Cost-effectiveness of midwifery services vs. medical services in Quebec
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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
A programme of midwifery services provided in birth centres for pregnant women at low obstetrical risk was studied.

Type of intervention
Midwifery services.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised women with a pregnancy duration of at least 20 weeks. Women were excluded if they transferred from the midwifery services to medical care because they met one or more exclusion criteria prior to 20 weeks. However, the exclusion criteria were reported elsewhere (see Other Publications of Related Interest).

Setting
The setting was the birth centre. The economic study was carried out in the province of Quebec, Canada.

Dates to which data relate
The effectiveness evidence and resource use data were gathered from January 1995 to July 1996. No price year was reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study, the main details of which were published elsewhere (see Other Publications of Related Interest).

Link between effectiveness and cost data
The costing was undertaken prospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations to determine the sample size were not performed. Of the 1,212 eligible cases, 1,000 women used midwifery services. These were compared with 1,000 women using hospital medical services. However, 39 records were unavailable and the final comparison was carried out for 961 pairs.

Study design
This was a cohort study with a randomised matched control group. The controls and cases were matched according to
their sociosanitary region, parity, age, civil status, educational level, and language. If matching was not possible on the basis of these characteristics, the level of obstetrical risk was used as the main factor for matching purposes. The study was carried out in seven project sites. The length of follow-up was not reported.

**Analysis of effectiveness**

It appears that all of the patients included in the study have been accounted for in the analysis. The primary health outcomes were:

- the site of birth;
- the number of women who required transfer to the hospital;
- the number of Caesarean sections;
- the frequency of third and fourth perineal tear;
- the requirement for more than 5 minutes' neonatal ventilation; and
- scores for quality of prenatal care, feeling control over delivery, quality of care during delivery, and self-confidence in caring for the baby.

Most of these outcomes were reported as being those which were statistically different across the groups. The study groups were comparable at baseline in terms of their age, distribution of parity, and obstetrical risk. However, they differed in terms of their educational level, spoken language, pre-pregnancy and postpartum weight, marital status, use of drugs or alcohol during pregnancy, and history of previous abortion.

**Effectiveness results**

The site of birth was the birth centre for 75% of the women in the midwifery group, since 23.8% were transferred to the hospital.

The proportion of Caesarean sections was 6% in the midwifery group and 13.2% in the physician group.

The frequency of third and fourth perineal tear was 1.7% in the midwifery group and 5.9% in the physician group.

The requirement for more than 5 minutes' ventilation at birth was higher in the midwifery group (1.5%) than in the physician group (0.7%).

All of the scores for quality of prenatal care, feeling control over delivery, quality of care during delivery, and self-confidence in caring for the baby, were statistically higher in the midwifery group than in the physician group.

**Clinical conclusions**

The results of the analysis appear to favour midwifery services over standard hospital-based physician services, especially in terms of a subjective client perspective. With the exception of one indicator, the health outcomes appear to have been more effective in the group of patients using midwifery services.

**Measure of benefits used in the economic analysis**

The health outcomes were left disaggregated and no summary benefit measure was used in the effectiveness analysis. A cost-consequences analysis was therefore carried out.

**Direct costs**

Discounting was not carried out due to the short timeframe of the study. The quantities of resources used were not
indicated and only the average costs were reported. The cost/resource boundary reflected the perspective adopted in the study. The cost items included in the study were those of relevance to the Ministry of Health (physician fees for mother and baby) and those of relevance to the regional board. Those relevant to the regional board were prenatal class, prenatal care in birth centres, consultation with non-physician providers, hospitalisations, neonatal intensive care, medication, and ancillary services for mother and baby. The costs were estimated using actual data, mainly derived from the provincial health care plan (RAMQ) database. The quantities of resources were estimated using actual data derived from the sample and measured from January 1995 to July 1996. No price year was reported.

**Statistical analysis of costs**
No statistical analysis of the costs was carried out.

**Indirect Costs**
The costs of time spent by women for consultation with non-physician providers, for medication, and transport-ambulance were included in the analysis. The Quebec minimum wage was used to price the woman's time and that of the relatives, friends and non-professionals who helped her.

**Currency**
Canadian dollars (Can$).

**Sensitivity analysis**
The authors stated that sensitivity analyses were performed on the consumption of services and on prices when some imprecision was apparent.

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

**Cost results**
The average costs per client relevant to the Ministry of Health were Can$342 in the midwifery group and Can$945 in the physician group.

The average costs per client relevant to the regional board were Can$1,699 in the midwifery group and Can$1,847 in the physician group.

The average costs per client relevant to the clients were Can$253 in the midwifery group and Can$229 in the physician group.

Overall, the average cost per client amounted to Can$2,294 (range: 2,062 - 2,930) in the midwifery group and Can$3,020 (range: 3,016 - 3,027) in the physician group.

**Synthesis of costs and benefits**
Not relevant.

**Authors' conclusions**
Midwifery services were slightly cheaper than physician services, but in some of the single pilot birth-centres, the cost ranges overlapped and thus the overall difference was not substantial. "Cost-effectiveness ratios were to the advantage of the midwifery group, except for one clinical indicator (neonatal ventilation)."
CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparator was clear. Hospital-based physician services were selected as representing the standard procedure for delivery. You should assess whether it represents a widely used health intervention in your own setting.

Validity of estimate of measure of effectiveness
The analysis of the effectiveness used a cohort study with a matched control group. Power calculations were not performed, but the sample size was very large. The study groups were not fully comparable at baseline. The authors acknowledged that the process of matching might have led to the selection of midwifery patients with better outcomes (selection bias), since a sub-group of women with a high risk of adverse perinatal outcome was excluded from the midwifery group. Statistical analyses were not carried out to take into account potential confounding factors. These issues could limit the internal validity of the analysis.

Validity of estimate of measure of benefit
No summary benefit measure was used in the economic analysis. This could make comparisons with other health technologies difficult. It would have been interesting had the authors assessed the health impact of the interventions on the patients' quality of life.

Validity of estimate of costs
The analysis of the costs was carried out from a societal perspective and detailed information was provided on the cost items included in the study. However, the unit costs and the quantities of resources used were not reported separately and no price year was given, thus reducing the generalisability to other settings. No statistical analysis was carried out on the quantities or costs. As the authors noted, the estimation of the costs was rendered difficult by the impossibility of dividing expenses by activity centres, since each birth centre received a global budget. Finally, only the short-term costs were considered.

Other issues
The authors made some comparisons of their findings with those from other studies, but the issue of the generalisability of the study results to other settings was not addressed. Therefore, the external validity of the study was quite low. The authors did not present their results selectively except for the cost breakdown. The authors highlighted some methodological limitations of their analysis, such as the lack of integration of the midwifery service into the health care system.

Implications of the study
The results of this study could be used to support the legalisation of midwifery services in Canada. The authors suggest that an increase in collaboration between midwifery services and standard carer could improve the service outcomes and reduce episodes of under- or over-utilisation of resources. In addition, future studies should focus on the social implications of the midwifery service.

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Bibliographic details

PubMedID
Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Birthing Centers /economics /standards; Cost-Benefit Analysis; Direct Service Costs /statistics & numerical data; Female; Hospital Costs /statistics & numerical data; Humans; Nurse Midwives /economics /standards; Nursing Evaluation Research; Obstetrics /economics /standards; Pilot Projects; Pregnancy; Pregnancy Outcome; Quality Indicators, Health Care; Quebec

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