Cost-effectiveness analysis of endometrial cancer prevention strategies for obese women

Kwon JS, Lu KH

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study examined the cost-effectiveness of oral contraceptives for five years and annual or biennial screening in a clinic, using endometrial biopsy, from age 30, as endometrial cancer prevention strategies in obese women. The authors concluded that oral contraceptives and screening were not cost-effective prevention strategies in this patient population. The study was generally well conducted and, despite a limited assessment of the model uncertainty, the authors’ conclusions appear to be robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the cost-effectiveness of oral contraceptives or screening for endometrial cancer prevention in obese women, with a body mass index of over 30.

Interventions
The four strategies were: no prevention; oral contraceptive pills for five years starting at age 30; annual screening, at a clinic, using endometrial biopsy, from age 30; biennial screening from age 30.

Location/setting
USA/secondary care and community.

Methods
Analytical approach:
The analysis was based on a Markov model, with a lifetime horizon. The authors stated that a societal perspective was adopted.

Effectiveness data:
The clinical evidence appears to have been derived from a selection of known, relevant sources. For example, the incidence rates for endometrial cancer were taken from the Surveillance Epidemiology and End Results (SEER) database, while the reduction in the risk of endometrial cancer with oral contraceptives was taken from population-based studies. Few details were given on the studies that supplied the other model inputs. The key clinical input was the disease incidence.

Monetary benefit and utility valuations:
Not included.

Measure of benefit:
Life-years (LYs) were the summary benefit measure and were discounted at an annual rate of 3%.

Cost data:
The economic analysis included two main cost categories: the costs of screening (transvaginal ultrasonography and endometrial biopsy) and the cost of endometrial cancer surgery. Patient costs (the time spent in consultations, transport to and from clinic, and time off work) and hospital costs (drugs, medical supplies, surgical, ward, nursing, health care staff, heat, electricity, and professional and technical fees) were included. The costs of additional radiotherapy or chemotherapy were not considered. All costs were derived from various US sources, such as Medicare reimbursement.
rates, the Agency for Healthcare Research and Quality report on hospital and ambulatory surgery care for women's cancers, average wholesale prices, the Bureau of Labor Statistics, and official gasoline costs. The costs were in US dollars ($) and the price year was 2006. Future costs were discounted at an annual rate of 3%.

Analysis of uncertainty:
A Monte Carlo simulation of 100,000 women was undertaken to estimate the total number of endometrial cancer cases and the additional adverse cardiovascular events attributable to oral contraceptives.

Results
The discounted costs were $1,485 with no intervention; $4,117 with oral contraceptives; $17,733 with biennial screening; and $27,567 with annual screening. The LYs were 26.7177 with no intervention; 26.7242 with oral contraceptives; 26.7277 with biennial screening; and 26.7349 with annual screening.

The incremental analysis showed that when compared with the next less effective strategy, the incremental cost per LY gained was $404,465 with oral contraceptives, $3,879,659 with biennial screening, and $1,352,486 with annual screening. None of these strategies had an incremental cost-effectiveness ratio below the commonly used threshold of $50,000 per LY gained.

The sensitivity analysis showed that these base-case results were robust. The relative risk of endometrial cancer in obese women had to be 13 times greater than that of the general population before oral contraceptives became cost-effective; the risk was three times greater in the base case.

The Monte Carlo simulation showed that oral contraceptives prevented 20% of endometrial cancer cases and annual screening prevented the highest number of cases over a lifetime. There were an additional 27 acute myocardial infarctions, 39 strokes, and 143 venous thrombolytic events, attributable to oral contraceptive pills.

Authors' conclusions
The authors concluded that oral contraceptive pills and screening were not cost-effective prevention strategies in obese women.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear as the available and recommended strategies for the prevention of endometrial cancer were considered and compared with a background option of no intervention, which was the usual pattern of care in some settings. Combination strategies, such as oral contraceptives with aspirin, were not included, but the authors discussed their potential greater efficacy.

Effectiveness/benefits:
Limited information was provided on the sources used to derive the clinical evidence. The SEER database should be a valid source, given its ability to be representative and its strengths, but the methodological characteristics of the other sources were not reported. The selection of sources aimed to include the most relevant data for the model, but systematic searches are generally considered to be a more robust approach. The authors did not explicitly address issues related to the use of data from various sources that might be heterogeneous. LYs were an appropriate benefit measure as they capture the impact of the interventions on survival, which is the main health issue for this patient population. The authors stated that survival could not be quality adjusted due to the uncertainty around the quality of life associated with obesity and being at risk of endometrial cancer. Discounting was applied at the recommended rate.

Costs:
The analysis of costs included a very broad range, which was consistent with the adoption of a societal perspective. The sources and some key unit costs were reported. Typical US sources were used and the resource consumption was likely to reflect conventional treatment patterns in the authors' setting. The impact of variations in the cost estimates was not clearly investigated and no statistical tests were carried out on the cost inputs.

Analysis and results:
The analytic approach used to synthesise the costs and benefits was appropriate. All the model outputs were clearly presented and discussed. The issue of uncertainty was only partially investigated as the sensitivity analyses focused on the clinical outcomes. The authors acknowledged some limitations of their analysis, such as the use of population-based studies for most of the model inputs, given the lack of more robust studies in the literature. It was noted that the preventive strategies could be cost-effective in only very high-risk patients.

**Concluding remarks:**
The study was generally well conducted and, despite a limited assessment of the model uncertainty, the authors’ conclusions appear to be robust.

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The Cancer and Steroid Hormone Study of the Centers for Disease Control and the National Institute of Child Health and Human Development. Combination oral contraceptive use and the risk of endometrial cancer. JAMA 1987; 257: 796-800.


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