A cost-benefit analysis of smoking cessation programs during the first trimester of pregnancy for the prevention of low birthweight

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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.

Health technology
Smoking cessation programmes, offering primarily education and support for the prevention of low birthweight babies.

Type of intervention
Primary prevention

Economic study type
Cost-effectiveness analysis.

Study population
American women in the first three months of pregnancy who participated in the 1988 National Health Interview Survey.

Setting
Primary care. The economic study was based in USA.

Dates to which data relate
Prices related to 1989. Effectiveness and resource dates were not specified.

Source of effectiveness data
Synthesis of various cessation programme reports.

Modelling
A decision tree was used to estimate costs.

Outcomes assessed in the review
Smoking cessation and birthweight.

Study designs and other criteria for inclusion in the review
Programme effectiveness was estimated using smoking cessation progress reports. Baseline values for birthweight and spontaneous smoking cessation rates were taken from the 1988 National Health Interview Survey.

Sources searched to identify primary studies
Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Not stated.

Methods of combining primary studies
Synthesis by unweighted mean.

Investigation of differences between primary studies
Not stated.

Results of the review
Previous studies have showed rates of smoking cessation with programs from 9-27%. The midpoint rate of 18% was used. The 1988 Health Interventions Survey reported that 37% of pregnant women stopped smoking in the first trimester without any formal smoking cessation program. Low birthweight babies were produced in: 5.5% of all pregnancies of non-smokers; 7.8% of pregnancies of women who quit in the first trimester; 9.6% of pregnancies of women who smoked beyond the first trimester.

Measure of benefits used in the economic analysis
Smoking cessation.

Direct costs
The boundary for direct costs was the health service. Costs were given per birth of normal and low birthweight infants and included the costs of prenatal care and delivery. Costs were derived using a decision tree. Price related to 1989.

Currency
US dollars.

Sensitivity analysis
Sensitivity considered analysis of extremes in terms of variation in smoking cessation effectiveness.

Estimated benefits used in the economic analysis
Clinical studies have shown rates of smoking cessation with programs from 9-27%. The midpoint rate of 18% was used.

Cost results
If no smoking cessation program was instituted the average prenatal and delivery costs per smoker who presented in the
first trimester were found to be $6,402. The intervention costs were expressed as functions of the effectiveness rates (see the next field).

Synthesis of costs and benefits
The break-even points which made the programme a dominant strategy with respect to no programme were calculated by the authors. If 18% of smokers quit (who would not otherwise) cessation programs costing less than $84 per participant appeared cost-effective. Programme cost-effectiveness was highly sensitive. If only 3% quit, the break-even point is $14 per participant. If 29% quit, programmes costing up to $135 are cost effective. As the baseline spontaneous smoking-cessation rate decreased, the break-even cost for programmes of equal effectiveness increased.

Authors' conclusions
Programmes costing $80 or less are cost-effective when the impact of smoking cessation on frequency of low birthweight is the primary outcome. Where few women spontaneously stop smoking early in pregnancy, programmes may be cost effective even if they are not extremely efficacious.

CRD Commentary
The authors identified limitations to their analysis.

1) Only a single outcome was considered. If other adverse effects of smoking on babies were included, the cost effectiveness of smoking cessation programmes increased.

2) Cost and complication rates were averages and not adjusted for potential effect modifiers.

3) The study focused only on the short term positive effect of smoking cessation on pregnancy outcomes and underestimated true cost effectiveness.

4) The model was limited to smoking cessation achieved only in the first trimester.

Moreover a) The research method of the effectiveness data should have been reported in more detail and the method of synthesis for these data should have been more rigorous.

b) Insufficient detail was given for calculations of health service costs for the care of low and normal birthweight babies.

c) External validity was dependent on female smoking rates and cost structure in other countries.

d) The economic study type was not a cost-benefit analysis, as the authors stated, but a cost-effectiveness analysis, since benefits were not expressed in monetary terms.

Bibliographic details

PubMedID
7931114

Indexing Status
Subject indexing assigned by NLM

MeSH
Cost-Benefit Analysis; Decision Trees; Female; Humans; Infant, Low Birth Weight; Infant, Newborn; Pregnancy; Pregnancy Trimester, First; Primary Prevention /economics; Smoking /adverse effects; Smoking Cessation /economics
AccessionNumber
21995007024

Date bibliographic record published
22/06/1995

Date abstract record published
22/06/1995