Selected Canadian Life and Economic Forecast Impacts of Lung Cancer

Paul Smetanin, RiskAnalytica
Paul Kobak, RiskAnalytica
William Evans, McMaster University, Canada

January 2005

Background: An analysis of the impacts of lung cancer on life and economics employing objective risk measurement and management methods can support national planning for cancer control resources. Life at Cancer Risk (L@CR) was developed as a cancer strategy framework to measure the risk associated with future burden due to cancer, including lung cancer. The absence of information systems that incorporate a national perspective of the impact of lung cancer on key value indicators in Canada necessitates such estimation methods, which take account of the age status of the population, increasing tumour incidence, and the national rationing of resources for the public health system.

Method: L@CR incorporates a model of the Canadian population, a lung cancer state transition model and a macro-economic model to jointly simulate the wider spectrum of impacts of lung cancer. Markov state transition methods, non-linear regression techniques and Monte Carlo simulation techniques are used in combination with various sources of economic, epidemiological, and financial data sets to estimate the crude Canadian lung cancer incidence, prevalence, death counts , age standardised rate trends and economic impacts for a 20 year period from 2005 to 2024.

Results: During this time period, a total of 498,825 Canadians are expected to develop lung cancer (38.15% increase over the previous 1985 to 2004 period), and 418,596 Canadians are expected to die as a result of the disease (39.69% increase over the previous 1985 to 2004 period). The expected impact on life amounts to 658,983 disability adjusted life years lost, and 6.3 million potential life years lost due to premature death. For the same forecast period and measured in terms of 2004 present value dollars, lung cancer is expected to cost the Canadian economy $CAD 27.3 billion in wage based productivity, $CAD 15.1 billion in corporate profits, $CAD 11.8 billion in taxation revenues, and $CAD 15.0 billion in direct health costs. These results were tested against historical data collected between 1981 and 2001 and found to be within a 5% margin of error.

Conclusion: Lung cancer has not only a significant impact upon the lives of many Canadians, it also consumes a considerable amount of Canadian economic resources beyond those usually associated with direct health care and the indirect costs of death. The results show that while the total direct health costs associated with incident cases of lung cancer are substantial, the impacts on wage based productivity, corporate profits and taxation revenues are also significant. Using modern risk measurement techniques such as L@CR, a greater understanding of the multidimensional burden that lung cancer will impose upon Canadian lives and the Canadian economy over the next 20 years can be gained.