

Original Investigation

Secondhand Smoke Exposure Among Canadians: Cotinine and Self-Report Measures From the Canadian Health Measures Survey 2007–2009

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Abstract

Introduction: Secondhand smoke (SHS) exposure is associated with numerous adverse health effects, including cancer, cardiovascular disease, asthma, respiratory infections, and decreased pulmonary function. This study provides population estimates of SHS exposure among the Canadian non-smoking population based on self-report and urinary cotinine concentrations.

Methods: The 2007–2009 Canadian Health Measures Survey, a nationally representative cross-sectional survey, collected data from Canadians aged 6–79 years, and it includes self-report and urinary cotinine measures of tobacco smoke exposure ($n = 4,455$).

Results: An estimated 22% of nonsmokers reported being exposed to SHS every day or almost every day. Of those, 70% of children (6–11 years) and 48% of adolescents (12–19 years) had detectable cotinine levels compared with 23% of adults (20–79 years). An estimated 77% of nonsmokers exposed to SHS only in the home had detectable cotinine levels compared with 11% of nonsmokers exposed to SHS only outside the home. Of those exposed to SHS only in the home, a higher percentage of children (5.1%) had detectable cotinine levels compared with adults (3.1%).

Conclusions: Despite well-known health risks associated with exposure to tobacco smoke, a substantial proportion of the Canadian population continues to be exposed to SHS. Higher percentages of certain subpopulations had detectable cotinine concentrations, including children, adolescents, and those exposed to SHS in the home.

Introduction

The health risks associated with exposure to secondhand smoke (SHS) are well documented and widely recognized. SHS exposure is associated with numerous types of cancer, cardiovascular disease, asthma, respiratory infections, and decreased pulmonary function (U.S. Department of Health and Human Services [USDHHS], 2006; U.S. Environmental Protection Agency [USEPA], 1992). SHS has been classified by the U.S. EPA as a Class A carcinogen (USEPA, 1992) and the U.S. Surgeon General concluded that there is no safe level of exposure to tobacco smoke (USDHHS, 2006). Tobacco-related illness costs Canadians billions of dollars each year in health care expenditures, with additional indirect costs such as lost productivity, longer term disability, and premature death (Rehm et al., 2006).

Although exposure to SHS declined during 2000–2005, there remains a substantial proportion of Canadians that are exposed to SHS (Shields, 2007). In 2005, 23% of nonsmokers reported being exposed to SHS in the home, vehicles, and/or public places every day or almost every day (Shields, 2007). Further, a greater proportion of youth reported being exposed to SHS. Of nonsmokers aged 12–17 years, 40% reported being regularly exposed to SHS in at least one location compared with 31% for those aged 18–34 and 19% for those aged 35–64.

Previous Canadian national surveys have been limited to self-report measures of SHS exposure (Gilmore, 2002; Health Canada, 2010b; Statistics Canada, 2010). However, objective measures of SHS exposure exist. Cotinine measurements in serum, urine, and saliva are a commonly used and widely accepted biomarker of exposure to tobacco smoke (Benowitz, 1999). Cotinine is the major metabolite of nicotine, with

