A comparison of the cost-effectiveness of in vitro fertilization strategies and stimulated intrauterine insemination in a Canadian health economic model

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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.

CRD summary
The aim was to examine the cost-effectiveness of two in vitro fertilisation (IVF) strategies compared with gonadotrophin-stimulated intra-uterine insemination, in Canada. The authors concluded that double embryo transfer IVF was the most cost-effective strategy and this was insensitive to changes in the success rates and IVF costs. There were limitations to the study, concerning both the data and the methodology, and for this reason the authors' conclusions should be considered with a degree of caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The aim was to examine the cost-effectiveness of two in vitro fertilisation (IVF) strategies compared with gonadotrophin-stimulated intra-uterine insemination (sIUI), in Canada. The two IVF strategies were single embryo transfer (SET) and double embryo transfer (DET).

Interventions
SET IVF was compared with DET IVF and with sIUI, in women under 36 years old.

Location/setting
Canada/outpatient care.

Methods
Analytical approach:
A Markov model was used to synthesise the data from published randomised controlled trials and observational studies. The authors did not specify the exact time period of the analysis, but did state that a maximum of three IVF treatments were allowed and that the perspective was that of the public payer.

Effectiveness data:
The evidence came from a wide range of sources including published literature, informed clinicians, and expert opinion. The clinical estimates included the pregnancy rate, delivery, singleton and twin births, higher-order multiple births, Caesarean section, and infant kept in neonatal intensive care unit.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit used was the number of live births.

Cost data:
Only the short-term costs were included in the analysis and the costs of complications, arising from multiple births, were not included. The costs included physician fees, hospitalisation, infertility treatment, and drug costs. The unit costs were presented, with their sources. The data on resource use and valuations were derived from fertility clinic website prices for drugs, expert opinion, and a cost of birth report published online (Canadian Institutes for Health Information).
2006, see ‘Other Publications of Related Interest’ below for bibliographic details). The prices were given in Canadian dollars (CAD) and no price year was stated.

**Analysis of uncertainty:**
The uncertainty was addressed by conducting scenario analyses using the high and low values of both probabilities and costs. Additionally, extensive one-way and two-way sensitivity analyses were conducted on the costs.

**Results**
The average cost-effectiveness ratio of DET IVF was CAD 14,409 per live birth. For sIUI, it was CAD 66,960 per live birth and, for SET IVF, it was CAD 109,385 per live birth.

These results were insensitive both to changes in the cost of IVF cycles and the success rates.

**Authors’ conclusions**
The authors concluded that DET IVF was the most cost-effective strategy and SET IVF was the least cost-effective, in the short term only, for assisted reproduction, for infertile couples, in Canada.

**CRD commentary**

**Interventions:**
The interventions were clearly reported, and their selection was justified. The study was thorough in its coverage of these interventions in its setting.

**Effectiveness/benefits:**
Although the sources of the literature were given, neither the methods used to identify the primary studies, nor the inclusion criteria were reported. Therefore, it is difficult to ascertain if the best available evidence was used. The transition probabilities were clearly reported and referenced.

**Costs:**
The short-term medical costs were included and appear to have been appropriate for the payer perspective and scope taken. The authors acknowledged the limitation that they did not include any downstream or indirect expenses related to miscarriages, maternal morbidity, or other complications. The sources of the resource use data and per cycle costs were clearly presented. However, the price year was not stated, and the authors did not report whether any inflationary or other cost adjustments were applied and this will hinder any future reflation exercises.

**Analysis and results:**
The average cost-effectiveness ratios were reported, whereas the incremental costs and effects, and incremental cost-effectiveness ratios would have been more appropriate to illustrate the additional gains and costs across the various options. In practice, average ratios should not be used to represent cost-effectiveness. The results of the sensitivity analyses were well reported and illustrated. The impact of uncertainty on the base-case findings was discussed at length, and the model was robust to changes in input values and scenarios. The generalisability of the results to other settings, and the limitations of the economic model were identified and discussed, including the omission of downstream payer costs and other societal costs, and the use of European efficacy data and their impact on the model outcomes.

**Concluding remarks:**
There were a few limitations to the study, concerning both the data and the methodology, and for this reason the authors' conclusions should be considered with a degree of caution.

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**Bibliographic details**
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Other publications of related interest

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