Occupational Burden of Asbestos-related Cancer in Argentina, Brazil, Colombia, and Mexico

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ABSTRACT

Background: An estimate at the national level of the occupational cancer burden brought about by the industrial use of asbestos requires detailed routine information on such uses as well as on vital statistics of good quality. A causal association with asbestos exposure has been established for mesothelioma and cancers of the lung, larynx, and ovary.

Objectives: The aim of this study was to provide estimates of the occupational burden of asbestos-related cancer for the Latin American countries that are or have been the highest asbestos consumers in the region: Argentina, Brazil, Colombia, and Mexico.

Methods: The burden of multifactorial cancers has been estimated through the approach suggested for the World Health Organization using the population attributable fraction. The following data were used:

- Proportion of workforce employed in each economic sector
- Proportion of workers exposed to asbestos in each sector
- Occupational turnover
- Levels of exposure
- Proportion of the population in the workforce
- Relative risk for each considered disease for 1 or more levels of exposure

Data on the proportion of workers exposed to asbestos in each sector are not available for Latin American countries; therefore, data from the European CAREX database (carcinogen exposure database) were used.

Findings: Using mortality data of the World Health Organization Health Statistics database for the year 2009 and applying the estimated values for population attributable fractions, the number of estimated deaths in 5 years for mesothelioma and for lung, larynx, and ovary cancers attributable to occupational asbestos exposures, were respectively 735, 233, 29, and 14 for Argentina; 340, 611, 68, and 43 for Brazil; 255, 97, 14, and 9 for Colombia, and 1075, 219, 18, and 22 for Mexico.

Conclusions: The limitations in compiling the estimates highlight the need for improvement in the quality of asbestos-related environmental and health data. Nevertheless, the figures are already usable to promote a ban on asbestos use.

Key Words: asbestos, burden of disease, Latin America, neoplasms, occupation

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INTRODUCTION

The purpose of this study was to tentatively estimate the asbestos occupational burden of cancer in Argentina, Brazil, Colombia, and Mexico, in the frame of scientific cooperation activities envisaged by the Italian National Asbestos Project. The project aimed at developing collaborations with Latin America countries where asbestos use is still permitted or only recently banned, as discussed by Marsili et al.[1]

Neoplasms causally associated with asbestos are mesothelioma of pleura, peritoneum, pericardium, and tunica vaginalis testis and cancer of the lung, larynx, and ovary.[2] Asbestos is the only recognized cause of mesothelioma, together with some asbestiform mineral fibers. In industrialized countries such as Italy, more than two-thirds of all mesothelioma cases are associated with documented

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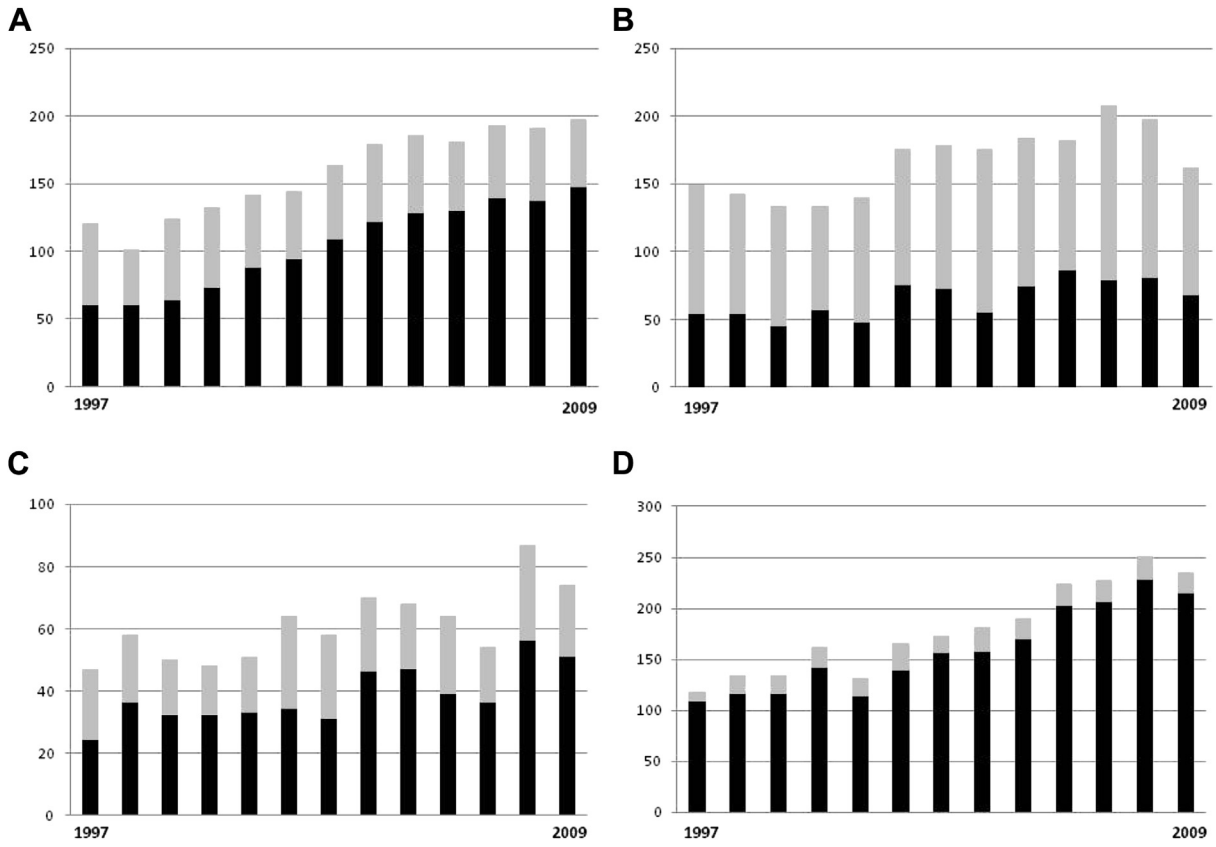

Figure 1. Mortality from "mesothelioma" (C45 in the 10th revision of the International Classification of diseases - ICD) and "pleural cancers excluding mesothelioma" (C38.4 10th ICD) in Argentina (A), Brazil (B), Colombia (C), and Mexico (D) during 1997-2009. Yearly number of C45 deaths in black, number of C38.4 deaths in grey. Data from the WHO Health statistics database (http://www.who.int/healthinfo/statistics/mortality_rawdata/en/index.html).

asbestos exposure in the workplace.[3] In general terms, the number of mesothelioma cases within a population can be directly retrieved from mortality data, if reliable, or from pathology registries, where available. This figure, furthermore, also can be indirectly estimated from data on asbestos consumption in the population of interest.[4]

Contrary to mesothelioma, the etiology of pulmonary, laryngeal, and ovarian cancers is multifactorial. For each outcome, the number of cases that would be prevented if exposure to asbestos were eliminated can be estimated by using the population attributable fraction (PAF). Within a project on occupational carcinogens commissioned by World Health Organization,[5] a multistep approach to estimate national PAFs from data on the workforce and a number of assumptions regarding exposure were established. Additionally, limited to lung cancer, PAF can also be estimated using a reasonable ratio between mesothelioma and occupational lung cancer cases. This ratio is time- and place-specific and is largely determined by the effectiveness of antismoking campaigns and by the type of asbestos used. In the United Kingdom, it has been estimated that for every mesothelioma death, between two-thirds and one asbestos-related lung cancer death occur.[6] A more recent meta-analysis of occupational cohort studies concluded that all types of asbestos, except crocidolite, kill at least twice as many people through lung cancer than through mesothelioma.[7] However, for chrysotile, still widely consumed today, the number of asbestos-related lung cancers cannot be robustly estimated from few mesothelioma deaths.

Both approaches have been used in the present study. A major problem in Latin America is the quality of mortality statistics regarding mesothelioma, whose diagnosis may be problematic. Worldwide, a sizable number of pleural mesotheliomas (C45.0 code in the 10th revision of the International Classification of Diseases) are wrongly certified as "pleural cancers excluding mesothelioma," corresponding to the C38.4 code.[8,9] A few studies performed in Brazil[10] and Mexico[11] suggested that the recognition of deaths caused by mesotheliomas in those countries is far from being satisfactory. Changes in time of the absolute number of death from C45 and C38.4 in the countries of interest are described in Figure 1.

METHODS

As stated earlier, the methodological approach was derived from an earlier study.[5] The number of cases of a given disease due to a given exposure is the product