Cost-effectiveness Studies of Medical Interventions for Breast Cancer: An International Comparison

Adora D. Holstein
Robert Morris University

ABSTRACT

This study extracted 148 cost-effectiveness studies pertaining to breast cancer in 22 countries from an international registry of peer-reviewed publications and results of clinical trials compiled by the Center for Evaluation of Value and Risk in Health at Tufts University. Cost effective analysis of alternative medical interventions is used by public health care decision-makers in many countries as one of many factors in determining reimbursement or in allocating limited health care resources. It is a modified cost-benefit analysis where benefit in terms of health outcome is not measured in monetary terms. Instead, the gain in quality-adjusted life year (QALY) is measured by the extension in the patient's years of life resulting from a medical intervention weighted on a continuum between 0 (dead) and 1 (best possible health state). Weights are generated from the person's ability to function in five dimensions: mobility, pain/discomfort, self-care, anxiety/depression, and ability to engage in usual activities. When comparing a new medical intervention that may be more expensive but possibly more effective than an existing one, the direct costs of treatment are compared to arrive at an incremental cost- effectiveness ratio (ICER) per QALY gained. If the ICER is below the rejection threshold, the new intervention is said to be cost-effective.

The U.S. accounts for almost 40% of all ICER studies reviewed, although it ranks second to last among 22 countries in the government's share of total health care expenditure. This study finds that it is the total health care dollars spent relative to GDP or the population that has a higher correlation with the interest in ICER research. Excluding the U.S. as an outlier, however, countries with a single payer health system account for more ICER studies than those without. There is a high degree of similarity across countries in treatment guidelines for breast cancer. Medical interventions range from (a) Prevention through hormone therapy for high-risk women identified through genetic test or family history; (b) Screening through mammogram, ultrasound or MRI; (c) Primary treatment through surgery (lumpectomy or mastectomy) with sentinel node biopsy to determine if metastasis has occurred; (d) Adjuvant treatment (radiotherapy, chemotherapy, targeted therapy) guided by genetic analysis to determine responsiveness to chemotherapy and the risk of recurrence; and (e) Reduction of recurrence through five-year hormone therapy and periodic imaging. The top four focus of ICER studies are alternatives in hormone therapy, chemotherapy, targeted therapy, and screening. There is no difference in focus between countries with, and without, a single payer system. Countries with significant ethnic minorities (US, UK, Canada, the Netherlands, France, Australia) have more ICER studies on average, but none of the studies discriminate effectiveness of medical interventions by ethnicity. Studies done in four Asian provide an alternative route to this determination, but the data is very sparse. This study finds no public health care authority in any country has an explicit rejection threshold, and implicit thresholds vary significantly across countries, with some indication that it is lower in countries with a single-payer health system. Although the Affordable Care Act prohibits the use of cost effectiveness to determine reimbursement decisions in the U.S., such an evaluation can be used by to design economic incentives to steer health care dollars towards cost-effective diagnosis and treatment.