A paediatric telecardiology service for district hospitals in south-east England: an observational study

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
This study investigated the clinical outcomes and costs of a telecardiology service, compared with conventional face-to-face delivery, for paediatric cardiac consultations. The authors concluded that a telecardiology service added to outreach services would create improved patient access at similar health care costs compared with the conventional approach. In summary, the methods were reasonably transparent, but the conclusions should be considered with caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study estimated various clinical indicators and costs of paediatric cardiologist consultations, using a telecardiology service versus conventional face-to-face delivery. The population included newborns, infants and children requiring specialist consultation services for suspected cardiac disease.

Interventions
The telemedicine package comprised video-conferencing equipment, integrated digital networking lines, additional monitors, video recorder, object camera visualiser, and an electronic stethoscope sender. This telecardiology service was compared with conventional face-to-face consultations.

Location/setting
UK/tertiary care.

Methods
Analytical approach:
This evaluation was based on single clinical trial, which recruited over a 16-month period. The authors stated that the perspective was that of the UK National Health Service (NHS). Costs were collected over a six-month period and three alternative scenarios were presented. In scenario one, there were four hospitals; in scenario two, there were three hospitals, with level two neonatal units and three- or four-monthly outreach clinics; and, in scenario three, there was a Basildon hospital with data for 12 months.

Effectiveness data:
The effectiveness evidence was derived from a randomised trial in which two hospitals, within 65 miles of central London, were randomly assigned to either the intervention or usual care. Data on the clinical outcomes included the type of presentation (emergency or referred), diagnosis, type of treatment, and length of consultation.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measures of benefit were the clinical outcomes mentioned above.

Cost data:
The resource use was derived by means of an audit of hospital records, including case notes. The types of resources
were neonatal cot days, paediatric ward bed days, out-patient attendances, echocardiograms, medical staff time, ambulance transfers to London, and the telemedicine service (including equipment, maintenance, rental of telephone, and network lines). The costs were derived from the hospital finance and pharmacy departments and NHS ambulance trusts. Bootstrapped mean costs per patient were produced for three time periods, which were the initial consultation day; 14 days inclusive of the initial consultation; and a maximum six-month period. Further details on the costing methods were published in another report (Dowie, et al. 2007, see ‘Other Publications of Related Interest’ below for bibliographic details). The costs were inflated using the NHS pay and prices index (2005 to 2006) and reported in 2007 UK pounds sterling (£).

Analysis of uncertainty:
None reported.

Results
In scenario one, with all four hospitals, the mean six-monthly costs were £6,337 (95% confidence interval, CI: 3,313 to 11,011) for telemedicine compared with £4,294 (95% CI: 3,045 to 6,175) for conventional face-to-face consultation. The costs were lower in the telemedicine groups than for face-to-face consultation, over six months, for scenarios two and three, but the differences were not statistically significant. The results were presented for all three cost scenarios.

Newborns or infants receiving neonatal care were more likely to be managed in the district general hospital (18.7%) via telemedicine compared with face-to-face consultation (1.6%). Paediatric out-patients or in-patients were discharged in similar proportions across the two options; 32% for telemedicine, and 39% for face-to-face consultation. Telemedicine enabled 5 out of 10 newborns with very low birth weight to avoid ambulance transportation to and from London.

Authors’ conclusions
The authors concluded that telecardiology networks, which complement existing outreach services in district general hospitals, can enable greater access to local paediatric cardiologists while remaining cost-neutral. They also stated that, if the telecardiology service could be shared with other telemedicine or administrative uses, it was likely to be financially beneficial.

CRD commentary
Interventions:
A clear description of the telecardiology strategy and technical components was provided.

Effectiveness/benefits:
The effectiveness data were based on a single study involving four hospitals and 266 new patients. The measurement of the clinical effects and their statistical analyses was transparent and rigorous. A range of outcomes was collected, but no key outcome of effectiveness was preferred, and the outcomes related primarily to aspects of feasibility and access (process outcomes) of the telemedicine service rather than benefits to the patient.

Costs:
The types of costs appeared to be appropriate for the UK NHS perspective. The sources of costs were clearly reported, but the reader was referred to a published paper on the cost analysis for further details of the valuation and analytic approach. The authors presented t-test results comparing the non-bootstraped mean costs in the two arms, given that these were likely to be right-skewed and their distributions non-parametric, it is not clear how valid these results were.

Analysis and results:
A cost-consequences analysis was undertaken, as the costs and effects were not combined into cost-effectiveness ratios. The cost and effect analyses were reasonably transparent and no assumptions appear to have been necessary. Any limitations of the data quality or analyses performed were not acknowledged by the authors. A sensitivity analysis of how robust the results were to changes in the estimates was not undertaken. Missing data and losses to follow-up were not discussed and nor was the potential for selection bias in the study cohort. This was an observational study, with only hospitals and not patients being randomised, and as a result may be subject to the limitations associated with the observational study design.
Concluding remarks:
The methodology appears to have been appropriate and was mostly transparent. The authors’ conclusions should be interpreted carefully given the caveats mentioned above.

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