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COLLEGIUM RAMAZZINI

The global health dimensions of asbestos and asbestos-related diseases

The Collegium Ramazzini is an international scientific society that examines critical issues in occupational and environmental medicine with a view towards action to prevent disease and promote health. The Collegium derives its name from Bernardino Ramazzini, the father of occupational medicine, a professor of medicine of the Universities of Modena and Padua in the late 1600s and the early 1700s. The Collegium is comprised of 180 physicians and scientists from 35 countries, each of whom is elected to membership. The Collegium is independent of commercial interests.

The Collegium Ramazzini (CR) reaffirms its long-standing position that responsible public health action is to ban all extraction and use of asbestos, including chrysotile. This current statement updates earlier statements by the CR with a focus on global health dimensions of asbestos and asbestos-related diseases (ARDs). The ARD epidemic will likely not peak for at least a decade in most industrialized countries and for several decades in industrializing countries. Asbestos and ARDs will continue to present challenges in the arena of occupational medicine and public health as well as in clinical research and practice, and have thus emerged as a global health issue. Industrialized countries that have already gone through the transition to an asbestos ban have learned lessons and acquired know-how and capacity that could be of great value if deployed in industrializing countries embarking on the transition. The accumulated wealth of experience and technologies in industrialized countries should thus be shared internationally through global campaigns to eliminate ARDs.

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Background

Every asbestos fiber that is mined is indestructible which repeatedly exposes many individuals during its life-cycle from mining and extraction of asbestos-containing rocks to manufacturing of asbestos-containing products (ACP), and further during use, repair, demolition and abatement of ACP. Since 1993, the Collegium Ramazzini has repeatedly called for a global ban on all mining, manufacture and use of asbestos[1–4] The Collegium has taken this position based on well-validated scientific evidence showing that all types of asbestos, including chrysotile, the most widely used form, cause cancers such as mesothelioma and lung cancer, and showing additionally that there is no safe level of exposure. The Collegium has continued to criticize as fallacious and unachievable the so-called "controlled use" of chrysotile advocated by the asbestos industry. Unfortunately, despite these concerns and abundant scientific evidence, global usage of chrysotile has remained at around two million metric tons per year in recent years. Most of this current use is concentrated in low- and middle-income countries[5].

The Collegium reaffirms its position that, given the well-documented availability of safer, cost-effective alternative materials, the responsible public health action is to ban all extraction and use of asbestos. State of the art technologies must be employed in asbestos removal and disposal. This current statement updates earlier statements with a focus on the global health dimensions of asbestos and asbestos-related diseases (ARDs).

UN Organizations

In 2006, the World Health Organization (WHO) called for the elimination of ARDs[6] taking the position that the most efficient way to eliminate ARDs is to cease using all types of asbestos. The 2014 update of this statement, which was attached to the WHO document "Chrysotile Asbestos"[7] published in response to the continuing widespread production and use of chrysotile, emphasized that all forms of asbestos, including chrysotile, are causally associated with an increased risk of cancer of the lung, larynx and ovary, mesothelioma and asbestosis; these observations are in line with the recent evaluation by the International Agency for Research on Cancer (IARC)[8]. In its 2014 update, the WHO reiterated the call for global campaigns to eliminate ARDs. These efforts have been joined by other United Nations agencies including the International Labour Organization (ILO) and the United Nations Environment Programme (UNEP). The Chemical Review Committee of the Rotterdam Convention has repeatedly recommended that chrysotile asbestos be put on the Convention's list of hazardous substances, thus requiring exporting countries to obtain prior informed consent (PIC) from the importing countries. A handful of countries have opposed that recommendation, thus preventing this basic safety protection from coming into effect. The Collegium calls on all Parties to the Rotterdam Convention to support the listing of chrysotile asbestos.

Global Burden of ARDs

Occupational exposure to asbestos causes an estimated 107,000 deaths each year worldwide. These deaths result from asbestos-related lung cancer (ARLC), mesothelioma and asbestosis[6, 7]. When the global burden of each type of ARD was considered separately, the estimated number of deaths per year was 41,000 for ARLC[9] 43,000[10]–59,000[7, 9, 11] for mesothelioma, and 7,000[12]–24,000[13] for asbestosis. No estimate is available for the annual numbers of deaths due to asbestos-related cancers of the larynx or ovary. Because asbestos is more likely to cause lung cancer than mesothelioma, the total burden of ARDs will differ substantially with the estimated magnitude of ARLC. The WHO recently advanced a risk ratio of 6:1 for contracting lung cancer versus mesothelioma following chrysotile exposure[7]. As these estimates are derived by different methods, inconsistencies might be eliminated through a cross-verification of the various estimation methods used. Regardless, the ARD burden is more likely to be underestimated than overestimated because ARDs are well known to be under diagnosed and underreported.

National Bans

Since Iceland first introduced a ban on all types of asbestos in 1983, more than 50 countries have implemented similar bans[14]. However, the pace of countries adopting bans has slowed in the past decade. Indeed, the governments of several industrializing countries have withdrawn bans while others have prescribed long periods over which to move towards a ban. Such actions are likely a consequence of the corrupting influence of pro-chrysotile lobbies, whether foreign or domestic. Asbestos industry lobbyists employ "product defense" science to foment uncertainty to sway the opinions of industrializing countries, a delaying tactic which, unfortunately, has often succeeded. Nine of the ten most populous countries in the world, all of which use or have used substantial amounts of asbestos, have yet to adopt bans. Coverage of the world population by bans thus remains low and is biased towards industrialized countries.

Alternatives to Asbestos

In countries where asbestos has been banned, safer, cost-effective substitute materials have been successfully introduced. Polyvinyl alcohol fibers and cellulose fibers can be used instead of asbestos in building products such as flat and corrugated fiber-cement sheets, which are used in roofing, interior walls, and ceilings. Polypropylene and cellulose fibers have been used instead of asbestos to make fiber-cement products in Brazil. Virtually all of the polymeric and cellulose fibers used instead of asbestos in fiber-cement sheets are greater than 10 microns in diameter and hence are non-respirable. For roofing in remote locations, lightweight concrete tiles can be fabricated using cement, sand and gravel; and optionally, locally available plant fibers such as jute, hemp, sisal, palm nut, coconut coir, kenaf, and wood pulp. Galvanized iron roofing and clay tiles are other alternative materials. Substitutes for asbestos-cement pipe include ductile iron pipe, high-density polyethylene pipe, and metal-wire-reinforced concrete pipes[15, 16]. While these materials are considered safer than asbestos, good work practices should be observed for the protection of those working with these materials.

Patterns of the ARD Epidemic

Countries continuing to use asbestos will shoulder the burden of ARDs in proportion to their prior levels of asbestos use[17]. Countries where asbestos has been banned or greatly limited invariably exhibit a sustained epidemic of ARDs. Age-adjusted mortality rates of mesothelioma are increasing in most industrialized countries[18] but the rate of increase has slowed in only the few industrialized countries, which started to reduce asbestos use decades ago. With the known synergy of asbestos and smoking, it can be expected that the many industrializing countries with high smoking prevalence and continued use of asbestos will shoulder a substantial burden of asbestos-related lung cancer. The ARD epidemic will likely not peak for at least a decade in most industrialized countries and for several decades in industrializing countries. Asbestos and ARDs will therefore continue to present challenges in the arena of occupational medicine and public health as well as in clinical research and practice. Hence, asbestos and ARDs are global health issues.

Industrializing Countries

Many industrializing countries have been slow to reduce, let alone ban, the use of asbestos. The multiple factors at play include the low price and easy accessibility of asbestos, demand from the construction sector in emerging economies, scarcity of medico-social resources, and fierce propaganda by the asbestos industry and other parties with conflicting interests. These factors are interrelated and converge uniquely in each country, presenting significant challenges to concerned parties. For example, a number of rapidly growing industrializing countries in Asia and former Soviet Union countries currently sustain a high level of asbestos use and/or production and they fail to provide even minimal protection to workers; they have a serious lack of expertise and resources required to diagnose and report ARDs. Furthermore, several industrializing countries that were importers (but not exporters) of asbestos were among the countries that opposed the inclusion of chrysotile into the aforementioned PIC procedure of the Rotterdam Convention. This is a blatant reflection of the corrupt influence of the asbestos industry and crude trade pressures of asbestos-exporting countries. Advocates for banning asbestos must continue to strive to overcome the reluctance, denial and antagonism of their opponents.

Industrialized Countries

The highest priority in reducing ARDs is primary prevention; that is, banning asbestos use in countries where it remains legal and preventing exposure to *in situ* sources in all countries with historical asbestos use. In industrialized countries, large quantities of asbestos remain as a legacy from past construction practices in many thousands of schools, homes, and commercial buildings. Significant quantities of asbestos also remain in various industrial applications. It is of importance to document and mark existing asbestos in buildings and industrial applications to avoid exposure during maintenance, repair and demolition. As the materials weather, erode, break or are cut by power tools, asbestos fibers are released into the air, soil and water, where they become a source of community-wide exposure. Policies, regulations and practices should safeguard workers engaged in the removal of asbestos-containing structures and the handling of the resulting waste material, via schemes for specialized training and licensing[19].

Secondary and tertiary prevention are also assuming vital importance in industrialized countries. In particular, workers exposed to asbestos in current or past occupations should be identified; registered and followed-up for health monitoring and surveillance[19]. The unfolding ARD epidemic in these countries poses costly challenges in the arenas of basic and clinical medicine. In medical practice, such challenges include the development of biomarkers for the early detection of mesothelioma, as well as effective modalities for its treatment. It is imperative to design and implement just compensation schemes for people with ARDs and their families. Industrialized countries should provide assistance to industrializing countries on issues related to asbestos and ARDs.

In countries having banned asbestos, as well as in countries still using asbestos, a large number of workers remain at high risk of developing ARDs from past exposure, in particular lung cancers and mesotheliomas. Most of these previously exposed people remain in the general population without any ongoing health monitoring. The Collegium recommends that countries develop strategies for identifying their previously and currently asbestos-exposed workers, to quantify their exposure, and register them, subsequently developing methods for continuous health surveillance and secondary prevention[20] In addition to workers there should be monitoring of household members of workers if they bring asbestos into their homes.

International Co-operation

The accumulated wealth of experience and technologies in industrialized countries should be shared internationally through global campaigns to eliminate ARDs. Industrialized countries have experience in primary, secondary and tertiary prevention, with the strengths of any given country depending on its particular stage in their epidemic of ARDs. The knowledge and technological developments that have emerged from these experiences could be of great benefit to countries in which asbestos continues to be used. The Statement[21] on asbestos by the International Commission on Occupational Health (ICOH) describes a broad range of activities at each of the three levels of prevention. For optimum effect, the resources of industrialized countries should be combined and distributed in a manner tailored to the needs of the beneficiaries. Scientific expertise is an important resource to be shared, including capacity building and surveillance of ARDs. Given the wide range of problems encountered at the global level, the development of regional initiatives should be particularly valuable[22].

Industrialized countries that have already gone through the transition to an asbestos ban have learned lessons and acquired know-how and capacity (*i.e.*, "soft" technology) that could be of great value if deployed in industrializing countries embarking on the transition. Collaboration between industrialized and industrializing countries can be led by international organizations, the scientific community and/or grass roots NGOs, and should involve practitioners, researchers, administrators and civil society. For example, through fora such as international workshops or conferences, countries with bans in place can outline how they implemented a ban and provide practical guidance on how countries currently using asbestos can move towards a ban.

Conclusion—The Need for a Global Health Approach

Asbestos and ARDs have emerged as global health issues. All countries with a history of asbestos use are experiencing an epidemic of ARDs, with the stage of the epidemic being a function of a country's past asbestos use, whether and when it implemented a ban, and, if no ban is in place, at what levels it continues to use the material. Gaps in human capital and technology available to countries warrant international cooperation. The expansion of national bans in industrializing countries and reducing the burden of ARDs in industrialized countries are the short-term targets. Given that ARDs are 100% preventable, zero new cases of ARDs should be the ultimate goal for both industrializing and industrialized countries. The pandemic of ARDs is an urgent international priority for action by public health workers.

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