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## **Interdisciplinary Cancer Risk Management: Canadian Life and Economic Impacts**

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**Background:** Modern risk management methods can support long term national planning for cancer control resources. Life at Cancer Risk (L@CR) was developed using an interdisciplinary approach employing various techniques based on the laws of physics as well as practical risk management considerations implied from global banking techniques. The approach allows for the dynamic measurement of the risk associated with future life impacts due to cancer and provides valuable management information.

**Method:** L@CR incorporates a model of the Canadian population, a cancer state transition model and a macro-economic model to jointly simulate the wider spectrum of impacts due to 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 measure the life and economic impacts of cancer for a 30 year period from 2004 to 2033.

**Results:** Over the simulation period, 5.9m Canadians are expected to develop cancer (90%c.i. 5.5m to 6.3m), and 2.8m Canadians are expected to die as a result of the disease (90%c.i. 2.6m to 3.1m). The expected impact on life amounts to 13.3m disability adjusted life years lost (90%c.i. 12.3m to 14.5m), and 38.2m potential life years lost due to premature death (90%c.i. 35.6m to 41.1m). Measured in terms of 2004 present value Canadian dollars, cancer is expected to cost the Canadian economy \$542.9b in wage based productivity (90%c.i. \$501.4b to \$583.9b), \$198.7b in corporate profits (90%c.i. \$183.6b to \$213.6b), \$249.7b in taxation revenues (90%c.i. \$241.9b to \$256.7b), and \$177.5b in direct health care costs (90%c.i. \$160.4b to \$194.7b). Results were tested to be within a 5% margin of error against history.

**Conclusion:** Cancer has a significant impact upon the lives of many Canadians, and consumes a considerable amount of Canadian economic resources beyond direct health care costs. Using modern risk measurement techniques such as L@CR, a greater understanding of the multidimensional impact that cancer can impose upon the Canadian community over the next 30 years can be gained, providing an evidence based approach to the possible population goals of Canadian cancer professionals, and the impacts they seek to manage away from.