

The Smoking Regulatory Index: a new way to measure public health performance

Cigarette smoking and environmental tobacco smoke (ETS) exposure are recognized as leading threats to public health. The health effects of ETS have been widely documented, and include an increased risk of lung cancer, respiratory ailments such as asthma and bronchitis, and heart disease. Laws restricting smoking have been shown to be effective public health measures, reducing both cigarette consumption and ETS exposure among smokers and non-smokers alike.

Previous research suggests that the effectiveness of antismoking laws in reducing ETS depends largely on how comprehensive the law is — in other words, in how many kinds of community spaces and to what degree is smoking prohibited. Partial bans — laws that restrict but do not totally ban smoking — are rarely as effective as comprehensive prohibitions, although they are certainly better than no smoking regulations at all.

A tool that measures the effective-

ness of smoke-free regulations rather than simply describing them will demonstrate their potential health benefit. When used at the local level, this tool can benchmark local public health protection, somewhat similar to the way in which wait lists for surgery also examine access to effective health care.

To this end we developed the Smoking Regulatory Index (SRI), a simple measure that can be applied across different jurisdictions (municipal, provincial, federal) and internationally. The SRI produces a score reflecting how well a person is protected from ETS exposure; on a scale of 0 to 100, a score of 50 means that the average potential ETS exposure in public places is reduced by half. The score is derived by estimating the ETS exposure for different types of location (e.g., workplaces, restaurants, bars) and calculating the percent contribution of that location to the overall ETS exposure for a typical person if there were no smoke-free law. The community SRI score, a value between 100 (complete protection against

ETS exposure in public places) and zero (no protection), is obtained by summing the percent protection of all locations where laws completely prohibit smoking.

The main challenge in deriving the SRI is estimating the ETS exposure in different locations for a typical person. In prior research, nicotine has been the most commonly used chemical marker of ETS. This is because tobacco smoke is the only source of nicotine, and nicotine is one of the main constituents of cigarette emissions. However, there are few estimates of nicotine exposure in different locations. Furthermore, nicotine concentrations and the average time a person will spend in each location — the 2 components of ETS exposure — will likely range widely.

Despite the potential variation in the measurement of ETS exposure, we expect that SRI scores will be reasonably reliable. Regardless of how ETS exposure is measured, some locations are more important than others for the overall SRI score. For example, workplaces will be important because of the amount of time people spend in them, and licensed establishments will be important because of the concentration of

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Table 1: Derivation of the Smoking Regulatory Index (SRI) scores

Location	ETS concentration,* mean (low, high)	Potential exposure to ETS,† mean h/wk (low, high)	SRI score	Simplified SRI score (out of 100)‡
Municipal facility	2.5 (0.1, 5.0)	0.1 (0, 0.2)	0.25	0.2
Elevator	2.5 (0.1, 5.0)	0.1 (0, 0.2)	0.25	0.2
Hospital	2.5 (0.1, 5.0)	0.1 (0, 0.2)	0.25	0.2
Transportation	2.5 (0.1, 5.0)	0.1 (0, 0.2)	0.25	0.2
Place of public assembly	2.5 (0.1, 5.0)	0.2 (0, 0.2)	0.5	0.4
Service counter and line	2.5 (0.1, 5.0)	0.2 (0, 0.2)	0.5	0.4
Reception area	2.5 (0.1, 5.0)	0.2 (0, 0.2)	0.5	0.4
Retail store	2.5 (0.1, 5.0)	0.5 (0, 0.2)	1.25	1.0
Licensed establishment	31.1 (7.4, 105.4)	0.2 (0.1, 0.5)	6.22	5
Restaurant	6.5 (3.4, 34.0)	2.1 (1, 3)	13.65	12
Workplace	4.1 (0.8, 22.1)	23.1 (20, 35)	94.71	80

*Environmental tobacco smoke (ETS) concentration is measured in terms of nicotine concentration in micrograms of nicotine per m³.

†ETS levels and exposure time were estimated uniformly for public places for which no data were available.

‡The simplified score is the score multiplied by 0.845 to attain a scale that totals 100. Scores are rounded to whole numbers, except for values < 1, which are rounded to the first decimal.

smoking in a confined space. Municipalities must include smoking bans in workplaces and licensed establishments to achieve a high level of protection for ETS exposure — and a high SRI score.

We estimated SRI scores for various Canadian locations using bylaw information,¹ likely nicotine concentrations for different areas derived from a synthesis of previous studies,^{2,3} and data on time spent in workplaces and restaurants⁴ (Table 1). The results highlight wide disparities in public health protection across Canadian municipalities. In 2001, a municipality such as Abbotsford, BC, would have received an SRI score of 3 because smoking was prohibited only in elevators, places of public assembly, reception areas, retail stores and service counters.¹ This compares with a score of 98 in Surrey, BC, where smoking was prohibited in workplaces, restaurants and licensed establishments as well as in municipal facilities, hospitals, places of public assembly, and public transportation (see

Appendix 1, available at www.cmaj.ca/cgi/content/full/174/10/1403/DC1).

Given the effectiveness of antismoking legislation, the SRI highlights important discrepancies between municipalities and the need for more jurisdictions to enact meaningful legislation.

The SRI could also be applied to provincial or national levels. Should a province introduce overarching legislation (as Ontario has put forward for the spring of 2006), one could simply apply the SRI to the province as a whole.

Our preliminary SRI estimates can be criticized for incomplete or older municipal data and imprecise ETS exposure measurements. However, this begs the question: why is accurate information lacking for one of the most important public health interventions? ETS interventions, like many other public health interventions, lack regular, comprehensive and public evaluation to gauge their effectiveness, even though performance measures for medical care have expanded compara-

tively quickly.

To address this, the SRI offers an intuitive and universal system to rank antismoking legislation across Canada and internationally and to monitor progress in curbing the community effects of smoking. It also supports broader efforts to evaluate public health efforts.

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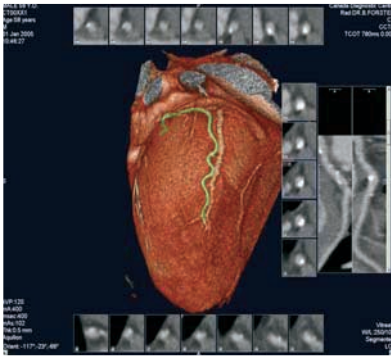
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