Cost savings from emergency contraceptive pills in Canada
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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
The use of emergency contraceptive pills (ECPs) for women after unprotected sexual intercourse, in order to prevent unwanted pregnancy.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The hypothetical study population comprised women who had had unprotected sexual intercourse, either because they used contraceptive methods perfectly but these failed, or because of an imperfect use, or because they did not use them at all. The women included were those using barrier methods, spermicides, periodic abstinence, and withdrawal. Women using oral contraceptives who missed the pills were excluded.

Setting
The setting was primary and secondary care. The economic study was carried out in Canada.

Dates to which data relate
The dates to which the effectiveness evidence, resources used and prices used referred were not reported.

Source of effectiveness data
The estimates for the effectiveness data were derived from a review of published studies.

Modelling
A model was used to estimate the cost-savings of ECPAUI and ECPAP. The type of model used was not specified. Two models were employed to calculate the cost-savings of ECPAUI and ECPAP. The base model (averted-birth model) assumed that births prevented today would not occur later. The authors stated that this model overstated the medical costs. Therefore, they employed a second model (delayed-birth model) assuming that an unwanted birth, if avoided today, would never occur later but that a mistimed birth, if avoided today, would occur 2 years later. To estimate the cost-savings of ECPAP it was assumed that three packs of ECPs (either Preven or Plan B) were provided to each woman. Two scenarios (consistent and inconsistent use) were estimated for each of the two models. In the first scenario, ECPs were used after all unprotected acts of intercourse (consistent use). In the second scenario, ECPs were used after three-quarters of all unprotected acts of intercourse (inconsistent use).
Outcomes assessed in the review
The following outcomes were assessed in the review:

the probability of preventing pregnancy with ECPs (both Preven and Plan B);

the probabilities of ectopic pregnancy, induced abortion, spontaneous abortion, and birth for unintended pregnancies;

the probability that a prevented unintended birth would not occur later;

the annual probabilities of pregnancy during typical and perfect use of contraceptive methods (male condom, female condom, diaphragm, cervical cap in parous and nulliparous women, sponge, spermicides, withdrawal, and periodic abstinence);

the annual probabilities of pregnancy with ECPs (both Preven and Plan B) for each kind of contraceptive method used and for each of the two scenarios, consistent and inconsistent use.

Study designs and other criteria for inclusion in the review
Not stated.

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
At least 9 primary studies were included in the review.

Methods of combining primary studies
The effectiveness estimates were not combined. A narrative method was used to present the estimates. It was stated that the probability of pregnancy for perfect use of the sponge was incorrectly estimated in the primary study. An arbitrary value was therefore chosen in order to diminish the resulting bias.

Investigation of differences between primary studies
Not stated.

Results of the review
The prevention of pregnancy with ECPs was 74% for Preven and 89% for Plan B.

The probability of ectopic pregnancy was 1%, induced abortion 51%, spontaneous abortion 12%, and birth for unintended pregnancies 37%.

The probability that a prevented unintended birth would not occur later was 30%.

The annual probabilities of pregnancy during typical use of the different contraceptive methods were: male condom
14%, female condom 21%, diaphragm 20%, cervical cap in parous women 40%, cervical cap in nulliparous women 20%, sponge 23%, spermicides 26%, withdrawal 19% and periodic abstinence 25%.

The annual probabilities of pregnancy during perfect use of the different contraceptive methods were: male condom 3%, female condom 5%, diaphragm 6%, cervical cap in parous women 26%, cervical cap in nulliparous women 9%, sponge 13%, spermicides 6%, withdrawal 4%, and periodic abstinence 9%.

The annual probabilities of pregnancy with consistent use of Preven ECPs, for each contraceptive method, were: male condom 4%, female condom 5%, diaphragm 9%, cervical cap in parous women 26%, cervical cap in nulliparous women 11%, sponge 14%, spermicides 10%, withdrawal 7%, and periodic abstinence 12%.

For inconsistent use, these probabilities were: male condom 6%, female condom 9%, diaphragm 12%, cervical cap in parous women 29%, cervical cap in nulliparous women 13%, sponge 16%, spermicides 14%, withdrawal 10%, and periodic abstinence 15%

The annual probabilities of pregnancy with consistent use of Plan B ECPs, for each kind of contraceptive method, were: male condom 2%, female condom 2%, diaphragm 7%, cervical cap in parous women 23%, cervical cap in nulliparous women 9%, sponge 12%, spermicides 7%, withdrawal 5%, and periodic abstinence 9%.

For inconsistent use, these probabilities were: male condom 5%, female condom 7%, diaphragm 10%, cervical cap in parous women 27%, cervical cap in nulliparous women 11%, sponge 15%, spermicides 12%, withdrawal 8%, and periodic abstinence 13%.

Measure of benefits used in the economic analysis
No summary of health benefit was used in the economic analysis. Therefore, a cost-consequences analysis was performed.

Direct costs
The resource quantities and the costs were not reported separately. The only costs that the authors considered were those associated with medical care. The direct costs included in the costs analysis were the average cost of an unintended pregnancy for both the averted and the delayed-birth model, the cost of Preven, the cost of Plan B, and the cost of a physician visit. The average cost of an unintended pregnancy was calculated as the weighted average of the average costs of a birth, a spontaneous abortion, an ectopic pregnancy and an induced abortion. The weights were equal to the probabilities of each one of these outcomes for unintended pregnancies.

The cost-savings were calculated as the savings (in Can$) for each dollar spent in ECPs. The cost data were obtained from the British Columbia Ministry of Health. Therefore, the costs were estimated from actual data. Discounting was not considered in the estimation of the averted-birth model because the costs were incurred over a period of less than 2 years. However, as the estimation of the delayed-birth model considered those costs incurred over a 2-year period, the average cost of an unintended birth was discounted at an annual rate of 5%. The date to which the price data referred was not reported.

Statistical analysis of costs
No statistical analysis of the costs was reported.

Indirect Costs
The indirect costs were not included.

Currency
Canadian dollars (Can$).
Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
For ECPAUI, the cost of the Preven-based regimen was $31.53, while the cost of the Plan B-based regimen was $42.48.

Under the averted-birth model, the cost-savings were $2.35 for Preven and $2.09 for Plan B. Under the delayed-birth model, the cost-savings were $1.34 for Preven and $1.19 for Plan B.

For ECPAP, the costs and cost-savings depended on the regular contraceptive method used, on how consistently ECPs were used when needed, and whether mistimed births were permanently averted or simply delayed.

The cost-savings obtained with Preven were greater than those obtained with Plan B for every modality studied. The cost-savings were also greater for the averted-birth model than for the delayed-birth model, and for consistent use of ECPs in comparison with inconsistent use.

The biggest cost-savings for ECPAP were found for Preven under a consistent use of ECPs in the averted-birth model. The cost-savings varied from $12.23 for parous women using a cervical cap to $2.90 for women using a sponge.

On the other hand, the smallest cost-savings for ECPAP were found for Plan B under inconsistent use of ECPs in the delayed-birth model. The cost-savings were very small, varying from $1.96 for parous women using a cervical cap to $0.83 for women using a sponge.

Synthesis of costs and benefits
Not applicable given that a cost-consequences analysis was performed.

Authors' conclusions
Emergency contraceptive pills (ECPs) are generally cost-saving, independently of whether they are provided after unprotected intercourse (ECPAUI) or in advance (ECPAP), thus reducing expenditures on medical care by preventing unintended pregnancies.

CRD COMMENTARY - Selection of comparators
The comparators used were justified on the grounds that Preven and Plan B were the ECPs available in Canada. You should consider how relevant these technologies are to your own setting.

Validity of estimate of measure of effectiveness
The authors did not state that a systematic review of the literature had been undertaken. The data on the effectiveness of ECPs were obtained from some published studies, but the results from these primary studies were not combined. The authors did not report the differences between the primary studies when estimating effectiveness. They also did not provide evidence of a systematic approach to identify, select and synthesise appropriate studies. Therefore, it was not shown how reliable the primary studies considered in the analysis were with regards to the study question.

Validity of estimate of measure of benefit
The authors did not derive a summary measure of health benefit. The analysis was therefore categorised as a cost-
consequences study.

**Validity of estimate of costs**
The authors considered only those costs associated with medical care and ignored all nonmedical costs. The medical costs associated with the side effects of ECPs were not included. The costs and the quantities were not reported separately thus reducing transparency. Moreover, the costs were obtained from only one of the Canadian provinces. All these facts tend to weaken the generalisability of the results to other settings. The lack of a price year also hinders reflation exercises to other settings.

A sensitivity analysis was not performed, and thus the interpretation of the study's findings may be limited. However, cost-savings were found independently of the estimated model (averted and delayed-birth models) and the level of consistency in the use of ECPs. Therefore, the results seem to have been robust for the effectiveness data provided.

No statistical analysis of the costs was carried out. Therefore, we cannot be sure whether there are statistically significant differences between the cost-savings from alternative ECPs or protocols, and whether some of these cost-savings are significantly different from zero.

**Other issues**
The authors did not make appropriate comparisons of their findings with those from other studies. In addition, the issue of generalisability of the results to other settings was not addressed. The authors appear to have presented their results selectively in terms of the literature review and the costing. The authors’ conclusions reflect the scope of the analysis.

The authors reported several limitations of their study. Firstly, the use of effectiveness data from USA when Canadian data were unavailable. In particular, when there were important differences in population, for example, the proportion of unintended births or contraceptive failure rates. Secondly, the cost-savings estimated for ECPs were likely to have been understated for those assumptions associated with the modelling of the costs and the effectiveness data.

**Implications of the study**
The findings of the study suggest that a more extensive use of ECPs could save considerable medical costs by reducing unintended pregnancies. However, the study could have been reported more comprehensively.

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None stated.

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**Other publications of related interest**


**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
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