

**BURDEN OF ILLNESS AS AN INDICATOR OF COMMUNITY AIR POLLUTION IMPACT,
AND ITS SENSITIVITY TO STATISTICAL DESIGN****L.D. Pengelly¹**, M. Campbell², M. Bienefeld², J. Sommerfreund³¹*Department of Medicine, McMaster University, Hamilton, Canada*²*Toronto Public Health, Toronto, Canada*³*University of Toronto, Toronto, Canada*

Burden of illness (BOI) estimates have been used increasingly as indicators of air quality impact by governments, by non-governmental agencies and community groups. A BOI study based on local air quality and health data, using risk coefficients from the epidemiological literature, is a cost-effective and reliable approach to air quality risk evaluation and risk communication for a community. In May 2000, we estimated that from 700 to 1300 premature deaths were associated with air pollution in Toronto, Ontario (approximately 2.5 million people), based on Toronto air quality and mortality information applied to risk coefficients obtained up to 2000. In mid-2002 it was reported that risk coefficients derived from generalized additive models (GAMs) using default convergence criteria and non-parametric smoothing techniques could be artificially biased to larger values, and narrower confidence intervals. In the past year, many epidemiological studies having used these techniques have been revised, in general reducing the risk coefficients associated with particulate pollution roughly by half. We undertook to revise our May 2000 estimate of BOI in light of the changes in scientific understanding in the intervening period. Our estimate in 2004 for premature mortality associated with acute exposure to air pollution in Toronto is 700, based on coefficients from a recently published multipollutant gas model and a particle risk coefficient derived from ten of the revised studies. If the risk associated with particles is estimated on the basis of chronic, rather than acute exposure, the estimate for premature mortality rises to 1700. (Supported by Toronto Public Health).