Cost-effectiveness of levonorgestrel subdermal implants: comparison with other contraceptive methods in the United States
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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
Contraceptive methods including: condoms, diaphragms, oral contraceptives, intrauterine devices (IUD), medroxyprogesterone acetate suspension, levonorgestrel subdermal implants, tubal ligation and vasectomy.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Women of child-bearing age.

Setting
Primary care and hospital setting. The economic study was carried out in the USA.

Dates to which data relate
Effectiveness data were mainly extracted from studies published during the period 1987-93. The dates for resource data and price were not specified.

Source of effectiveness data
Synthesis of previous studies and other sources.

Outcomes assessed in the review
Failure rates.

Study designs and other criteria for inclusion in the review
The study reviewed published articles, physician surveys and manufacturers' package inserts. Published sources were only included if the methodology and sample size enabled the authors to conduct statistical significance tests.

Sources searched to identify primary studies
Not stated.
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
Mean failure rates (defined as unintended pregnancy) were calculated. Confidence intervals were calculated but not reported.

Investigation of differences between primary studies
Not stated.

Results of the review
The failure rates for the contraceptives were reported as follows: condom 12.02%; oral contraceptive 3.61%; IUD 0.6% (first year and 2.3% in the 8th years after); Progestin 2.9%; Diaphragm 15.07%; Tubal ligation 0.42%; Vasectomy 0.22%; Levonorgestrel implant 0.20% (first year and 1.6% in the 4th year).

Measure of benefits used in the economic analysis
Failure rates.

Direct costs
Costs and quantities were not reported separately. To allow for the different lengths of effectiveness and the spreading of initial costs over the whole period of effectiveness, the authors assumed all methods would be used for 5, 8 or 15 years. These costs were then discounted by 5% to calculate the present value.

Only health service costs were considered. These included: the cost of each contraceptive method; cost of treatment of adverse effects and the cost of failure (an unintended pregnancy). The cost of an unintended pregnancy was broken down into those pregnancies carried to full term, abortions and miscarriages. The savings accrued each year from the reduction in the rate of ectopic pregnancy, protection against benign breast/ovarian cysts, iron deficiency anemia, ovarian/endometrial cancer and pelvic inflammatory disease were considered to calculate the net direct cost.

The estimation of costs was based on actual data. The cost of each contraceptive was obtained from a variety of sources including manufacturers and retailers, average wholesale prices and physician surveys, and medical economic literature. The cost of treating adverse effects was based on claims filed by obstetricians and gynaecologists and average 1992 DRG reimbursement rates for hospitalisation for two US states (Massachusetts and New Jersey). Price data was not given.

Currency
US Dollars ($)

Sensitivity analysis
One-way and two-way simple sensitivity analysis were carried out to test the robustness of the model with respect to:
delivery cost; mean probability of failure; product cost of medroxyprogesterone and changing monitoring costs.

**Estimated benefits used in the economic analysis**
The failure rates for the contraceptives were reported as follows: condom 12.02%; oral contraceptive 3.61%; IUD 0.6% (first year and 2.3% in the 8th year after); Progestin 2.9%; Diaphragm 15.07%; Tubal ligation 0.42%; Vasectomy 0.22%; Levonorgestrel implant 0.20% (first year and 1.6% in the 4th year).

**Cost results**
Based on the 15 years of use (discounted to present value of 5%), total costs ranged from $587 for vasectomy to $11,900 for diaphragm. Costs of Levonorgestrel implants was $2,188. The incremental cost of each method in comparison to vasectomy was: IUDs and Levonorgestrel subdermal implants were 2-3 times more costly; medroxyprogesterone acetate suspension and oral contraceptives were 6-7 times more costly and condoms and diaphragms were 13-19 time more costly. The cost per patient per year ranged from $55 for vasectomy to $1,147 for diaphragm. Levonorgestrel cost $202 per patient per year.

**Synthesis of costs and benefits**
No cost-effectiveness ratio was given.

**Authors' conclusions**
Vasectomy was the most cost-effective non-reversible contraceptive treatment and IUD the most cost-effective reversible method, followed by Levonorgestrel implants. This ranking appears robust to the sensitivity analysis.

**CRD Commentary**
The costing methodology used is generally quite accurate. However, the study failed to adequately document a number of key features: a) more information is needed on the search strategy used in the literature review; b) greater detail is needed on the source of cost information, particularly for the beneficial effects of contraception c) IUD was not more cost-effective than Levonorgestrel implants. The analysis should provide the incremental cost-effectiveness ratio of the former versus the latter.

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