Mass screening for neuroblastoma using high-performance liquid chromatography and medical cost

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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
Mass screening for neuroblastoma using high-performance liquid chromatography (HPLC).

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
Japanese infants.

Setting
Hospital. The study was carried out in Sapporo, Hokkaido, Japan.

Dates to which data relate
Effectiveness and resource use data were collected from 1970 to 1979 and from April 1984 to March 1992. Cost data were collected from 1991 to 1997. The price year was 1997.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken on the same patient sample as that used in the effectiveness study and was carried out retrospectively after the effectiveness results were known.

Study sample
From April 1984 to March 1992, 125,522 infants were screened in Sapporo City. From April 1988 to March 1992, 126,183 infants were screened in Hokkaido Prefecture excluding Sapporo City. 890,049 infants born between 1970 and 1979 were not screened. No power calculations were reported.

Study design
Retrospective cohort study. Neither the duration of follow-up nor the loss to follow-up were reported.
Analysis of effectiveness
The primary health outcomes studied included the number of true-positive and false-negative cases, the diagnosis rate, and the death rate. The author did not report whether groups were comparable at analysis in terms of demographic characteristics.

Effectiveness results
125,522 infants were screened in Sapporo City. 27 true-positive cases and 7 false-negative cases aged 1-4 years were detected. 126,183 infants were screened in Hokkaido Prefecture excluding Sapporo City. 30 true-positive cases (6-11 months) and 7 false-negative cases (1-4 years) were detected. In the Hokkaido Prefecture, therefore, the incidence of true-positive cases was 22.6 per 100,000 screened and false-negative cases 5.56 per 100,000 screened. No true-positive cases died. Of the 14 false-negative cases, 11 died. Of the 890,049 infants born between 1970 and 1979, 8 cases were diagnosed at 6-11 months of age (0.9 per 100,000 live births) and 75 were diagnosed at 1-4 years of age. Of those 75 cases, 62 died.

Clinical conclusions
Children's lives can be saved simply by using an HPLC mass screening programme.

Modelling
No modelling was used.

Measure of benefits used in the economic analysis
The benefit measure was lives saved due to the screening programme.

Direct costs
Costs were not discounted given the short time frame of the study (less than 1 year). Quantities and costs were not reported separately. Direct costs covered the cost of screening and the medical cost of treatment from admission to discharge (included costs of surgery and chemotherapy). The quantity/cost boundary adopted was that of the health service. The estimation of quantities and costs was based on actual data. Data for medical costs were obtained from patients admitted to Sapporo National Hospital from 1991 to 1997. The price year was 1997.

Statistical analysis of costs
Not reported.

Indirect Costs
Not included.

Currency
Japanese Yen (Y) with US$1 = Y125 as at November 1997.

Sensitivity analysis
Not reported.

Estimated benefits used in the economic analysis
For a cohort of 100,000 live births the programme would save 3.6 lives.
Cost results
The median medical cost of the 13 true-positive cases was ¥1,260,000 (range: 1,110,000 - 2,190,000). The median medical cost of the 5 false-negative cases was ¥13,610,000 (range: 5,990,000 - 18,339,000). Under the assumption that of 100,000 children screened by HPLC, 22.5 true-positive cases and 5.5 false-negative cases are detected, the total medical and screening costs amounted to ¥197,260,000. Under the assumption that of 100,000 children unscreened, 1 patient aged 6-11 months and 10 patients aged 1-4 years will be detected, the total medical and screening costs amounted to ¥137,460,000.

Synthesis of costs and benefits
Under the assumption that 10 cases would be diagnosed in the unscreened group and that 80% of cases die in both the screened and unscreened groups, the reduction in mortality at 1-4 years of age is 3.6 per 100,000 live births. ¥16,610,000 is the cost required for saving one additional life. If the over diagnosis of true-positive cases could be eliminated, the cost for saving one additional life would decrease to around ¥10,000,000.

Authors' conclusions
Children's lives can be saved at a relatively low cost simply by using an HPLC mass screening programme.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparator was clear. You, as a user of this database, should verify whether this health technology is relevant to your setting.

Validity of estimate of measure of benefit
Relevant measures of benefit were used. No justification was reported for assigning a sensitivity of 80% to HPLC. Identification of cases and deaths was dependent on the Hokkaido Prefectural Registry of Childhood Malignancies and was not directly measured by the authors. The authors did not report whether, at analysis, groups were comparable in terms of demographic characteristics. The authors also assumed that there was no change in the total incidence before and after the start of the mass screening.

Validity of estimate of costs
Only direct costs falling to the health service were included. No indirect costs were considered. Data for medical costs were obtained from a local source and are unlikely to be generalisable to other settings. No sensitivity analysis was reported.

Other issues
Adequate comparisons with other relevant studies were made. The generalisability of the results to other settings or countries was not discussed. The authors do not appear to have presented their results selectively. The study enrolled Japanese infants and this was reflected in the authors' conclusions.

Implications of the study
Children's lives can be saved at a low cost by using a HPLC mass screening programme.

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None stated.

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