Economic benefits of establishing a National Cancer Center in Louisiana

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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
The study investigated the establishment of a National Cancer Centre (NCC) in Louisiana. In the USA, NCCs act as referral facilities for cancer patients and conduct research and training in cancer-related issues. This intervention was compared with no establishment of an NCC.

Type of intervention
Screening, health education and treatment.

Economic study type
Cost-effectiveness analysis and cost-benefit analysis.

Study population
The study population comprised cancer patients living in Louisiana and neighbouring states.

Setting
The study setting was secondary care. The economic study was carried out in Louisiana, USA.

Dates to which data relate
The effectiveness data were derived from sources dating from 1999 to 2000. The resource data also related to this period. The price year appears to have been 2002.

Source of effectiveness data
The study was based on a review of secondary data obtained from various national and state level sources. The authors made assumptions to supplement the data from these sources.

Outcomes assessed in the review
The outcomes assessed were:

- the number of cancer deaths in Louisiana;
- the male to female proportion of cancer deaths in the USA;
- the 50th percentile cancer death rates among men and women; and
- the current death rates in Louisiana.

Study designs and other criteria for inclusion in the review
The study was based on secondary data obtained from various national and state level sources.

Sources searched to identify primary studies
Not applicable.

Criteria used to ensure the validity of primary studies
Not applicable.

Methods used to judge relevance and validity, and for extracting data
Not applicable.

Number of primary studies included
It was unclear how many sources of information were included in the study.

Methods of combining primary studies
Not applicable.

Investigation of differences between primary studies
Not applicable.

Results of the review
The number of cancer deaths in Louisiana in 2002 was 9,500. Of these, 4,930 were male deaths and 4,570 were female deaths.

The 50th percentile cancer death rates among men and women were, respectively, 207.8 and 137.9 per 100,000 age-adjusted populations during the time 1994 to 1998.

The death rates in Louisiana were 248.7 per 100,000 for men and 150.4 per 100,000 for women.

Methods used to derive estimates of effectiveness
The authors supplemented the data derived from national and state level sources with their own assumptions.

Estimates of effectiveness and key assumptions
The authors assumed that only a limited number of patients from neighbouring states, possibly the more severe cases, would seek care from the cancer centre in Louisiana once it became operational. The authors estimated that in the two neighbouring states (Mississippi and Arkansas) the number of new cases was 28,600, making the total number of cases with a history of cancer approximately 198,600. If only 1% of cases decided to use the cancer centre in Louisiana, this would generate 229 inpatient admissions in the state.

The authors assumed that 1% of state cancer patients would be registered out of state, representing a total of 1,500 patients, of which 216 would be new cases.

The authors assumed that the NCI-designated centre would help to decrease cancer death rates to the 50th percentile in the long run.

The authors also assumed that the number of deaths from cancer would remain at current levels in the absence of a
Measure of benefits used in the economic analysis
The measures of benefits used were the deaths averted, the disability-adjusted life-years (DALYs) saved and monetary benefits. Deaths averted by the NCI-designated centre were calculated by subtracting the 50th percentile cancer death levels from the current levels. DALYs were derived using data from the World Health Organization and, apparently, authors' assumptions. However, it was unclear how the authors estimated the number of DALYs saved per cancer death as a result of the NCI-designated centre.

To evaluate the economic value of DALYs saved the authors multiplied each DALY by $14,830 (the national estimate for productivity loss).

Direct costs
The direct costs of the health care system and research bodies were included in the analysis. These costs covered the costs of providing care to cancer patients, the costs of establishing a cancer centre (i.e. start-up costs and operating expenses), and the funding the NCC would receive from research and education bodies in terms of grants. To estimate the cost of providing care to cancer patients, the costs per inpatient admission of different cancer types were obtained from HCUPnet of the Healthcare cost and Utilisation Project. The number of cases to be hospitalised was estimated by multiplying the new cases per cancer site by the ratio of site-specific number of admissions to new cases for the country. The costs of starting the NCC were based on discussions with the director of a cancer facility in Louisiana. The costs of running the centre were derived from the 25th percentile annual amount of core funding for NCCs in the USA.

The study reported the total costs. The costs per admission for 2002 were derived from 1999 costs, assuming that the total costs of cancer treatment and management increased by 4% per annum. As the costs of establishing and running a cancer centre were incurred for up to 10 years, these future costs were discounted at an annual rate of 5%.

Statistical analysis of costs
The costs were treated as point estimates (i.e. the data were deterministic).

Indirect Costs
The indirect costs were included in the analysis. These included the mortality costs, which were calculated by obtaining the national estimate for productivity loss ($84.7 billion) caused by 555,500 deaths. Hence, the mortality loss per death would be approximately $14,830. As already reported, this estimate was multiplied for each DALY saved by the NCI-designated centre to obtain the economic value of DALYs saved. Since these costs could be incurred for up to 10 years, a 5% discount rate was applied to the future costs. The price year appears to have been 2002.

The authors also estimated the macro-level implications of the cancer centre's activities and patient care services using industry-specific regional multipliers. The authors used specific multipliers for health and education sectors for Kansas, as reported in the RIMS II (Regional Input-output Modelling System) handbook of the Bureau of Economic Analysis. The multiplier for hospital care was about 2.44, while the multiplier for research and educational funding was 2.52.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analyses were performed.
Estimated benefits used in the economic analysis
From 2002 until 2011, the authors estimated that the NCI-designated centre would prevent a total of 6,554 deaths, representing a total of 23,070 DALYs saved.

Cost results
The authors calculated that establishing an NCI-designated cancer centre in the state would generate annual revenues to hospitals of $38.24 million. This was broken down as $28 million through increased revenue due to improved access to care, $4.44 million through recovery of lost revenue from Louisiana patients using out-of-state cancer centres, and $5.80 million through attracting patients from neighbouring states.

The authors estimated that the Louisiana NCI-designated centre could generate $9 million per year in research and educational activities.

Using the RIMS II, the additional macro-economic benefit of an additional $10 million in hospital services translated into $24.0 million a year. Similarly, the $9 million dollars in terms of research and education translated into $23.0 million in the macro-economy. The authors calculated that the present value of these annual flows for 10 years would be $380 million.

The authors estimated that the economic present value of DALYs saved over 10 years by the NCI-designated centre was $257 million ($342 million if left undiscounted).

According to the authors, the present value of all these benefits from the NCI-designated centre came to $637 million.

The authors reported that the present value of establishing and running an NCC for 10 years was $73.5 million ($60 million as the start-up cost and an additional $1.67 million per year in running costs).

Synthesis of costs and benefits
The costs and health outcomes were not combined. However, the costs and benefits were combined in the cost-benefit analysis using a benefit-to-cost ratio of 8.5 (i.e. $637 million divided by $73.5 million).

Authors’ conclusions
The establishment of a National Cancer Centre (NCC) was highly cost-effective, with expected returns exceeding $8 for each dollar spent on the cancer centre.

CRD COMMENTARY - Selection of comparators
A justification was given for the comparator used, namely that at present there was no NCC in Louisiana. You should decide if the comparator represents current practice in your own setting.

Validity of estimate of measure of effectiveness
The authors utilised secondary data which were obtained from various national and state-level sources. These data were epidemiological in nature, such as the number of cancer cases and deaths, and therefore required no systematic review of the literature. The authors supplemented these data with their own assumptions. The main assumption in this case was that the NCI-designated centre would help to decrease cancer death rates to the 50th percentile in the long run. It was unclear whether this assumption was based on the literature, or on evidence from other NCCs in the USA. Further, the authors did not undertake any sensitivity analyses to examine the effect of changes in their assumptions.

Validity of estimate of measure of benefit
The authors used DALYs as their measure of benefit, which were then converted into monetary benefits. It was unclear how the authors estimated the number of DALYs saved by the NCI-designated centre, as their ‘Methods’ section was
rather difficult to understand and follow. Further, it was also unclear why the authors used the productivity loss of one death to value each DALY saved by the centre. It would appear that there will be numerous DALYs saved for each death averted, not just one.

Validity of estimate of costs
All the cost categories relevant to the perspective adopted were included in the analysis. However, it appears that some costs, such as outpatient costs, have been omitted from the analysis. The costs and the quantities were not reported separately, which will limit the generalisability of the authors’ results. The costs were derived from other settings, assumptions and published literature. Several of the authors’ cost calculations were somewhat difficult to follow and would not be easy to replicate. For example, it was not possible to determine how the authors obtained the present value of benefits from the NCC (i.e. $637 million). The authors also appear to have included the cost of treating extra patients due to the NCC as a benefit rather than as an actual ’cost’ (presumably the extra income generated would be the most likely explanation). The authors appropriately discounted the costs. The price year appears to have been 2002.

Other issues
The authors did not make appropriate comparisons of their findings with those from other studies. In addition, the issue of generalisability to other settings was not addressed. The authors do not appear to have presented their results selectively, although it was not possible to determine how some outcomes (both the costs and DALYs) were calculated and obtained. The authors reported no further limitations to their study.

Implications of the study
The authors recommended the establishment of an NCC in Louisiana on both health improvement and economic terms.

Source of funding
None stated.

Bibliographic details

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Cancer Care Facilities /economics; Cost-Benefit Analysis; Humans; Louisiana; National Health Programs /economics; Neoplasms /mortality /prevention & control

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