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The State of Cost-Utility Analyses in Asia: A Systematic Review

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ABSTRACT

Objective: To review and evaluate published cost-utility analyses (CUAs) targeting populations in Asia. **Methods:** We examined data from the Tufts Medical Center Cost-Effectiveness Analysis Registry, which contains detailed information on more than 3700 English-language CUAs in peer-reviewed journals through 2012. We focused on CUAs pertaining to Asian countries (Asian CUAs), summarized study features and methodological practices, and compared them with CUAs focusing on non-Asian countries (non-Asian CUAs) from 2000 to 2012. **Results:** We identified 175 published CUAs pertaining to Asian populations (representing 5.1% of all CUAs) from 2000 to 2012. The number has increased from 19 CUAs in the period 2000 to 2004 to 107 CUAs in the period 2009 to 2012. Roughly one-third focused on Japan (33.1%), followed by Taiwan (15.4%), China (14.9%), and Thailand (8.0%). The diseases targeted in Asian CUAs were cancer (24.6%), infectious diseases (13.7%), cardiovascular diseases (8.6%), and musculoskeletal and rheumatological diseases (5.7%). More Asian CUAs evaluated primary prevention interventions (e.g., vaccinations and screenings) compared with

non-Asian CUAs (21.7% vs. 16.5%, $P = 0.069$). Compared with non-Asian CUAs, significantly more studies in Asia suggest that the health interventions examined provide reasonable value for money. Asian and non-Asian CUAs did not differ in adherence to good methodological practices, including clearly stating the perspective, discounting costs and quality-adjusted life-years, stating a time horizon, and correctly conducting incremental cost-effectiveness analysis. Asian CUAs, however, lagged in reporting sensitivity analyses, disclosing funding status, and currency year. **Conclusions:** The number of CUAs in Asia has grown steadily, with more than half focused on pharmaceuticals. The literature reveals that CUAs generally follow good methodological practices though areas for improvement exist.

Keywords: Asia, cost-effectiveness, cost-utility analysis, quality-adjusted life-year.

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Introduction

Economic evaluations such as cost-utility analyses (CUAs) and cost-effectiveness analyses have been widely used by many developed countries for coverage and reimbursement decisions [1]. CUAs show the relationship between the resources used (costs) and the health benefits achieved (measured as quality-adjusted life-years [QALYs]) for an intervention compared with an alternative strategy. Because CUAs allow for comparisons across a broad spectrum of interventions, conditions, and populations, such tools are useful to aid health care decision making. However, in most Asian countries, formal adoption of CUAs remains in its infancy. Many factors such as lack of relevant data, resources, expertise, and lack or delayed willingness among stakeholders and other decision makers to accept economic evaluation information contribute to the delay in using cost-effectiveness evidence in health care decision making [2,3].

Over the last decade, rising health care expenditures in Asia have accelerated the understanding and implementation of economic evaluations of health care interventions [1,4]. Many

Asian countries are taking steps toward using economic information and evidence-based frameworks for health care decision making [2–4]. For example, in South Korea, the National Evidence-based Healthcare Collaborating Agency (NECA) has been set up to review evidence on health economics [1,3–5]. In Taiwan, the Center of Drug Evaluations reviews health technology assessments (HTAs) for pricing and reimbursement of medical technologies [1,3]. Thailand has established the Health Intervention & Technology Assessment Program for reviewing evidence on health economics before reimbursement [6]. In addition, China has established guidance on pharmacoeconomics and currently academic researchers are focusing on the implementation and utilization of the guidelines [3,6,7]. From 1998 to 2007, the number of published HTA studies in China has increased from 91 to 421 [8]. The establishment of the International Society of Pharmacoeconomics and Outcomes Research Asia Consortium has provided the Asian countries with a platform to discuss the development and integration of pharmacoeconomics in health care decision making [3].

Conflict of interest: The authors have indicated that they have no conflicts of interest with regard to the content of this article.

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A 2004 study by Doherty et al. [2] reviewed the present state of pharmacoeconomics in Asia and predicted increased use of health economics in the future. To date no systematic review to our knowledge has examined CUAs targeting Asian populations. This study will assist in understanding the current landscape of economic evaluations such as cost-utility studies in Asian countries, along with providing a valuable portrait of the trends, quality of studies, and areas for improvement.

Methods

The Tufts Medical Center Cost-Effectiveness Analysis Registry

We examined data from the Tufts Medical Center Cost-Effectiveness Analysis (CEA) Registry (www.cearegistry.org), which contains detailed information on more than 3700 English-language CUAs in peer-reviewed journals, with more than 10,300 incremental cost-effectiveness ratios (ICERs) and 14,200 utility weights. Detailed information on the methodology of literature search and data extraction has been reported elsewhere [9,10]. Briefly, we used the keywords “QALYs,” “quality-adjusted,” and “cost-utility analysis” to search MEDLINE for English-language publications. Abstracts returned from the search were screened to deem whether the study contains original cost-utility analysis. Systematic reviews, editorials, non-English CUAs, and other studies purely focused on methods are excluded from the registry.

Two trained reviewers independently reviewed articles that met the inclusion criteria. The standardized data collection forms broadly collect data on the methodology, cost-effectiveness ratios, health utilities, and overall quality of the study. The form was developed using “checklists” recommended by the Panel on Cost-Effectiveness in Health and Medicine [11], and other commonly adopted guidelines and recommendations on collecting cost-effectiveness information [12,13]. Reviewers received a manual entailing the details of the review process to maintain uniformity in the data collected.

The data collection forms are used to collect data over 40 variables pertaining to study sponsorship, discounting, time horizon, sensitivity analyses, target population along with the intervention and comparator, ICERs, and health utilities from published CUAs. CEA registry reviewers also assign a subjective quality score for each article (from 1 [low] to 7 [high]), which is based on factors such as whether articles present a correct computation of the ICERs, a comprehensive characterization of uncertainty, an explicit specification of assumptions, and an appropriate and explicit estimation of utility weights. ICERs were expressed as 2013 US dollars per QALY using exchange rates for

currency conversion and the consumer price index to adjust for inflation.

Sample Selection and Data Analysis

We identified English-language CUAs pertaining to Asian countries (Asian CUAs) published from 2000 through 2012 and summarized key study features such as country of study, study sponsorship, author affiliation, disease category, perspective, discount rate, prevention stage, and quality scores. Fig. 1 presents the search strategy and sample selection process along with a consort diagram. To evaluate their adherence to methodological standards in the field, we reported the proportion of Asian CUAs that 1) clearly state the study perspective, 2) discount costs and QALYs, 3) clearly state the time horizon for the analysis, 4) state the year of currency for the reported cost-effectiveness ratios, 5) disclose the study funder, 6) correctly conduct the ICER calculation, 7) include acceptability curves, and 8) state whether the study performed sensitivity analyses including the types of sensitivity analyses. These criteria for determining adherence to methodological and reporting practices were based on published recommendations [13,14].

We used the chi-square test to compare Asian CUAs with CUAs from all other countries (non-Asian CUAs) with respect to adherence to good methodological practices, average quality scores, and the distribution of ICERs (as expressed as \$2013/QALY). We also compared the proportion of studies that report high-value and low-value services in Asian and non-Asian CUAs. “High-value” services were defined as cost-saving interventions (improved health and decreased health costs) and interventions with an ICER of less than \$50,000/QALY; “low-value” services were defined as dominated interventions (increased costs and worsened health) and interventions with an ICER of more than \$100,000/QALY. ICERs for interventions with lower costs and lower QALYs were excluded from this sample (n = 127). All statistical analyses were performed using SAS 9.3 software (SAS, Cary, NC).

Results

Of the 3414 CUAs published from 2000 to 2012, 175 (5.1%) pertained to Asian countries and contained 483 ICERs and 667 utility weights. The number of published Asian CUAs has increased over the past decade, from 19 CUAs in the period 2000 to 2004 to 107 CUAs in the period 2009 to 2012. Roughly one-third of the CUAs focused on Japan (n = 58, 33.1%), followed by Taiwan (n = 27, 15.4%), China (n = 26, 14.9%), Thailand (n = 14, 8.0%), and South Korea (n = 12, 6.9%) (Fig. 2). A total of 3239

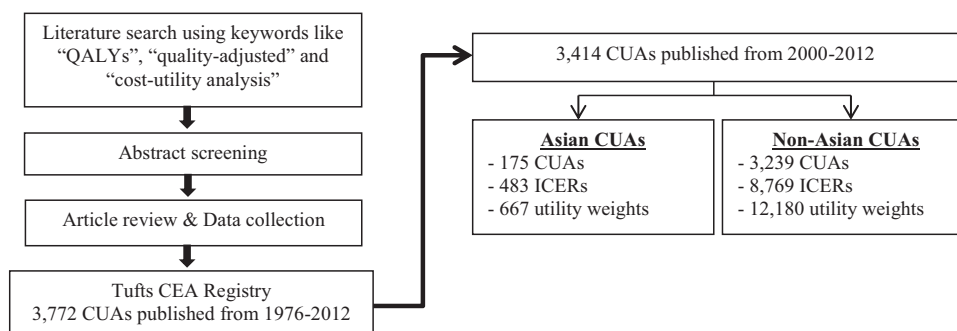


Fig. 1 – Search strategy and sample selection process. CEA, cost-effectiveness analysis; CUA, cost-utility analysis; ICERs, Incremental cost-effectiveness ratios; QALY, quality-adjusted life-year.

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