COMMENTARY

International Scientific Cooperation on Asbestos-Related Disease Prevention in Latin America

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The International Labour Organization-World Health Organization Outline for the Development of National Programmes for Elimination of asbestos-related diseases recommends the "Enhancement of international cooperation to stimulate the transfer of know-how on alternatives to asbestos and the best practices for prevention of asbestos-related diseases" as a strategic action to be developed at national level.[1] In this framework, the Italian National Asbestos project (www.iss.it/amianto), financed by the Ministry of Health within the Italian Asbestos National Plan,[2] aims to develop collaborations on diverse asbestos-related research, training and dissemination activities in countries where asbestos use is still permitted or has been recently banned, with a particular attention to Latin American countries. This viewpoint focuses on asbestos consumption and epidemiologic studies in Argentina, Brazil, Colombia, and Mexico.

In the second half of the 20th century, Latin America was one of the regions in the world in which the global asbestos industry displaced local industrial mining, production, and trade of asbestos. These activities also are currently maintained by the domestic industry and a widespread use of asbestos is still present in many Latin American countries.

Consumption in Latin America was initially supported by the import of both asbestos fibers and asbestos-containing products, mostly from Canada and the United States[3] and by asbestos cement production mostly concentrated by the multinational Eternit group. Between 1960 and 1980, major consumption was concentrated in Brazil, Mexico, Colombia, and Argentina. Consumption in Latin America peaked in 1980 with 356,033 tons used, half of which was consumed by Brazil (Table 1). The latter maintained the position as the dominant asbestos producer and user in Latin America and as an exporter, not only to other Latin American countries.

The extensive use of asbestos in Brazil[4-6] and Mexico[7] is well documented. Data on asbestos cement production in Colombia were presented in 1985 at the Latin American Conference on Asbestos and Health by Eternit Colombiana SA representatives.[8] Argentina progressively reduced its consumption until the adoption of the asbestos ban in 2000 (anphiboles) and 2001 (chrysotile). Chile, Uruguay, and Honduras adopted national bans shortly thereafter. Brazil did not adopt a national asbestos ban, and in the case of the five Brazilian states (São Paulo, Río de Janeiro, Rio Grande do Sul, Pernambuco, Mato Grosso) that did adopt a ban, an evaluation is underway by the Brazilian Supreme Court.

Noticeably enough, despite the national bans and the drastic reduction of consumption in Mexico, between 1970 and 2003, the ratio of asbestos consumption in Latin American increased from 4% to 6% (Table 1). This increase in consumption in Brazil and Colombia in the most recent years for which data are available is concerning.

The potency of amphiboles in the induction of mesothelioma is higher than that of chrysotile.[9] In this case, data on South Africa's export of crocidolite to Latin American countries are of great interest.[10] Most amphiboles used in Latin American were imported from South Africa: During the period from 1980 to 2003, Mexico imported more than 30,000 tons and Colombia imported more 8000 (almost exclusively crocidolite). Argentina imported 7000 tons of crocidolite and 4000 tons of amosite. Corresponding amounts for Brazil were 2000 and 1000 tons, respectively.

Taking into account the long-time interval and the amount of asbestos consumption in these 4 Latin American countries, the impact of asbestos exposure in working and residential environments on population health is a priority for public health, calling for dedicated epidemiologic studies. An attempt to estimate the asbestos cancer burden in the countries of interest is described elsewhere.[11]

Indeed, all over Latin America, little research has been conducted on asbestos and health. A search in Medline (April 18, 2014) with the key words "asbestos,"

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All authors declare that they have no conflicts of interests.

DM conceived and wrote this paper in strict cooperation with BT who reviewed and evaluated the available epidemiologic studies. RP and PC contributed to revising the manuscript.

http://dx.doi.org/10.1016/j.aogh.2014.09.002

Table 1. Asbestos Consumption in Four Latin American Countries, 1960-2011 (metric tons)

Country	Argentina	Brazil	Colombia	Mexico	Latin America	World
Year						
1960	NA	26,906	6,836	13,421	52,013	2,178.681
1970	21,141	37,710	16,763	40,460	144,229	3,543,889
1980	21,410	195,202	27,057	79,014	355,933	4,728,619
1990	6,863	163,238	21,437	39,316	248,495	3,963,873
2000	2,097	172,560	17,992	36,945	250,990	2,035,150
2003	166	62,532	13,118	19,872	129,996	2,108,943
2008	0	131,000	7,300	15,400	NA	2,200,000
2009	0	140,000	8,550	17,100	NA	1,980,000
2010	0	171,000	12,300	13,800	NA	2,060,000
2011	0	185,000	20,000	10,200	NA	2,070,000

NA: Not Available.
Data source: Virta R., U.S. Geological Survey (2005 - *Mineral commodity profiles — Asbestos* [Circular 1255—KK]; 2012 -*Mineral Yearbook. Asbestos [Advanced release]*).[3]

"epidemiology," and the name of the country, identifies 9 entries for Mexico, 12 for Brazil, 4 for Argentina, and 1 for Colombia. Corresponding figures for Italy and the United Kingdom are 394 and 211, respectively.

The entries include 6 analytical epidemiologic studies (i.e., providing risk estimates based on exposure and outcome at the individual level) carried out in the countries of interest. These are 4 case-control studies: 1 on mesothelioma in Mexico,[12] 2 on lung cancers, respectively in Buenos Aires, Argentina[13] and in São Paulo, Brazil,[14] and 2 on laryngeal cancer also in São Paulo.[15] The health status of Brazilian asbestos miners and former miners was investigated in 2 cross-sectional studies carried out several years apart.[16,17] Prospective studies on clinical conditions of former asbestos cement workers in São Paulo is ongoing.[18,19]

Only 2 studies, however, provided some valuable information.[12,18] In the case-control study in Mexico, occupational exposure of workers and residents in the Valley of Mexico corresponded to estimates of relative and attributable risks on the order of those expected in other industrialized areas.[9] The respiratory conditions of the former asbestos cement workers in São Paulo worsened over time in relation to previous asbestos exposure[18] and 7 of them died of mesothelioma.[19] On the other hand, the other 3 case-control studies, carried out relatively early after the expansion of asbestos use in Brazil and Argentina, were of limited statistical power and did not detect any association with asbestos nor with polycyclic aromatic hydrocarbons and other proven carcinogens for the respiratory tract. Finally, the study on miners and former miners in Brazil was exclusively addressed to nonmalignant conditions, excluded cancer or death as an outcome, and was affected by selection bias due to limited participation.

The literature survey also has detected several reports of case series of mesotheliomas in Mexico, in which occupational or environmental exposure to asbestos could be documented for a substantial proportion of cases.[20-22] Cases also were reported from Panama.[23] A Brazilian "reproducibility study" using ultrathin computed tomography, detected pleural plaques in 57 of 752 chrysotile mining workers and former mining employees.[24] In a hospital in Argentina, as early as the 1990s, 17 cases of mesothelioma had been reported. Of these 9 were believed to be related to environmental asbestos exposure.[25] A more recent report described 27 patients with asbestos-related diseases who had worked in a steel factory in the province of Santa Fe, Argentina. This group included 6 individuals with asbestosis, 16 with benign pleural lesions, 4 with mesothelioma, and 1 with lung cancer.[26]

Thus, foci of asbestos-related diseases occur in the countries of interest: Most likely, those that have been reported and occasionally included in conventional epidemiologic studies represent the tip of an iceberg. This also is suggested by recent data produced by cancer registries.[27] In Argentina, in the province of Mendoza (where talc mines contaminated with amphiboles are present) and in the highly industrialized city of Cordoba, rates approach those of traditionally industrialized countries. In Cali, Colombia, where an asbestos cement plant is active, rates are somewhat lower but are of the same order of magnitude. Most Latin American cancer registries have produced relatively high rates of cases coded as "pleural cancers excluding mesothelioma."[27] Despite the wording, this is the only admissible code for registering pleural cancers whose clinical records do not fulfill all the complex conditions required for a diagnosis of pleural mesothelioma, which may be difficult.[28]

In light of these findings and observations, it can be hypothesized that international scientific cooperation can provide 3 major sets of contributions to prevent asbestos-related disease at a global level.

First, it is necessary to create a common frame to determine public health decision-making processes, based

on the dissemination of valid scientific information, as previously discussed.[29] This implies a clear-cut rebuttal of the falsely alleged notions of safety of controlled use of asbestos and lack of carcinogenicity of chrysotile.

International cooperation aimed at primary prevention should be pursued by a ban on asbestos and by environmental cleanup. This cooperation may concurrently pursue improvements in assessment of asbestos exposure addressed at detecting the worst situations, which deserve priority. The relevance of this aspect was illustrated[30,31] on asbestos-exposure levels in Bogota automobile repair shops.[30,31] Improvements in exposure assessment also contribute to the validity and scope of information provided by epidemiologic studies.

International cooperation may in fact also be applied to the domain of epidemiology, with the specific goal of providing estimates of the impact of asbestos-related disease in local settings, as illustrated previously.[11] To this end, improvements in the quality of mortality and cancer incidence data are needed, as discussed in this viewpoint, as well as integration of environmental and health data in well-designed study protocols. Finally, local experiences of health surveillance of exposed individuals might benefit from compliance with international guidelines in this field, like those recently provided by the International Committee on Occupational Health in the Helsinki Declaration.[32] In conclusion, availability of reliable figures on health effects of asbestos at the national level may constitute a step in the construction of collective awareness of the adverse effects of this agent, thus corroborating the need for the empowerment of a preventive and precautionary approach, as was the case in Italy.[33] Nowadays, this process should strongly speed up in light of the unprecedented availability of technologic approaches for accessing and disseminating the pertinent scientific evidence.

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