Fertility preservation for social indications: a cost-based decision analysis

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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 study examined cost-effectiveness of fertility preservation for women planning delayed childbearing until age 40, including oocyte cryopreservation or ovarian tissue cryopreservation at age 25 and no cryopreservation. The authors concluded that no action was the most cost-effective strategy for a 25-year-old woman interested in future fertility at age 40. The analysis used a typical cost-effectiveness framework based on evidence from published sources whose methodological quality was not described. The authors’ conclusions appear robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The study examined the cost-effectiveness of three strategies of fertility preservation for women planning delayed childbearing until age 40, including oocyte cryopreservation at age 25, ovarian tissue cryopreservation (OTC) at age 25, and no cryopreservation and in vitro fertilisation (IVF) if spontaneous conception at age 40 was unsuccessful.

Interventions
The three strategies under examination were oocyte cryopreservation at age 25, OTC at age 25 and no cryopreservation followed by standard IVF if spontaneous conception at age 40 was unsuccessful. In the two cryopreservation strategies oocytes or OTC with the use of the ovary were used in the case of unsuccessful spontaneous conception at age 40.

Location/setting
USA. Tertiary care and fertility centre.

Methods
Analytical approach:
The analysis was based on a decision tree model. The time horizon of the study was from cryopreservation (age 25) to conception attempt (age 40) and thus appeared to be 15 years. The perspective adopted in the study was that of the third-party payer.

Effectiveness data:
Clinical inputs for the model were based on published sources. In general each model input was based on a single reference. Some assumptions were made. The probability of pregnancy rates after IVF procedures was a key input of the model.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
Rate of live birth was the summary benefit measure.

Cost data:
Costs of IVF (medications, hormone and embryology testing, visits, consultation, procedures, nurses, hospital services, anaesthesia and administration), cryopreservation, laparoscopic oophorectomy, tissue processing and frozen embryo transfer were included. Costs were taken from the published literature supplemented with estimates from the National Physician Cooperative (NPC), which includes specialised reproductive endocrinology centres. Specific cost-to-charge...
ratios were applied. Costs were in USA dollars ($). The price year was 2010. A 3% annual discount rate was used.

Analysis of uncertainty:
One-way sensitivity analyses were carried out to investigate the robustness of model outcomes using ranges of values based on the literature or on authors' assumption (±50% the base case estimate).

Results
The cumulative rate of live birth and total costs per patient were 0.7183 and $16,000 with no action taken at age 25, 0.7922 and $26,000 with oocyte cryopreservation and 0.7320 and $27,000 with OTC.

OTC was an inferior strategy as it was more expensive and less effective than oocyte preservation. The incremental cost per additional live birth with oocyte preservation over no action was $135,520.

The base case results were extremely robust as in no circumstances OTC turned out to be the preferred strategy.

Authors' conclusions
The authors concluded that the strategy of taking no action was the most cost-effective for a 25-year-old woman interested in future fertility at age 40.

CRD commentary
Interventions:
The selection of the comparators was appropriate as the analysis included the feasible strategies for women without a current partner who were interested in proactively delaying childbearing.

Effectiveness/benefits:
It appeared that a selective approach was used to identify relevant sources of data as no information on a literature review was provided. The authors did not give the details of these published sources so it was not possible to judge the quality of the evidence used in the model. It was stated that no clinical trials were available to compare these strategies and that use of clinical trials appeared difficult in this area.

The rate of live birth is the natural outcome of fertilisation strategies and represented a typical endpoint of these studies but did not allow comparisons with the benefits of other health care interventions.

Costs:
Cost categories included in the analysis reflected the perspective of the third-party payer stated by the authors. Most data were taken from the published literature and appeared specific to the USA context. Other data were obtained from national databases and institutes. Only macro-categories of costs were reported. Unit costs and resource use were not presented separately. Some costs were varied in a deterministic sensitivity analysis. The price year was reported. No discounting was applied.

Analysis and results:
The health and economic outcomes were clearly reported and were combined using an incremental approach, which was appropriate to exclude inferior strategies. The structure and main assumptions of the decision model were illustrated. A deterministic approach was used to deal with the issue of uncertainty; these results were reported clearly and showed the robustness of the model. The time horizon of the model was not clearly stated but presumably covered the period from cryopreservation to conception attempt. The study results were specific to the USA context and appeared difficult to transfer to other settings. The authors stated that study results might be biased against the no cryopreservation strategy as it was assumed that all women did not attempt to have a baby before age 40; at least some women would choose pregnancy before 40 and so the probability of conception would be higher.

Concluding remarks:
The analysis used a typical cost-effectiveness framework based on evidence from published sources whose methodological quality was not described. The authors’ conclusions appear robust.