Quality of Systematic Reviews of Economic Evaluations in Health Care

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Economic evaluations (analytical studies comparing costs and outcomes of investing resources in ≥1 alternatives) have increased in availability and acceptance as a tool for decision making in health care in the last 2 decades. However, the costs of decisions based on methodologically weak evidence are widely accepted. A number of reviews published in the period 1990-1994 illustrated the variability of the methods used in conducting and reporting economic evaluations. Although the findings could be partly explained by possible variations in review methods and by the known absence of editorial policies to assess economic evaluations prior to publication, initiatives aimed at increasing the uniformity, quality, and reporting of economic evaluations were undertaken. The initiatives (production of guidelines for regulatory bodies for submission and editorial management in medical journals and further research into the quality of economic evaluation methods) should have led to an increase in the quality of economic evaluations during the last years of the previous decade. We examined systematic reviews of economic evaluations in health care to assess the quality of methods used in the reviews and the quality of conducting and reporting economic evaluations in the last decade.

METHODS

Data Sources
We searched for studies from the period 1990 to March 2001 in all languages on a variety of databases, corresponding with members of the International Health Economist Association, and handsearched issues of Health Economics from 1992 to March 2001. A detailed description of search strategy, sources, and terms used is available in the online Appendix (http://www.jama.com).

Study Selection
Two reviewers examined each citation for relevance. Those deemed relevant were retrieved in full. Two reviewers compared each study against the selection criteria independently, resolving disagreements by discussion and, when necessary, the third reviewer adjudicated. We included systematic reviews of economic evaluations of health care interventions defined as studies assessing methodological quality using explicit criteria. We identified and retrieved 102 reports of reviews possibly satisfying our inclusion criteria. Fifty-four were excluded from further analysis, 9 are awaiting assessment, and the remaining 39 were included. References to the 54 excluded reviews and 9 awaiting assessment are available in the online Appendix (http://www.jama.com).

Context Reviews performed almost a decade ago showed considerable gaps in the quality of reporting and methods applied to economic evaluations of health care interventions. Measures taken by the research community to address the issue included the promulgation of guidelines and the publicizing of good practice in economic evaluation.

Methods To assess the quality of methods of systematic reviews, economic evaluations in health care, and reporting methods, we conducted full-text searches of private and public databases for the period 1990 through March 2001 and corresponded with researchers active in the field. A total of 102 reports were identified, but only 39 were included. Quality of systematic reviews was assessed by a 6-item checklist.

Results Quality of review methods was reasonable, but more attention needs to be paid to search methods and standardization of evaluation instruments. The reviews found consistent evidence of serious methodological flaws in a significant number of economic evaluations. Lack of clear descriptions of methods, lack of explanation and justification for the framework and approach used, and low-quality estimates of effectiveness for the interventions evaluated were the most frequent flaws. Modest improvements in quality of conducting and reporting economic evaluations appear to have taken place in the last decade.

Conclusions Proper allocation of resources on the basis of economic evaluations remains uncertain. Editorial teams and regulatory bodies should perform quality assurance based on a single widely accepted and validated standard instrument.

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Data Extraction
For each included review, we extracted author(s) and year of study, topic and study question, type (ie, cost-benefit analysis) and number of included economic evaluations, year of publication or preparation of included economic evaluations, instrument used to assess quality of included economic evaluations, and main study conclusions. Quality of systematic review methods was assessed using the following criteria that were adapted from different sources7-9: (1) Is it unlikely that important relevant studies were missed? (2) Were the inclusion criteria used to select articles appropriate? (3) Was the assessment of studies reproducible? (4) Were the design and/or methods and/or topic of included studies broadly comparable? (5) How reproducible are the overall results? (6) Will the results help resource allocation in health care? Each question was answered with “no,” “partly,” “yes.”

We performed a calculation of Spearman rank-order coefficient correlating inter-reviewer agreement on an initial sample of 20 studies using 2 independent reviewers. As correlation was high (0.98), the remaining studies were assessed by a single reviewer.

Two reviewers extracted data on methods of assessing the quality of economic evaluations included in each of the reviews in our study. As a wide variety of assessment instruments were used, the criteria used in each instrument were grouped and analyzed by variables listed in the BMJ checklist for editors and authors of economic evaluations.3,10 We hoped that this would enable us to find some common methodological quality items used for assessment in the reviews to allow us to draw some conclusions. We further subdivided grouped items into methodological quality and reporting quality items.

Data Synthesis
We grouped reviews according to whether they assessed general methodological quality or by intervention, by study design, or by specific methods used in economic evaluations. A summary of the 39 included reviews is in the online Table (http://www.jama.com).

Four of the 6 quality criteria (inclusion criteria, reproducibility of assessment, comparability of included economic evaluations, and impact on resource allocation in health care) were fulfilled in at least 75% of reviews. The remaining 2 criteria (thoroughness of searches and reproducibility of overall results) were completely fulfilled in 12% and 73.5% and partly in 52.9% and 23.5% of reviews, respectively. A detailed methodological assessment of each review is available from the corresponding author.

Common search weaknesses were restricted use of databases and lack of efforts to identify unpublished material. Reproducibility of overall review results was hampered by the disparate nature of quality assessment instruments used in the reviews. Twenty-six reviews used ad hoc instruments with a variable number of items (3-25), 5 used the Drummond et al11 10-item checklist, 5 used the BMJ 35-item checklist,3 and 2 used US panel recommendations.12-14 One review used a checklist of unclear structure and origin.15

Funding sources were available for 28 (71%) reviews. Twenty-one (53%) were publicly funded, 2 (5%) were privately funded, and 5 (13%) had mixed funding.

Quality assessment criteria used in each review were compared with those in the BMJ checklist. Many reviews did not use quality assessment instruments that covered all the criteria as the BMJ checklist. In some cases this was because a review focused on a narrow methodological issue.16-18 Overall, the instruments used appeared to be appropriate to the scope of the reviews.

We included 6 reviews assessing the quality of 644 economic evaluations in health care across a wide range of general and specialty medical journals, different countries and settings, including industry submissions to a reimbursement authority (unpublished data, 2000).19-21 All identified major flaws in a substantial number of evaluations. The prevalence of major methodological flaws appeared higher in the population assessed by Hill et al,22 probably because of a higher degree of scrutiny by the Australian reimbursement authority.

We included 19 reviews assessing the quality of 776 economic evaluations (not allowing for the overlap between Demichelli23 and Jefferson24) focusing on vaccines, preventive interventions for human immunodeficiency virus, adjuvant therapy for breast cancer, vascular and orthopedic surgery, and antenatal screening (unpublished data, 2000).21-25-42 The evaluated interventions were mainly preventive. All included studies reached the same conclusions, albeit with different emphasis, such as the presence of uncertainty due to variable epidemiological assumptions, estimates of effect of evaluated interventions, and poor reporting, writing, or use of methods.

Six reviews assessing the quality of specific economic study design included 5 studies that assessed 362 cost-utility analyses over a time span of 20 years.43-47 Overall results show a small and slow improvement over the years, but the authors raise concerns about the standard of peer review in some of the smaller specialty journals. We were unable to identify similar depth of scrutiny for other economic study types.

Nine reviews assessing the quality of a broad range of specific methods (statistical analysis of costs, health status measurement, contingent valuation, and cost estimation) in 1407 economic evaluations reported poor methods.15-18,48-52 All reviews cast serious doubts on the validity of the conclusions reached by the economic evaluations assessed and all propose stricter criteria for quality control.

Eleven reviews assessed and commented on changes in quality of economic evaluations over time. Six reported improvements mostly up to the late 1990s,15,23,34,49,47 one reported qual-
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ity improvement over the 1980s, one the opposite, and 4 reported no improvement. The major methodological findings of the reviews are: lack of clarity on study questions, viewpoint, and epide-

miological assumptions; unclear conceptual and decision-making context; lack of clear descriptions of methods used to define effectiveness, utilities, benefits, and resource and cost estimates; basic calculation errors in a signifi-
nicant minority of studies; variability in the assumptions underlying the choice of estimates of effect; choice of discount rate and perspective often not explained; and sensitivity analysis more likely to be performed in more recent evaluations.

Although the provision of some descriptive information (study viewpoint, cost basis) may be improving over time, a sizeable proportion of eco-
nomic evaluations could not justify their conclusions on the basis of methods used. There appeared to be no dif-
ference in the methodological quality of conducting and reporting economic evaluations, although evaluation of the former was difficult as few reviews had raw data from the evaluations at their disposal.

COMMENT

Although overall quality of reviews is satisfactory, more attention needs to be paid to search strategies and the use of comparable instruments to assess quality of included studies.

The findings of the reviews indicate the presence of serious methodologi-
cal flaws in a significant number of eco-
nomic evaluations of health care inter-
ventions, regardless of publication status, period of preparation or publication, topic, or type of evaluation. Overall, there appear to have been some modest, but slow, improvements in quality in the last decade, but the evi-
dence for this observation is thin. There is evidence of lower quality in evaluations published in specialty journals. There is no evidence of language bias, but there is evidence of low quality of unpublished evaluations submitted by

the pharmaceutical industry within a reimbursement scheme.

There is evidence of considerable confusion in the design, reporting, and description of economic evaluations. Reviews found a proportion of evaluations of unclassifiable study design, studies that ignored basic research and economic methodological principles, and ones that reported results lacking clarity.

There could be many explanations for our findings, ranging from lack of appreciation by researchers and editors of the complexities of eco-
nomic evaluation method to resis-
tance in accepting that “any method” will no longer suffice, or lack of dire-
ction in the quality control of eco-
nomic submissions to journals, with the exception of the BMJ.

There are 2 possible major limita-
tions to our descriptive synthesis of re-


results. First, it is possible that a num-


ber of primary studies were included more than once in the research synthe-
sis studies included in our review. For example, a cost-utility analysis in-
cluded in Gerard et al also could have been included in the analysis by Demicheli and Jefferson. If this kind of double counting were extensively present, a proportion of the same poor-quality evaluations could bias the re-


sults of our review.

Second, few methodological stud-
ies used the same instrument to assess quality, possibly leading to lack of over-


all comparability of their results. We be-
lieve these problems not to have had a major impact on our findings. All in-
cluded systematic reviews unequivoc-
ally pointed to the variable nature of methods for conducting and reporting economic evaluations and to the slow and modest progress in overall quality over the last decade. This find-
ing appears to be independent of re-
view focus or assessment methods.

There appears to be little difference in the conclusions of those reviews using disparate instruments and those which used the same instrument.

We believe that urgent action should be taken to address the problem of poor

methods in economic evaluations. First, absolute transparency of reporting is needed, with maximum use of jour-
nal Web sites to obviate space con-
straints. Economic models used in evaluations should be readily accessible to reviewers and readers. Sec-
ond, basic formal training in economic evaluation should be given to all those involved in economic evalua-
tion or their assessment. Third, the use of a validated and accepted instru-
ment for quality assessment is a prior-
ity for any future monitoring of eco-
nomic evaluations. In our view, the BMJ checklist could be adopted by general and specialty journals and regulatory and grant-giving institutions as a qual-
ity assessment instrument. Modifi-
cations of the BMJ checklist for in-depth scrutiny of particular methodological aspects, such as the ones described by Gerard et al, should be performed on the basis of the research results.

Lastly, we propose continuous moni-
toring of the quality of economic evalu-
ation methods and more research into specific study designs, often-used interventions, and comparisons of economic evaluations in decision-
making and editorial settings.

Caution should be taken when de-


ciding or justifying allocation of resources on the basis of economic evaluations, especially if based on unpublished studies or studies pub-


lished in specialty journals. Editorial teams, regulatory institutions, and researchers should implement and assess quality assurance based on a single widely accepted and validated standard instrument.

Author Contributions: Study concept and design: Jefferson, Demicheli.
Analysis and interpretation of data: Jefferson, Demicheli, Vale.
Acquisition of data: Jefferson, Demicheli, Vale.
Drafting of the manuscript: Jefferson, Demicheli.
Critical revision of the manuscript for important intellec-
tual content: Jefferson, Demicheli, Vale.
Statistical expertise: Demicheli.
Administrative, technical, or material support: Vale.
Study supervision: Jefferson.

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ration of this article. Drs Jefferson and Demicheli took active part in the development of the BMJ checklist.
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REFERENCES

Appendix. Search Strategy for Identification of Studies and Lists of Excluded Reviews and Reviews Awaiting Assessment

Search Strategies and Sources

Bibliographical references for included studies are numbered sequentially as in the text of the study. Due to resource constraints, we performed searches for the period 1990 through March 2001. We aim to extend the search back in time when resources become available. All languages were considered and the following sources were searched for reviews on the quality of economic evaluations.

The Cochrane Library. The NHS Economic Evaluation database and the Health Technology Assessment database were used.

MEDLINE. The strategy below was derived from that designed by Julie Glanville, information services manager, NHS Centre for Reviews and Dissemination, University of York, Heslington (Available at: http://www.york.ac.uk/inst/crd/). Subject strategy: (1) economics (Is) or explode Costs-and-Cost-Analysis (mh) or Economic-value-of-life (mh) or explode Economics-Dental (mh) or explode Economics-Hospital (mh) or explode Economics-Medical (mh) or Economics-Nursing (mh) or explode Fees-and-Charges (mh) orexplode Budgets (mh) or explode Models-Economic (mh) or (2) (cost or costs or costed or costly or costing or cost?minimi or cost?consequence or economic or pharmacoeconomic or price or pricing or contingent valuation or willingness to pay or conjoint analysis) (tw,mh)

Search Filter. A search filter with high sensitivity for identifying reviews, derived from the strategies developed by Boynton et al., was added to the MEDLINE subject search strategy to identify reviews that have evaluated the methodology of economic evaluations. The filter contained the following: systematic “near4 (review” or overview”) (tw) or (meta/analy or meta analy”) (tw,mh,pt) or Randomized-Controlled-Trials (mh) or synthesis (tw) or (data near2 extraction) (ab) or published (ab) or medline (ab) or (review” or overview”) (tw,mh,pt) or literature (ab) or articles (ab).

Other Databases. Databases of conference proceedings were checked (eg, International Society of Technology Assessment in Health Care database available at: http://www.isstahc.org/en/database.html) and our protocol was reviewed by members of the Health Economists Study Group and the Cochrane Health Economics Methods Group. We corresponded with members of the International Health Economist Association to seek to identify unpublished studies. We handsearched issues of Health Economics from 1992 (first year of publication) through March 2001. We also searched EMBASE, HealthStar, Economics Literature Index (EconLit), Health Economic Evaluations Database (HEED), System for Information on Grey Literature in Europe (SIGLE), and Dissertation Abstracts Online.

Excluded Reviews


Reviews Awaiting Assessment


9. Morrow J. The clinical, social and psychological problems of patients with Epilepsy. Thesis (MD). Queen’s University of Belfast (Northern Ireland).
### Table A. Summary of Content of Included Studies *

<table>
<thead>
<tr>
<th>Source, y</th>
<th>Topic</th>
<th>Years Study Conducted</th>
<th>Type of Analysis</th>
<th>No. of Analyses</th>
<th>Type of Instrument</th>
<th>Main Conclusion(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams et al, 1992</td>
<td>Quality of economic evaluations nested in RCTs</td>
<td>1973-1988</td>
<td>Cost-benefit and cost-effectiveness analyses</td>
<td>51</td>
<td>Ad-hoc checklists: quality and completeness score (0 to 1)</td>
<td>No clarity on study questions, viewpoint, epidemiological assumptions, methods used to define effectiveness, utilities, benefits, resource and cost estimates</td>
</tr>
<tr>
<td>Garcia-Ates, 2001</td>
<td>Quality of Spanish economic evaluations</td>
<td>1983-1999</td>
<td>Cost-benefit, cost-effectiveness, cost-minimization, and cost-utility analyses</td>
<td>87</td>
<td>Mixed 16-item classification/quality checklist</td>
<td>Lack of clarity on viewpoint and effectiveness estimates; lack of consistency between viewpoint and economic design</td>
</tr>
<tr>
<td>Badia et al, 1994</td>
<td>Quality of pharmacoeconomic studies published in Spain</td>
<td>1982-1992</td>
<td>Cost-effectiveness, cost-benefit, and cost-utility analyses</td>
<td>16</td>
<td>10-Item checklist</td>
<td>Quality of studies is similar to that from other countries but improvement in the quality of future studies should be promoted</td>
</tr>
<tr>
<td>Barber and Thompson, 1998</td>
<td>Quality of statistic evaluation of cost data in RCTs</td>
<td>1995</td>
<td>Not stated</td>
<td>45</td>
<td>Data extraction checklist based on statistical principles</td>
<td>Strong inferential conclusions made without supporting data</td>
</tr>
<tr>
<td>Brazier et al, 1999</td>
<td>Quality of health status measures used in included studies</td>
<td>1995</td>
<td>Cost-consequence and cost-utility analyses</td>
<td>13</td>
<td>Checklist with 3 questions</td>
<td>Choice of instruments and their validity is unclear or questionable in 50% of studies</td>
</tr>
<tr>
<td>Briggs and Gray, 1999</td>
<td>Assessment of methods of handling uncertainty in economic evaluation</td>
<td>1986-1998</td>
<td>Cost-utility analysis</td>
<td>492</td>
<td>Ad-hoc checklist</td>
<td>Use of sensitivity analysis has increased over time but it has rarely been adequately performed</td>
</tr>
<tr>
<td>Brown and Sculpher, 1999</td>
<td>Quality of evaluations of cancer therapies containing preference-based measures of benefit</td>
<td>1988-1997</td>
<td>Cost-utility analysis</td>
<td>29</td>
<td>6-Item checklist</td>
<td>Inadequate use of good methods</td>
</tr>
<tr>
<td>Chang and Henry, 1999</td>
<td>Assessment of economic studies in nursing, medical, and health services research</td>
<td>1990-1996</td>
<td>Cost-benefit, cost-effectiveness, cost-minimization, and cost-utility analyses</td>
<td>88</td>
<td>6 Methodological principles checklist</td>
<td>Quality was variable, but discounting was less likely to be performed in nursing studies</td>
</tr>
<tr>
<td>Deverill et al, 1998</td>
<td>Quality of health status measures</td>
<td>1995</td>
<td>Cost-utility and cost-consequence analyses</td>
<td>11</td>
<td>3-Item checklist</td>
<td>Usual methodological criteria for an economic evaluation were not met by the included studies</td>
</tr>
</tbody>
</table>

(continued)
Table A. Summary of Content of Included Studies* (cont)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Earle et al,44 2000</td>
<td>Quality of published cost-utility analyses in oncology</td>
<td>1988-1997</td>
<td>Cost-utility analysis</td>
<td>40</td>
<td>Subjectively rated 17-point scale based on the recommendations of US panel on cost-effectiveness</td>
<td>Slight but not significant trend toward methodological improvement</td>
</tr>
<tr>
<td>Evers et al,27 1997</td>
<td>Quality of economic evaluations of mental health interventions</td>
<td>1971-1995</td>
<td>Cost-benefit, cost-utility, cost-effectiveness, and cost-minimization analyses, and cost-of-illness study</td>
<td>91</td>
<td>21-item checklist</td>
<td>Few good quality economic evaluations were found</td>
</tr>
<tr>
<td>Evers et al,26 2000</td>
<td>Quality of economic evaluations in stroke research</td>
<td>1966-1998</td>
<td>Cost-minimization, cost-effectiveness, and cost-utility analyses</td>
<td>23</td>
<td>21-item checklist</td>
<td>Few studies of inferior quality were found</td>
</tr>
<tr>
<td>Gambhir and Schwimmer,30 2000</td>
<td>Quality of economic studies evaluating nuclear medicine procedures</td>
<td>1985-2000</td>
<td>Cost-effectiveness and cost-utility analyses</td>
<td>29</td>
<td>10-item checklist</td>
<td>Overall quality was limited; only 6 of 29 articles conformed to all 10 methodological criteria</td>
</tr>
<tr>
<td>Gerard,41 1992</td>
<td>Quality of cost-utility analyses</td>
<td>1980-1991</td>
<td>Cost-utility analyses</td>
<td>51</td>
<td>2-Stage checklist based on “good practice” principles</td>
<td>Improvements in reporting and evaluations urgently required</td>
</tr>
<tr>
<td>Gerard et al,46 2000</td>
<td>Quality of cost-utility analyses and validation of BMJ checklist as quality instrument</td>
<td>1996</td>
<td>Cost-utility analyses</td>
<td>43</td>
<td>33-item BMJ checklist modified for cost-utility analysis assessment</td>
<td>More than 50% of cost-utility analyses included in the review were of unsatisfactory quality</td>
</tr>
<tr>
<td>Hill et al,23 2000</td>
<td>Description of problems with pharmaco-economic submissions to Australian Pharmaceutical Benefits Scheme</td>
<td>1994-1997</td>
<td>Submissions and resubmissions</td>
<td>326</td>
<td>Detailed scrutiny by assessors and committees, rerun of computer models submitted</td>
<td>218 (67%) submissions had 1 or more serious methodological problems</td>
</tr>
<tr>
<td>Holloway et al,31 1999</td>
<td>Quality of cost-utility analyses of interventions for stroke evaluation and treatment</td>
<td>1992-1998</td>
<td>Cost-utility analyses</td>
<td>26</td>
<td>Modified scale based on the recommendations of US panel on cost-effectiveness</td>
<td>Although quality was higher than reported in other reviews, there was still room for considerable improvement</td>
</tr>
<tr>
<td>Jefferson and Demicheli,26 1994</td>
<td>Quality of economic evaluations of hepatitis B vaccines</td>
<td>1982-1993</td>
<td>Economic studies of different design</td>
<td>90</td>
<td>19-item checklist; 5 definitions for study design classification</td>
<td>Wide variations in methods used; epidemiological assumptions of doubtful credibility were used</td>
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<tr>
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</tr>
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<tbody>
<tr>
<td>Jefferson and Demicheli,33 1996</td>
<td>Quality of economic evaluations of influenza vaccination as a preliminary for defining a secondary model</td>
<td>1974-1994</td>
<td>Economic studies of different design</td>
<td>31</td>
<td>6-Item checklist</td>
<td>17 studies failed the screening phase, only 2 because of methodological weaknesses; considerable variability in underlying assumptions of effect of vaccines</td>
</tr>
<tr>
<td>Lord et al,34 1999</td>
<td>Quality of economic evaluation of screening for phenylketonuria</td>
<td>1969-1994</td>
<td>Cost-benefit analyses</td>
<td>13</td>
<td>Checklist based on Adams et al19 and Drummond et al11</td>
<td>Quality of included studies was mixed</td>
</tr>
<tr>
<td>Neumann et al,47 2000</td>
<td>Quality of cost-utility analyses reporting and assessment of changes over time</td>
<td>1976-1997</td>
<td>Cost-utility analyses</td>
<td>228</td>
<td>7-Item reporting quality checklist</td>
<td>Variability of reporting methods, with a slight improvement over time; specialty journals fared worse</td>
</tr>
<tr>
<td>Petrou et al,30 2000</td>
<td>Quality of economic evaluations of antenatal screening</td>
<td>1991-1999</td>
<td>Economic evaluations of different design</td>
<td>41</td>
<td>BMJ checklist</td>
<td>Poor methodological quality of majority of evaluations; narrow definition of benefits adopted by most evaluations</td>
</tr>
<tr>
<td>Sassi,50 2000</td>
<td>Quality of economic evaluations of diagnostic technology</td>
<td>1987, 1992, and 1997</td>
<td>Economic evaluations of different design</td>
<td>109</td>
<td>3-Criteria checklist</td>
<td>Most studies appear methodologically weak and provide misleading information</td>
</tr>
<tr>
<td>Shackley et al,37 1999</td>
<td>Quality of reporting of costing studies on peripheral vascular surgery</td>
<td>1986-1997</td>
<td>Cost analyses</td>
<td>30</td>
<td>BMJ checklist</td>
<td>Reporting inadequacies are likely to be a problem for users</td>
</tr>
<tr>
<td>Schrappe and Lauterbach,39 1998</td>
<td>Quality of economic evaluations of public health interventions for HIV prevention in developed countries</td>
<td>1987-1997</td>
<td>Cost-benefit, cost-effectiveness, and cost-utility analyses</td>
<td>40</td>
<td>BMJ checklist</td>
<td>Variability of quality methods; 11 evaluations did not pose a clear study question and were of poor quality</td>
</tr>
<tr>
<td>Spåth et al,36 1999</td>
<td>Quality of economic evaluation of adjuvant therapy for breast cancer as a preliminary to transfer of data to French health care system</td>
<td>1982-1996</td>
<td>Economic evaluations of different design</td>
<td>26</td>
<td>4-Point checklist</td>
<td>20 (77%) of evaluations failed the first assessment; data from the remaining 6 could not be used due to lack of clarity of reporting, standardization of reporting and better methods are needed</td>
</tr>
<tr>
<td>Stone et al,30 2000</td>
<td>Quality of cost-utility analyses and whether there have been improvements over time</td>
<td>1976-1997</td>
<td>Cost-utility analyses</td>
<td>228</td>
<td>8 Broad-item checklist</td>
<td>Wide variation in methods and results; little evidence of change over time; cost-utility analyses should be performed using more uniform and transparent methods</td>
</tr>
</tbody>
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Table A. Summary of Content of Included Studies* (cont)

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</tr>
</thead>
<tbody>
<tr>
<td>Udvarhelyi et al,24 1992</td>
<td>Quality of economic evaluations and its variation over 2 periods</td>
<td>1978-1980 and 1985-1987</td>
<td>Cost-benefit, cost-utility, and cost-effectiveness analyses</td>
<td>77 and 46</td>
<td>6-Point checklist</td>
<td>No significant differences in quality between the 2 periods; better reporting of analytical methods in general medical journals</td>
</tr>
<tr>
<td>van der Weijden et al,40 1998</td>
<td>Quality of economic evaluations of cholesterol-related intervention in general practice</td>
<td>1966-1996</td>
<td>Economic evaluations of different design</td>
<td>39</td>
<td>14-Item checklist</td>
<td>Several methodological principals were poorly applied</td>
</tr>
<tr>
<td>Walker and Fox-Rushby,41 2000</td>
<td>Quality of economic evaluations of control strategies against parasitic diseases</td>
<td>1984-1997</td>
<td>Economic evaluations of different design</td>
<td>42</td>
<td>Checklist based on Drummond et al11</td>
<td>Key variables were often not considered and ranges over which parameters were varied were rarely justified</td>
</tr>
<tr>
<td>Walker and Fox-Rushby,42 2000</td>
<td>Quality of economic evaluations of control strategies against communicable diseases</td>
<td>1984-1997</td>
<td>Economic evaluations of different design</td>
<td>107</td>
<td>10-Item checklist11</td>
<td>Overall quality was poor</td>
</tr>
</tbody>
</table>

*RCT indicates randomized controlled trial; HIV, human immunodeficiency virus.