Resuscitation of likely nonviable infants: a cost-utility analysis after the Born-Alive Infant Protection Act
Partridge JC, Sendowski MD, Martinez AM, Caughey AB

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 aimed to explore the potential impact of universal compared with selective resuscitation on the cost-effectiveness in infants at the margin of viability in the USA. The authors concluded that selective intervention resulted in the greatest utility and lowest cost for infants at the margin of viability. The quality of the methodology of the study was satisfactory but some limitations were outlined. The authors’ conclusions appear appropriate.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective was to explore the cost-effectiveness of two alternative resuscitation policies for preterm delivery and termination of pregnancy at 20 to 23 weeks six days gestation in the USA.

Interventions
Universal resuscitation of potentially viable infants born at 20 to 23 weeks six days gestational age was compared with current practice of selective resuscitation. The two policies were compared for both preterm delivery and induced termination.

Location/setting
USA/Secondary care

Methods
Analytical approach:
The authors used two decision-analytic models to synthesise data from a range of sources and model costs and outcomes of spontaneous preterm delivery and induced preterm deliveries or therapeutic abortions. The time horizon of the analysis was lifetime. The authors stated that the study perspective taken was societal for costs and maternal for utilities.

Effectiveness data:
Effectiveness data were taken from known relevant studies based on observational databases collected in USA and expert opinion. The authors used their judgement to select the most appropriate estimate from the available evidence found in the literature. The main clinical effectiveness estimates were proportions of preterm infants resuscitated under a selective resuscitation regime (all infants were assumed to be resuscitated under a universal regime) and the outcome of resuscitation. Outcomes were death, moderate disability, severe impairment and survival intact or with mild sequelae. Average life expectancy of parturients was assumed to be 50 years.

Monetary benefit and utility valuations:
Maternal Utility weights were taken from a published study that assessed maternal quality of life for prenatal diagnosis of Down syndrome which estimated the preferences of the mother. For the termination of pregnancy model utilities were assumed as none were available from the literature.

Measure of benefit:
Quality-adjusted life-years (QALYs) were used to produce the ratio of cost per QALY. The numbers of infants
surviving was reported. Future QALYs were discounted at a rate of 3% per annum.

Cost data:
Cost categories included in the analysis were costs of maternal care, foetal and neonatal care costs and the cost of long-term care for surviving infants. The sources of resource use and prices were based on estimates from the published literature. The price year for the analysis was 2010. Costs were presented in US Dollars ($). The authors used the medical component of the US Consumer Price Index to inflate costs and discounted future costs at a rate of 3% per annum.

Analysis of uncertainty:
The authors conducted univariate, bivariate and probabilistic sensitivity analysis. The results of the uncertainty analysis were presented using confidence ellipses.

Results
A universal resuscitation policy was expected to result in an additional 153 infants surviving and 372,951 maternal QALYs compared with 373,299 for a selective resuscitation policy (a reduction of 348 QALYs for universal resuscitation).

A universal resuscitation policy was expected to cost $1,509,442,364 in total compared with $1,180,783,926 for selective resuscitation, an additional $328,658,438 for universal resuscitation.

Selective resuscitation was dominant (less costly and resulting in more maternal QALYs) and remained dominant in 100% of the sensitivity analyses.

Authors' conclusions
The authors concluded that selective intervention resulted in the greatest maternal utility and lowest cost for infants at the margin of viability.

CRD commentary
Interventions:
The level of reporting of the intervention was adequate and both the intervention (new policy) and comparator (current practice) in the setting were relevant. It was likely that these interventions were relevant to other settings.

Effectiveness/benefits:
Methods used to identify and select the clinical studies and derive the clinical estimate used in the economic evaluation were not reported. Therefore it was unclear whether the effectiveness data used were the best available. Sources of data appeared relevant to the study setting and it was suggested in the paper that a pragmatic approach was taken to populating the model. No formal assessment of their validity was possible given the level of reporting. The utility outcomes focused on maternal utility and did not include the utility of the surviving preterm infants. Inclusion of these additional utilities may have had an impact on the overall result; this issue was highlighted in the authors' discussion. Very little information was presented on estimation of utilities and given the use of a proxy population for one model and assumptions for the other the estimates are uncertain.

Costs:
It was not clear that all costs relevant to the stated societal perspective were included but it seemed that the major cost categories were considered. The studies that supplied costs and resources were stated but there was no discussion on how these studies were selected or identified. It appeared that all were relevant to the setting but it whether they represented the best available evidence was unclear. Reporting of costs at macro-levels restricted understanding of the included resources and replication of the cost results. Costs were adjusted appropriately.

Analysis and results:
Full details of the decision models were reported and graphical depictions were included. The analytical approach was appropriate to compare the relative cost-effectiveness of alternative strategies. Parameter uncertainty was comprehensively assessed and reported. The authors stated a number of key limitations and analytical assumptions which enabled consideration of the generalisability of the study to other settings. There was limited reporting on the
identification and selection of data to inform the model but overall the study was well presented.

Concluding remarks:
The quality of the methodology of the study was satisfactory but some limitations were outlined. The authors’ conclusions appear appropriate.

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