reported on page No./ line No.
<b>Introduction</b>			
Background and objectives	3	Provide an explicit report of the broader context of the study. Present the study question and its relevance for public health or practical decisions.	
<b>Methods</b>			
Target-population and subgroups	4	Describe the characteristics of the base-case population and of the subgroups analyzed, including the reason why those subgroups were chosen.	
Context and location	5	State relevant aspects of the system(s) in which the decision(s) must be made.	
Study perspective	6	Describe the study perspective and relate it to the costs to be evaluated.	
Comparators	7	Describe the interventions or strategies being compared and describe why they were chosen.	
Time horizon	8	Describe the time horizon(s) over which the costs and consequences are being evaluated and say why it is/they are appropriate.	
Discount rate	9	Report the choice of the discount rate(s) used for costs and outcomes and say why it is/they are appropriate.	
Choice of the health outcome	10	Describe which health outcomes were used as the measure(s) of benefits in the evaluation and their relevance for the type of analysis performed.	
Measurement of effectiveness	11a	<i>Estimates based on a single study:</i> Describe fully the design characteristics of the single effectiveness study and why the single study was sufficient source of clinical effectiveness data.	
	11b	<i>Estimates based on synthesis:</i> Describe fully the methods used to identify the included studies and to the synthesis of clinical effectiveness data.	
Measurement and valuation of results based on preferences	12	If applicable, describe the approaches used to elicit preferences for results	
Estimating resources and costs	13a	<i>Economic evaluation based on a single study:</i> Describe the approaches used to estimate the use of resources associated with alternative interventions. Describe the primary or secondary research methods for valuing each item of the resources in terms of cost units. Describe any adjustment done to approximate to opportunity costs.	
	13b	<i>Economic evaluation based on model:</i> Describe the approaches and data sources used to estimate the use of resources associated with the model health status. Describe the primary or secondary research methods for valuing each item of the resources in terms of cost units. Describe any adjustment done to approximate to opportunity costs.	
Currency, price date and conversion	14	Report the dates of estimate resources amounts and the unit costs. Describe the methods to adjust estimated unit costs to the year of reported costs, if necessary. Describe the methods to convert the costs into a common currency and the exchange rate.	
Choice of model	15	Describe – and give reasons for – the specific type of analytical decision model used. Providing a figure to show the model structure is strongly recommended.	
Assumptions	16	Describe all the structure assumptions or other assumptions underpinning the decision-analytic model.	
Analytical methods	17	Describe all the analytical methods that support the evaluation. This can include methods to deal with skewed, missing or censored data; extrapolation methods; methods for pooling data; approaches for validation or adjustments (e.g., half-cycle corrections) in a model; and methods for handling population heterogeneity and uncertainty.	
<b>Results</b>			
Study parameters	18	Report the values, ranges, references and, if used, the probability distributions for all the parameters. Report the reasons or sources for distribution used to represent the uncertainty, when appropriate. Providing a table to show the input values is strongly recommended.	

**Figure 1 – CHEERS<sup>a</sup> checklist: items to include when reporting economic evaluations of health interventions**

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Section/item	Item No.	Recommendation	Reported on page No./line No.
Incremental costs and outcomes	19	For each intervention, report the mean values for the main categories of estimated costs and outcomes of interest, as well as the mean differences between the comparator groups. If applicable, report the incremental cost-effectiveness ratios.	
Characterizing uncertainty	20a	<i>Economic evaluation based on a single study:</i> Describe the effects of sample uncertainty for estimated incremental cost, incremental effectiveness, and incremental cost-effectiveness, together with the impact of methodological assumptions (such as discount rate and study perspective).	
	20b	<i>Economic evaluation based on model:</i> Describe the effects on uncertainty results for all input parameters and the uncertainty related to the model structure and assumptions.	
Characterizing heterogeneity	21	If applicable, report the differences in cost, outcomes or cost-effectiveness that can be explained by variations between subgroups of patients with different baseline characteristics or other variabilities observed in effects that are not reducible by more information.	
<b>Discussion</b>			
Study findings, limitations, generalizability, and current knowledge	22	Summarize the key findings of the study and describe how they support the conclusions reached. Discuss the findings limitations and the generalizability and how the findings fit with current knowledge.	
<b>Others</b>			
Sources of funding	23	Describe how the study was funded and the role of the funder in the identification, design, conduction, and reporting of the analysis. Describe other non-monetary sources.	
Conflicts of interest	24	Describe any potential conflicts of interest among the study authors, according to the journal's rules. In the absence of a journal's rules, we recommend authors comply with International Committee of Medical Journal Editors recommendations.	

a) CHEERS: Consolidated Health Economic Evaluation Reporting Standards

Note: For consistency, CHEERS checklist format is based on CONSORT (Consolidated Standards of Reporting Trials) checklist format.

**Figure 1 – CHEERS<sup>a</sup> checklist: items to include when reporting economic evaluations of health interventions**

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