Economic evaluation of the US Environmental Protection Agency’s SunWise program: sun protection education for young children


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 objective was to examine the clinical and economic impact of a sun protection education programme for young children to prevent skin cancers. The authors concluded that the SunWise programme was cost-effective as it reduced the burden of skin cancer in both clinical and economic terms. Some data sources were not reported in detail, but the methodology was appropriate and the authors’ conclusions appear to be valid.

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

Study objective
The objective was to examine the clinical and economic impact of a sun protection education programme for young children (five to 15 years) in order to prevent skin cancers.

Interventions
The intervention was the SunWise School Program, a national health and environmental education programme for sun safety designed for children in elementary and middle schools to protect them from overexposure to the sun. The programme was compared against the pre-intervention state.

Location/setting
USA/community or school.

Methods
Analytical approach:
The authors stated that a model was used to translate any reduction in sun exposure into a decrease in the incidence of skin cancer (basal cell carcinoma, squamous cell carcinoma, and cutaneous malignant melanoma). The time horizon was lifetime and the authors stated that the perspective of the US government, which funded the programme, was adopted.

Effectiveness data:
The clinical evidence on the effectiveness of the SunWise programme came from surveys in a random sample of participating schools. Before and after the implementation of the programme, each student completed a test that assessed attitudes and intended practice with respect to sun protection. The differences between responses on these two tests were translated into differences in sun exposure. Other clinical data came from published studies, the details of which were not fully reported. A number of assumptions were also made. The key clinical endpoint was the ultraviolet (UV) exposure reduction after the programme implementation.

Monetary benefit and utility valuations:
For the cost-utility analysis, the estimates of health-related quality of life were derived from official data from the 2000 to 2002 Medical Expenditure Panel Survey and supplemented with data from a published study. Both sources used the European Quality of life (EQ-5D) questionnaire. For the cost-benefit analysis, a monetary value was given to premature death and this was based on the value of a statistical life reported in the US Environmental Protection Agency (EPA)'s Guidelines for Preparing Economic Analyses, which reviewed 26 studies on the value of a statistical life.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure, in the cost-utility analysis, and were discounted at an annual rate of 3%.

Cost data:
The economic analysis included the following cost categories: programme implementation, direct medical services associated with treatment of fatal and non-fatal skin cancer, and productivity losses per case of skin cancer. These costs came from published studies that used data from Medicare or from the EPA. They were presented as macro-categories, with no unit costs. All costs were in US dollars ($) and the price year was 1999. A 3% annual discount rate was applied.

Analysis of uncertainty:
A deterministic one-way sensitivity analysis was undertaken, using reasonable ranges of values, for the behavioural retention rate (the rate at which the students retained their learning of sun safety behaviour over the years after the intervention), the number of classrooms participating in SunWise, the percentage of time that students actually performed a behaviour that they reported practicing all the time, and the percentage of UV exposure received before age 18 years.

Results
The analysis considered three scenarios: current funding, increasing funding, and low funding. Current funding assumed that the number of classrooms participating in the programme in future years (2008 to 2015) was constant; increasing funding assumed it increased; and low funding assumed it decreased.

The net benefit of the programme was calculated as the averted costs (for medical services, productivity losses, and mortality) minus the programme costs. The net benefit was $31,197,080 for current funding, $44,572,484 for increasing funding, and $6,866,347 for low funding.

The discounted QALY losses averted were 159 with current, 217 with increasing, and 52 with low funding. The programme was dominant, which means it was more effective and saved costs compared with no programme, for all three funding scenarios.

The sensitivity analysis confirmed the economic superiority of the SunWise programme. The economic benefits were sensitive to variations in the discount rate and some varied inputs in the low funding scenario.

Authors' conclusions
The authors concluded that the SunWise programme was cost-effective as it reduced the burden of skin cancer in both clinical and economic terms.

CRD commentary
Interventions:
A detailed description of the intervention was provided. The comparator was the pattern of care before the implementation of the SunWise programme, which was appropriate. Three levels of funding were considered to reflect the possible availability of government funds for the programme.

Effectiveness/benefits:
The clinical data came from selected sources, which were probably known to the authors. The evidence on the intervention came from the implementation of the SunWise programme and the key details were reported. Little information on the supplementary sources was given, but some were government agencies in the USA. The issues surrounding the use of data from mixed sources were not addressed. The use of QALYs as the summary benefit measure was appropriate as they allow cross-disease comparisons to be made and capture the impact of the disease on a patient's health.

Costs:
The perspective appears to have been societal, rather than governmental, as indirect costs such as productivity losses were included as well as the direct medical costs. A breakdown of cost items was not given and no information on the unit costs or quantities of resources used was provided. The data sources were mentioned but were not described. In
general, the economic analysis was not transparently reported, but the types of costs were clearly stated. The price year and the use of discounting were reported.

Analysis and results:
The costs and benefits were not synthesised in the cost-utility framework and the net benefit was calculated in the cost-benefit analysis. The monetary value of a statistical life was based on official data and this was not described in detail. The issue of uncertainty was restricted to the investigation of a few parameters. A more comprehensive approach, such as a probabilistic analysis, would have been appropriate. The authors acknowledged that the programme effectiveness was based on self-reported questionnaires that might overestimate or underestimate the real benefits, but a conservative approach was taken. For example, the additional benefits associated with the reduction in UV exposure were not included.

Concluding remarks:
Some data sources were not reported in detail, but appropriate methodology was used and the authors’ conclusions appear to be valid.

Funding
Supported by the US EPA.

Bibliographic details

PubMedID 18450850

DOI 10.1542/peds.2007-1400

Original Paper URL http://pediatrics.aappublications.org/cgi/reprint/121/5/e1074

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Indexing Status
Subject indexing assigned by NLM

MeSH
Child; Child, Preschool; Cost-Benefit Analysis; Educational Measurement; Health Behavior; Health Care Costs; Health Education /economics; Humans; Neoplasms, Radiation-Induced /economics /prevention & control; Quality-Adjusted Life Years; School Health Services; Skin Neoplasms /economics /prevention & control; Sunlight /adverse effects;
United States

AccessionNumber
22008101321

Date bibliographic record published
09/09/2009

Date abstract record published
13/01/2010