Cost-effectiveness of palivizumab for respiratory syncytial virus infection in high-risk children, based on long-term epidemiologic data from Austria

Resch B, Sommer C, Nuijten MJC, Seidinger S, Walter E, Schoellbauer V, Mueller WD

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 assessed the cost-effectiveness of palivizumab for the prevention of respiratory syncytial virus in infants at high risk (such as premature infants, infants with bronchopulmonary dysplasia and those with congenital heart disease). The authors concluded that palivizumab was a cost-effective strategy from the perspectives of both the health care system and the society. The study used valid and transparent cost-effectiveness methodology that should ensure the validity of the authors’ conclusions.

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

Study objective
The study assessed the cost-effectiveness of palivizumab for prevention of respiratory syncytial virus in infants at high risk (such as premature infants, infants with bronchopulmonary dysplasia and those with congenital heart disease). The study updated a previous economic analysis by the same authors, which took into account changes in medication prices and long-term epidemiological data.

Interventions
Prevention of respiratory syncytial virus with palivizumab was compared to no prevention.

Location/setting
Austria/primary care.

Methods
Analytical approach:
The analysis was based on a decision tree model with a lifetime horizon. The primary perspective adopted in the study was that of the health care system (Austrian national health insurer). A secondary analysis was carried out from the perspective of society.

Effectiveness data:
Clinical data for the model were taken from various sources that included the literature and country-specific databases. Most epidemiological inputs were derived from long-term data on respiratory syncytial virus-associated hospitalisations, which were a key input of the analysis and were reported in a local database (1993 to 2002) and a nationwide electronic epidemiological monitoring system. Treatment effect for palivizumab was taken from clinical trials.

Monetary benefit and utility valuations:
Utility valuations were derived from a published study that used the Health Utility Index for children with a history of respiratory syncytial virus.

Measure of benefit:
Life-years and quality-adjusted life years (QALYs) were the summary benefit measures. A 5% annual discount rate was applied.

Cost data:
The primary analysis included the cost associated with administration of palivizumab and outpatient/in-patient costs of respiratory syncytial virus treatment. The secondary analysis added indirect costs associated with future productivity losses of the child, which were valued using the human capital approach (the production of a person valued at the market price). Patterns of resource consumption were based on Austrian sources. Unit costs were calculated using official reimbursement prices, tariff catalogues and diagnosis-related groups. Costs were in Euros (€) and were discounted at an annual rate of 5%. The price year was 2010.

Analysis of uncertainty:
In a scenario analysis, the long-term cost of recurrent wheezing was taken into account and was based on a published study. One-way sensitivity analyses were performed to deal with the issue of uncertainty around the inputs of discount rate, number of vials, in-patient cost, length of stay and utilities.

**Results**
In the primary analysis, projected incremental costs, discounted life-years and discounted QALYs were €3,146, 0.009 and 0.13 in all preterm infants, €3,155, 0.09 and 0.12 in preterm infants less than 33 weeks gestational age, €3,171, 0.09 and 0.13 in preterm infants 33 to 35 weeks gestational age, €3,205, 0.09 and 0.13 in children with bronchopulmonary dysplasia and €3,224, 0.36 and 0.38 in children with congenital heart disease.

The incremental cost per life-year and per QALY were €34,956 and €26,212 in all preterm infants, €35,056 and €26,292 in preterm infants less than 33 weeks gestational age, €35,233 and €24,392 in preterm infants 33 to 35 weeks gestational age, €35,611 and €24,654 in children with bronchopulmonary dysplasia and €8,956 and €8,484 in children with congenital heart disease.

More favourable cost-effectiveness and cost-utility ratios were achieved when the long-term costs of recurrent wheezing were taken into account or when adopting a societal perspective.

The discount rate was an influential input but base case findings were generally robust.

**Authors' conclusions**
The authors concluded that palivizumab was a cost-effective strategy from the perspectives of the health care system and society.

**CRD commentary**
Interventions:
The selection of the comparators was appropriate as palivizumab was compared against no prevention (the typical pattern of care in several health care settings).

Effectiveness/benefits:
It appeared that a selective approach was used to identify relevant sources of evidence. Such an approach was valid as the authors used most data from nationally representative databases to provide appropriate epidemiological and some clinical estimates. Treatment effect was taken from clinical trials that should have ensured high internal validity, but these studies were not described. More details might have been available from a previous publication by the same authors (see Other Publications of Related Interest). Both benefit measures appeared appropriate for capturing the impact of the disease on patients’ health. Utility estimates were derived from a study that used an appropriate instrument.

Costs:
The economic analysis was carried out satisfactorily. Two different perspectives were adopted and a breakdown of cost items was provided. Key unit costs and data on resource quantities were presented, as were data sources, price year and discount rate, which enhanced the transparency of the cost analysis. Sources of resource use and unit costs were representative of the Austrian setting. The impact of variations in cost estimates was taken into account in the sensitivity analyses.

Analysis and results:
The study results were presented clearly. Costs and benefits were synthesised using an incremental approach. The
authors used USA- and UK-based benchmarks to identify the optimal prevention strategy because of the lack of a formal cost-effectiveness threshold in Austria. The issue of uncertainty was investigated using a deterministic approach, which considered variations of selected inputs one at a time. The authors acknowledged that a more comprehensive approach (probabilistic analysis) would have been more appropriate. Nevertheless, the study results appear to be robust. The issue of transferability of results was not addressed explicitly, but the authors compared their findings with those of other published studies that generally showed the cost-effectiveness of palivizumab. The decision model was partially described and presented as a diagram.

Concluding remarks:
The study used valid and transparent cost-effectiveness methodology that should ensure the validity of the authors’ conclusions.

Bibliographic details

PubMedID
21960187

DOI
10.1097/INF.0b013e318235455b

Original Paper URL

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Antibodies, Monoclonal /economics /therapeutic use; Antibodies, Monoclonal, Humanized /economics /therapeutic use; Austria /epidemiology; Chemoprevention; Cost-Benefit Analysis; Decision Trees; Female; Hospitalization; Humans; Infant; Infant, Newborn; Infant, Premature; Infant, Premature, Diseases /epidemiology /immunology /prevention & control /virology; Male; Palivizumab; Respiratory Syncytial Virus Infections /epidemiology /immunology /prevention & control; Respiratory Syncytial Viruses /drug effects; Respiratory Tract Infections /epidemiology /immunology /prevention & control /virology; Risk; Treatment Outcome

AccessionNumber
22012001694

Date bibliographic record published
02/04/2012

Date abstract record published
11/07/2012