JPC SE Joint Policy Committee Societies of Epidemiology

Position Statement on Asbestos

from the

Joint Policy Committee

of the

Societies of Epidemiology (JPC-SE)

June 4, 2012

The Joint Policy Committee (JPC) of the Societies of Epidemiology (SE) is a consortium of epidemiology societies and organisations, national and international in scope. The JPC-SE originated in 2006 at the 2nd North American Congress of Epidemiology to coordinate and unify joint policy actions globally among epidemiology societies. The lead organisers of that Congress (the American College of Epidemiology, the Society for Epidemiologic Research, and the Epidemiology Section of the American Public Health Association), in conjunction with the Canadian Society for Epidemiology and Biostatistics, took the leading roles in the formation of the JPC-SE, which now numbers 13 member organisations. The American College of Epidemiology provides substantial administrative and logistical support to its activities.

This Position Statement on Asbestos was developed by representatives of 12 of our member societies, in consultation with these societies. On June 4th, 2012, the JPC-SE approved this Position Statement. Each member organisation then followed its own endorsement process, such as the recusal of its leadership members when appropriate or necessary, such as for some government employees or for those with conflicting interests. Some individual epidemiologists hold the position that epidemiologists should not play any role in advocacy. Some of our member organisations, as per their own internal policies, do not issue or publicly endorse any specific statements.

Endorsers of this Statement are included as appendices (pages 26 onwards).

For more information, contact the Chair of the JPC-SE (Professor Stanley H. Weiss, MD) by e-mail at JPCSE.Chair@gmail.com, or by writing to Dr. Weiss care of the American College of Epidemiology (address immediately below).

The Joint Policy Committee of the Societies of Epidemiology provides a forum for surveillance of and communication about funding, regulatory, and legislative environments relating to epidemiologic research and practice. Through coordinated joint action, the Committee strives to impact policies and influence opinion leaders relevant to policies that rely on epidemiologic evidence.

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POSITION STATEMENT ON ASBESTOS

EXECUTIVE SUMMARY

A rigorous review of the epidemiologic evidence confirms that all types of asbestos fibre are causally implicated in the development of various diseases and premature death. Numerous well-respected international and national scientific organisations, through an impartial and rigorous process of deliberation and evaluation, have concluded that all forms of asbestos are capable of inducing mesothelioma, lung cancer, asbestosis and other diseases[1]. These conclusions are based on the full body of evidence, including the epidemiology, toxicology, industrial hygiene, biology, pathology, and other related literature published to the time of the respective evaluations.

Industrialised countries have virtually ceased using asbestos and over 50 countries have passed laws banning its use. Consequently, the asbestos industry, to establish new markets, is promoting the use of asbestos in low-to-middle income countries, particularly in Asia, and has created lobby organisations to achieve this goal.

In spite of the scientific evidence and calls to end all use of asbestos by many organisations including the World Health Organization, the World Federation of Public Health Associations, the International Commission on Occupational Health, the International Social Security Association, the International Trade Union Confederation and the World Bank, the use of asbestos is increasing in low-to-middle income countries. There is little awareness in these countries of the risk that asbestos poses to health; in addition, safety regulations are weak to non-existent. If unstopped, this continued and increasing use of asbestos will lead to a public health disaster of asbestos-related illness and premature death for decades to come in those countries, repeating the epidemic we are witnessing today in industrialised countries that used asbestos in the past.

[1] IARC, 2012; LaDou et al, 2010; ATSDR, 2001; NTP, 2011; NIOSH, 1972.

Therefore, the Joint Policy Committee of the Societies of Epidemiology (JPC-SE), comprising epidemiologists from around the world:

- Calls for a global ban on the mining, use, and export of all forms of asbestos;
- Calls specifically on the major asbestos exporting countries – Brazil, Canada, Kazakhstan, and Russia – to respect the right to health by ceasing the mining, use, and export of asbestos, and providing transition assistance to their asbestos-mining communities;
- Calls specifically on the major asbestos-using countries – Brazil, China, India, Indonesia, Iran, Kazakhstan, Russia, Sri Lanka, Thailand, Ukraine, Uzbekistan, and Vietnam – to cease use of asbestos;
- Urges sister societies of epidemiology and/or public health organisations and agencies, particularly in those countries that continue to mine, use and/or export asbestos, such as Brazil, Canada, China, India, Indonesia, Iran, Kazakhstan, Russia, Sri Lanka, Thailand, Ukraine, Uzbekistan, and Vietnam, to adopt a position calling for a ban on the mining, use, and export of all forms of asbestos;
- Urges all countries that have used asbestos to inform their citizens and their healthcare professionals of the hazards of asbestos and to implement safety measures to monitor the health of exposed citizens. To facilitate this, an inventory of asbestos already in place is needed, particularly in schools and places where children are present; and
- Urges all sister societies of epidemiology and/or public health organisations and agencies to support the right of scientists and academics to carry out their work free from intimidation. In situations where the asbestos industry files legal cases to silence scientists and academics, societies of epidemiology and/or public health organisations and agencies are urged to examine the situation and, if warranted by the facts, to support the scientists or academics being threatened and to denounce such tactics of intimidation. The procedure developed by the International Society for Environmental Epidemiology for dealing with beleaguered colleagues could be followed as a model. It is available at: http://www.iseepi.org/About/Docs/iseeprocedurefordealingwithbeleagueredcolleagues.pdf

Position Statement on Asbestos

The issue

Over a century ago, factory inspectors in Europe noted the harmful effects of asbestos on workers' health. Since the 1960s, the scientific evidence has become overwhelming that occupational and environmental exposure to asbestos can cause asbestosis, lung cancer, and mesothelioma. More recently, additional lung diseases and other cancers have been added to the list of diseases resulting from asbestos exposure; these include ovarian and laryngeal cancers (IARC, 2012).

In countries in which asbestos has been mined or used, epidemics of asbestos-related diseases have followed. Indeed, over the ten-year period from 1999 to 2008, 70% of deaths from occupational diseases in the Canadian province of Quebec were estimated to be caused by asbestos (Commission de la santé et de la sécurité du travail du Québec, 2010), and asbestos is the biggest single cause of occupational disease across Canada.

Asbestos used in buildings, houses, and ships releases harmful – and potentially lethal – fibres when these structures deteriorate, are renovated or demolished. Government health authorities in privileged, technologically advanced jurisdictions, such as Quebec, Canada, state that it is impossible for any form of asbestos to be used safely – even in their own highly regulated jurisdictions (Quebec, Public Health Directors, 2011).

As a legacy of past use of asbestos, the number of cases of asbestos-related diseases continues to climb every year across Canada and in many other industrialised countries. Consequently, the countries that used asbestos in the past, such as Canada, the United States (US), Australia, and throughout Europe, have either adopted a legal ban, or have virtually ceased using asbestos altogether.

Following the same types of strategies that were used by the tobacco industry (McCulloch and Tweedale, 2008; Michaels, 2008), the global asbestos industry targets low-to-middle income countries where there is limited awareness of the harm caused by the substance and where safety

protections are weak to non-existent. Also, the asbestos industry denies the scientific evidence concerning harm and uses its political and economic power to promote the use of asbestos in low-to-middle income countries, claiming that it is an excellent and safe product. An international trend has emerged, exemplified by Asia. Le et al. (2011) demonstrate that the proportion of global asbestos use attributed to Asia has been steadily increasing over the years from 14% (1920–1970) to 33% (1971–2000) to 64% (2001–2007). This increase has been reflected in the absolute level of per capita use across a wide range of countries in Asia. For example, in both India and China, the per capita asbestos use has increased. In India, it has increased from 0.04 to 0.13 to 0.20 kg/capita/year over the three successive time periods; and, in China, the increase has gone from 0.07 to 0.24 to 0.39. In other Asian countries, bans on asbestos use are reflected in decreases over the same three time periods.

The continued promotion of asbestos mining and use will result in a continuing epidemic of asbestos-related diseases and death. The situation is particularly unfortunate in that there are safe substitutes[2] for asbestos, as well as the knowledge and means to prevent this epidemic. It is now important that the science of epidemiology be brought to bear in preventive policy.

Context

Recently, the International Agency for Research on Cancer (IARC, 2012) – the highly respected cancer agency of the World Health Organization, a scientific review body – concluded that: "There is sufficient evidence in humans for the carcinogenicity of all forms of asbestos (chrysotile, crocidolite, amosite, tremolite, actinolite, and anthophyllite). Asbestos causes mesothelioma and cancer of the lung, larynx, and ovary." This assessment had been previously reached by the Collegium Ramazzini (2004, 2010; and LaDou et al., 2010). Furthermore, broad-based objective assessments have also been undertaken by public policy and/or regulatory agencies including the ATSDR (2001), EPA (1986), ILO (2006), WHO (2006), APHA (2009), and CPHA (2009). All have concluded that asbestos – in all of its different forms – is both an occupational and an environmental hazard responsible for on-going increases in the number of cases of mesothelioma, lung cancer, asbestosis, and other diseases.

[2] See Appendix 4, page 14, at The World Bank Guidance Note on Asbestos, 2009 "Some Alternatives to Asbestos-Containing Products" at http://siteresources.worldbank.org/EXTPOPS/Resources/AsbestosGuidanceNoteFinal.pdf

Asbestos has been banned in more than 50 countries (International Ban Asbestos Secretariat, 2011). The World Health Organization (WHO, 2006) and the World Bank (2007 and 2009) have urged the use of safer materials in place of asbestos, and have provided information on possible safe substitutes. However, the asbestos industry and a handful of countries in which the industry has strong political influence – such as Brazil, Canada, Kazakhstan, Russia, and Ukraine – continue to deny the compelling scientific evidence of asbestos' deadly effects and to promote its use (McCulloch and Tweedale, 2008).

In a review of cost and performance issues, the World Bank (2009) concluded that the present direct cost of industrially produced safer alternatives is between 10-15% more than asbestos-containing construction materials. The same document also notes that micro-concrete tiles are cheaper than asbestos-cement to produce and can be made in basic workshops near the building site with locally available small contractors and materials, lowering transport costs. Further, the World Bank (2009) notes that its estimates externalise the health and remediation costs of asbestos use. When health and remediation costs are factored in, the use of asbestos not only causes a human tragedy, but also an economic disaster. This is the experience in every country where asbestos has been used in the past: health care, compensation, and remediation costs cumulatively reach billions of dollars.

In a number of countries, such as France, Belgium, and Australia, governments have found it necessary to create special funds to compensate people with asbestos-related diseases. In France alone, between 2002 and 2010, the fund awarded $3.5 billion to such persons (Fonds d'Indemnisation des Victimes de l'Amiante, 2010, page 45, Table 25). In the province of Quebec, Canada, the cost to the government for remediating asbestos in certain schools was $75 million in 2002 (Le Devoir, 2002). Many more millions of dollars have been spent on asbestos remediation of schools in Quebec since that date.

The Rotterdam Convention, in effect since 2003, convenes every two years to deliberate on the designation of hazardous substances as recommended by its scientific review panel. The Convention requires of signatory countries that, once a substance is placed on its list of hazardous substances, exporting countries must, prior to its exportation, provide information on

the harms the substance can cause. It also requires exporting countries to provide information on the safety measures necessary to protect importing country workers and the local population from harm throughout the life cycle of the substance. Warning labels on the packaging of the substance are also mandatory. The Convention thus enables importing countries to make a prior, informed decision regarding their capability to manage the substance safely and gives them the right to refuse importation.

The Convention is organised on two levels: one scientific and the other political. On the political level, any one country can obstruct a recommendation of its scientific review panel. Indeed, Canada, along with Kazakhstan, Kyrgyzstan, Ukraine, and Vietnam, refused the listing of chrysotile asbestos (the only form of asbestos still mined and traded) as a hazardous substance under the Rotterdam Convention in 2011, thus allowing the trade in asbestos to continue without warnings as to its harmful effects. In fact, attempts to list chrysotile asbestos at each of the two previous Conferences were also obstructed by at least one of these five countries.

Asbestos

Asbestos is the generic name for a variety of silicate minerals whose crystals occur in fibrous forms. Asbestos minerals are divided into two main groups, based on their fibre structure: serpentine (which includes only chrysotile or white asbestos), and amphibole (which includes amosite, crocidolite, anthophyllite, tremolite, and actinolite). Chrysotile asbestos accounts for approximately 95% of all asbestos used in the 20th century (Virta, 2006).

Where is asbestos being used, and how much?

In the past century, asbestos was widely used in industrialised countries for a variety of purposes in buildings and in transportation and electrical systems. However, more than 50 countries, including all of the European Union, have now banned asbestos products. Other industrialised countries, such as the US and Canada, although having not officially banned asbestos, have virtually stopped using it in their own domestic industries. Asbestos-containing materials, such as automobile brake pads and even asbestos-containing toys, continue, however, to be imported into Canada and the US. Furthermore, asbestos is in place in many areas where human exposure is possible, including private and institutional housing (in flooring, walls, electrical circuitry, and

ceilings: see http://www.hiddenkiller.ca/images/HouseBCLarge.jpg for details; see also Agency for Toxic Substances and Disease Registry, 2001), in building materials, construction, and the like. When damage occurs in such areas, asbestos fibres can become airborne, necessitating costly abatement and safe removal operations by specially trained and equipped professionals.

World consumption was relatively steady between 2003 and 2007, averaging 2.11 million metric tonnes (Mt). The leading consuming countries in 2007 were, in decreasing order of tonnage: China (30%), India (15%), Russia (13%), Kazakhstan, and Brazil (5% each) and Thailand, Uzbekistan, and Ukraine (4% each). These eight countries accounted for about 80% of world asbestos consumption in 2007. The latest data show that in 2010 China used an estimated 613,760 Mt of asbestos, followed by India (426,368 Mt), Russia (263,037 Mt), Brazil (139,153 Mt), Indonesia (111,848 Mt), Thailand (79,250 Mt), Vietnam (67,420 Mt), and Sri Lanka (47,892 Mt) (Virta, 2009; Virta, 2012; personal communication from RL Virta, National Minerals Information Center, US Geological Survey on May 30, 2012).

The asbestos industry promotes the "safe use" of asbestos in low-to-middle income countries, where workers are largely unaware of its dangers and where regulatory and enforcement regimes are weak. At the same time that the use of asbestos has plummeted in industrialised countries, its use has sharply increased in low-to-middle income countries, particularly in Asia. Today, the five largest users of asbestos are China, India, Russia, Brazil, and Indonesia.

Where is asbestos being produced, and how much?

Since the early 1990s, global asbestos use has remained at around 2 million Mt per year. Russia, China, Kazakhstan, Brazil, and Canada produce 93% of this total (Virta, 2009; personal communication from RL Virta, National Minerals Information Center, US Geological Survey on May 30, 2012). Some countries, such as the United States (Virta, 2006) and South Africa (McCulloch and Tweedale, 2008), have permanently closed down their asbestos mines. However, other countries, such as Canada (Montreal Gazette, 2012) and Zimbabwe (Zimbabwe Herald, 2011), while no longer presently mining asbestos, have expressed the intention to recommence asbestos mining and export. In Brazil, a number of states have banned the mining, use, and transport of asbestos; public health professionals and victims are endeavouring to

achieve a national ban on asbestos, but are meeting fierce resistance from the asbestos industry (BBC, 2010).

World Asbestos Production from 1900 through 2003 **(Virta, 2006)**

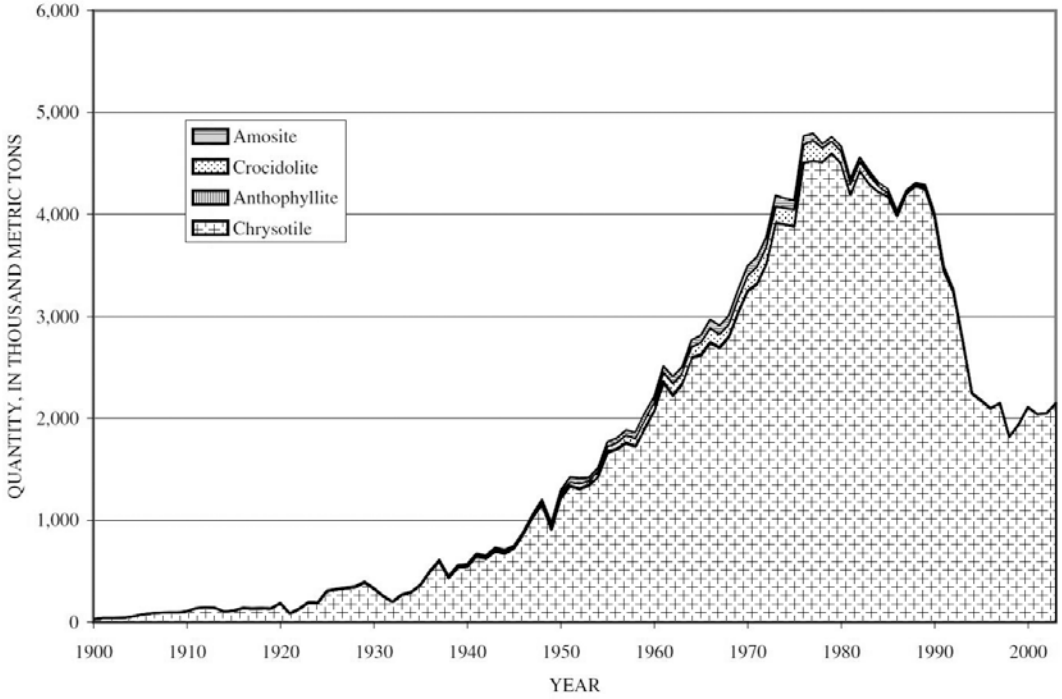

Figure 1. World production of asbestos, by type, from 1900 to 2003. About 2.81 million metric tons (Mt) of amosite, 460,000 metric tons of anthophyllite, 173 Mt of chrysotile, and 3.92 Mt of crocidolite were produced from 1900 to 2003. Sources: U.S. Geological Survey, 1901-1921, 1924-1932, 1997-2005; U.S. Bureau of Mines, 1934-1996.

From 1900 to 1960, world asbestos production increased steadily to 2 million Mt per annum; from the early 1960s to the mid-1980s, production spiked to over 4 million Mt per annum, most of which was used in industrialized countries. By the mid-1990s, however, many industrialized countries stopped using asbestos and world production dropped to 2 million Mt per annum. Since then, and until today, the asbestos industry has succeeded in maintaining global asbestos production at approximately 2 million Mt per annum (Figure 1 and personal communication from RL Virta, National Minerals Information Center, US Geological Survey on May 30, 2012).

Harmful effects

The estimated current "hidden" burden of mesothelioma deaths (for the 15-year period of 1994-2008) in the largest of the countries using asbestos is (from Park et al., 2011) 5,107 for China;

2,158 for India; 21,308 for Russia; 955 for Brazil (this number is the actual reported number); and 123 for Indonesia. For additional asbestos-attributable cases of lung cancer, a multiplier of 3 (with a range from 2–10) can be used for a conservative estimate of the number of lung cancer deaths (Takahashi, K., personal communication, Dec. 10, 2011). Hence, we find for China 15,321 deaths; India 6,474; Russia 63,924; Brazil 2,865; and Indonesia 369 (Le et al., 2011). Although more difficult to quantify, substantial numbers of asbestosis-related fatalities can also be expected.

It should be noted that the above-estimated "hidden" numbers are based on asbestos consumption (not production) up to the year 1970. Because this group of countries, on average, quintupled consumption since 1970, a future surge of asbestos related diseases in Asia should be anticipated in the coming decades (Le et al., 2011). Takahashi and colleagues are developing predictive models to extend this work (personal communication, December 10, 2011).

As noted previously, international agencies such as the International Agency for Research on Cancer (IARC, 2012) have determined that all forms of asbestos are carcinogenic to humans, and can cause mesothelioma and cancers of the lung, larynx and ovary. Indeed, Straif et al. (2009) reported in *The Lancet* on the then-recent IARC findings as follows: "Epidemiological evidence has increasingly shown an association of all forms of asbestos (chrysotile, crocidolite, amosite, tremolite, actinolite, and anthophyllite) with an increased risk of lung cancer and mesothelioma." Asbestos exposure is also responsible for other non-cancer morbidity, such as asbestosis (fibrosis of the lungs), pleural plaques, pleural thickening, and pleural effusions.

The World Health Organization (WHO, 2006) states that about 125 million people in the world are currently exposed to asbestos in the workplace. According to the most recent WHO estimates, more than 107,000 people die each year from asbestos-related lung cancer, mesothelioma, and asbestosis resulting from exposure at work; one in every three deaths from occupational cancer is estimated to be caused by asbestos. In addition, it is estimated that several thousand deaths annually can be attributed to exposure to asbestos in the environment, particularly in the home. Indeed, asbestos is still used in brake linings that people may replace at home, and, in the course of home renovations, asbestos can be released. Its presence is thus

environmentally pervasive, albeit generally at relatively lower levels than in the workplace. Because the extent of environmental exposure among the general public is methodologically difficult to assess, there are few studies directly documenting what the attributable risk is in the general population.

What is asbestos being used for today?

Approximately 90% of asbestos produced today is used in asbestos-cement materials, such as roofing, pipes, and water storage tanks, primarily in low-to-middle income countries (Collegium Ramazzini, 2010). The remainder is used in other products, including friction materials such as brake pads, gaskets, certain plastics, and industrial textiles.

Epidemiologic evidence

A large number of studies have reported an excess of mesothelioma and lung cancer among workers who were predominantly exposed to chrysotile asbestos (Kanarek, 2011). For example, excess mortality from lung cancer and mesothelioma has been reported among miners and millers in Quebec (Liddell et al., 1997), among textile workers in South Carolina (Hein et al., 2007) and North Carolina (Loomis et al., 2009), Chinese chrysotile production workers (Wang et al., 2012), and in Italian miners (Pira et al., 2009) exposed primarily to chrysotile asbestos.

There has been some suggestion that the cases of mesothelioma may be due to contamination of chrysotile ores by amphiboles. Truly “pure” exposures to any one form of asbestos in a large cohort may be difficult to study because most exposures described in the literature involve at least some mixture of fibre types. This said, there have been examples of relatively “pure” exposures, and again, such epidemiologic data are consistent with the proposition that all forms of asbestos can cause mesothelioma. For example, an Italian chrysotile mining cohort in Balangero, Italy, has been followed up over the years (Piolatto, 1990; Mirabelli, 2008) and has demonstrated a statistically significant four-fold excess (6 cases vs. 1.5 expected) of pleural mesothelioma among blue-collar workers, and also among other classes of workers as well as among allied workers (Mirabelli, 2008). The chrysotile mined at Balangero was reported to be free of tremolite and other amphiboles. While the ore contains trace amounts of another fibre called balangeroite, this is not an amphibole and is unlikely to be responsible for the excess of

mesothelioma found in Balangero in past and more recent studies (Turci et al., 2009).

The Canadian asbestos industry is largely responsible for creating and advancing the idea that chrysotile asbestos is safer than asbestos of other fibre types (McCulloch and Tweedale, 2008). Egilman and colleagues (2003) previously evaluated published and unpublished studies carried out by researchers at McGill University and funded by the Quebec Asbestos Mining Association (QAMA). These QAMA-funded researchers had claimed that Quebec-mined chrysotile was essentially harmless and that the contamination of chrysotile with oils, tremolite or crocidolite was the source of occupational health risk. Careful review of these claims revealed unsound selection, sampling, and analytical techniques, with the rejection of their contention that chrysotile was "essentially innocuous". Nevertheless, these refuted QAMA-funded studies have been used to promote the marketing and sale of asbestos, with a substantial effect on policy and occupational health litigation (Egilman et al., 2003; Bohme et al., 2005).

Yano and colleagues (2001), in a 25-year longitudinal study, followed a cohort of 515 male asbestos plant workers exposed to chrysotile only; the control cohort included 650 non-dust-exposed workers. Mortality from all causes, all cancers, and lung cancer was related to asbestos exposure; the relative risks, adjusted for age and smoking, were 2.9, 4.3, and 6.6, respectively. The adjusted relative risk of lung cancer was 8.1 for workers exposed to high versus low levels of asbestos. The authors conclude that exposure to pure chrysotile asbestos can cause lung cancer and malignant mesothelioma in exposed workers (Yano et al., 2001). Other researchers have demonstrated that chrysotile without tremolite can cause peritoneal mesothelioma (Egilman and Menéndez, 2011).

The main controversies today are about relative potency of the different types of asbestos and not about causality. There has been a continuing debate in the literature about the mesotheliogenic potency of chrysotile asbestos relative to other forms of asbestos (Hodgson and Darnton, 2000). The Hodgson and Darnton (2000) article was a quantitative risk assessment (QRA) performed for regulatory purposes. QRA on the relative potency of the different forms of asbestos fibre types has been rejected on the grounds of inadequate data (Kane letter to EPA, 2008). However, Hodgson and Darnton (2000) estimated that, on a fibre-for-fibre basis, the risk ratio from crocidolite to amosite to chrysotile was '500:100:1' for mesothelioma.

After the Carolina cohort update by Loomis et al. (2009), Hodgson and Darnton modified their estimates, increasing the mesothelioma potency of chrysotile in their QRA model by a factor of 10; by increasing the potency of chrysotile by one order of magnitude, their relative potency ratio is now reduced from '500:100:1' to '50:10:1' (Hodgson and Darnton, 2009). This change reveals the instabilities of regulatory exercises in QRA on the relative potency estimates of the various forms of asbestos.

In their most recent publication, Loomis et al. (2012) conclude that exposure to chrysotile fibres of all sizes is associated with excess lung cancer in asbestos textile workers. Exposure to fibres throughout the range of length and diameter is significantly associated with increased risk of lung cancer. The association is strongest and most consistent for long, thin fibres.

More broadly, evidence from other scientific disciplines also demonstrates that chrysotile alone causes not only lung cancers (and asbestosis), but also pleural and peritoneal mesothelioma. All forms of study – electron microscopy (Frank et al., 1998), biological assessments (Upadhyaya and Kamp, 2003; Wu et al., 2000), inhalation toxicology (Wagner et al., 1974), and autopsies (Suzuki and Yuen, 2002) – indicate that chrysotile, uncontaminated with amphiboles, causes mesothelioma in both animals and humans.

The general consensus today is that chrysotile is less potent than amphiboles for the induction of mesothelioma. However, there is no question as to its significant potency in the causation of lung cancer, other lung diseases, and other cancers (Hodgson and Darnton, 2000; IARC, 2012). Indeed, chrysotile may be as potent as amphiboles in the causation of lung cancer (Stayner et al., 1996). At least three excess lung cancer cases have been observed for each mesothelioma case in most epidemiologic investigations. Thus, even with chrysotile being deemed less potent than the amphiboles for mesothelioma, the overall risk of cancer does not vary substantially by fibre type.

While smoking does not contribute to the development of mesothelioma, the interactive, synergistic and close to multiplicative effects of exposures to both tobacco and asbestos have been demonstrated in the development of lung cancer (Selikoff et al., 1968; Schottenfeld, 2010).

Indeed, according to the Agency for Toxic Substances and Disease Registry (ATSDR, 2006), when a cigarette smoker is exposed to asbestos, his/her risk of lung cancer increases by 50 to 84 times.

Finally, the countries being targeted for asbestos exports also tend to have some of the poorest urban air quality, both from particulate matter and other airborne pollutants. It is noteworthy that since these pose an increased risk for lung cancer, adding yet another carcinogen (i.e., asbestos) to the mix would likely make these already hazardous environments even more hazardous, further increasing the health burdens on those countries.

Position of the World Health Organization (WHO)

The WHO's efforts to eliminate asbestos-related diseases are targeted, in particular, at countries that continue to use chrysotile asbestos. The WHO depends for its policy positions on the recommendations provided by its scientific affiliate, the International Agency for Research on Cancer (IARC). IARC is part of the WHO, its mission being to coordinate and conduct research on the causes of human cancer, the mechanisms of carcinogenesis, and to develop scientific strategies for cancer prevention and control. The most current and pertinent document from IARC (2012) has been referenced above.

The WHO (2006) has called for an end to the use of all types of asbestos as the most effective way to eliminate asbestos-related diseases. It has expressed particular concern regarding the use of asbestos-cement in the construction industry. The workforce involved is large, exposure is difficult to control, and in-place materials have the potential to deteriorate and pose a risk to those carrying out alterations, maintenance, and demolition. The WHO recommends that asbestos be replaced by certain fibrous materials and other products that pose less or no risk to health.

Position of the International Labour Organization

The International Labour Organization (ILO, 2006) has stated that "the elimination of the future use of asbestos and the identification and proper management of asbestos currently in place are the most effective means to protect workers."

Position of the World Bank

The World Bank Group's guidance document on asbestos (2009) urges that asbestos-containing building materials be avoided in new construction, including disaster relief. It describes the dangers throughout the life cycle of asbestos used in construction materials:

> *"From the industrial hygiene viewpoint, asbestos creates a chain of exposure from the time it is mined until it returns to the earth at the landfill or an unauthorized disposal site. At each link in the chain, occupational and community exposures co-exist. Workers in the mines are exposed to the fibres while extracting the ore; their families breathe fibres brought home on their work clothes. Workers in the mills and factories process the fibre and manufacture products with it; their families are also secondarily exposed. Communities around the mines, mills and factories are contaminated with their wastes; children play on tailings piles and in contaminated schoolyards; transportation of fibre and products contaminate roads and right-of-ways. Tradesmen who install, repair and remove asbestos-containing materials are exposed in the course of their work, as are bystanders in the absence of proper controls. Disposal of asbestos wastes from any step in this sequence not only exposes the workers handling the wastes, but also local residents when fibres become airborne due to insufficient covering and erosion control. Finally, the cycle is often repeated when discarded material is scavenged and re-used in the absence of measures to remove asbestos-containing materials from the waste stream and dispose of them properly."*

Position of leading international health and trade union organisations

The World Federation of Public Health Associations (2005), the International Commission on Occupational Health (2000), the International Social Security Association (2004), and the International Trade Union Confederation (2004) – representing 175 million workers in 151 countries – have all called for a global ban on the use of all forms of asbestos, particularly chrysotile.

The Building and Wood Workers' International (1989), representing approximately 12 million members in 130 countries, has dedicated particular effort to achieving a worldwide ban on chrysotile asbestos. They persist in their efforts because so many construction and maintenance workers around the world have died from asbestos-related diseases.

The undermining of public health policy by the asbestos industry

Similar to the tobacco industry, the asbestos industry has funded and manipulated research to manufacture findings favourable to its own interests. It has set up front organisations claiming to be expert scientific institutes, such as the Canadian Chrysotile Institute[3], the Russian Chrysotile Institute, and the Brazilian Chrysotile Institute. But, they are, in reality, lobby groups promoting the continued use of asbestos.

These institutes claim that, while other forms of asbestos are hazardous, chrysotile asbestos is quickly expelled from the lungs and presents little hazard to health. Independent and reputable scientific authorities reject these claims as erroneous, dangerous, and deceptive.

Asbestos mining companies and companies that sell asbestos-containing products collaborate in efforts to promote the continued use of chrysotile asbestos. This collaboration is collectively referred to as the global asbestos industry. The asbestos products companies have created lobby organisations around the world, denying the established scientific evidence and promoting the continued use of chrysotile asbestos. Examples of these industry lobby organisations are the Asbestos Cement Products Manufacturers' Association of India, the Mexican Institute of Fibro Industries, the Vietnam National Roof Sheet Association, the Chrysotile Information Center of Thailand, the Ukrainian Chrysotile Corporation, the Chrysotile Asbestos Cement Products of Sri Lanka, the Fibre Association of Colombia, the Asbestos Information Centre of India, and the Asbestos Association of Central Asia and Kazakhstan.

The asbestos mining and asbestos products companies created the Asbestos International Association (AIA) in order to work together in a united fashion to promote the continued use of asbestos. The AIA was created in 1974 in the United Kingdom (UK), but as the UK moved towards banning asbestos, the Association closed its UK office and, in 1997, re-incorporated in Montreal, Canada (Gouvernement du Québec, 1997). The President of the Canadian Asbestos Institute, Clément Godbout, was also the Chairman of the AIA. Both organisations changed their

[3] In the face of strong criticism from the Canadian Medical Association, the Canadian Public Health Association, and the Canadian Cancer Society, among others, the Canadian government ceased its funding of the Chrysotile Institute in 2011. In March 2012, the Chrysotile Institute filed an application to abandon its corporate charter and closed its doors.

names in 2005 to become known respectively as the Chrysotile Institute and the International Chrysotile Association (ICA). As the Asbestos Cement Products Manufacturers' Association of India states (ACPMA, 2012), "The ICA actively represents the interest of Chrysotile Industry world over." With the support of the Canadian and Quebec governments, the Chrysotile Institute and the ICA sponsored a major international conference, promoting the use of chrysotile asbestos, in Montreal in 2006.

The directors of the International Chrysotile Association include persons from Brazil, Bolivia, Canada, China, Colombia, India, Indonesia, Iran, Kazakhstan, Mexico, Russia, Senegal, Sri Lanka, the United Arab Emirates, the United States, and Vietnam (Gouvernement du Québec, Registraire des entreprises, 2012). These people are in positions whereby they can help to promote the use of asbestos in their respective countries.

Through its political influence, the asbestos industry has prevented action in numerous countries, as well as blocking international initiatives that would protect populations from asbestos harms. This has been extensively documented in a joint investigative 2010 report by the British Broadcasting Corporation (BBC) and the International Consortium of Investigative Journalists (see link to the report under References), as well as by McCulloch and Tweedale (2008). In this tradition, at the 2011 Conference of the Parties to the Rotterdam Convention in Geneva, 15 lobbyists from the global asbestos industry, including representatives of the Canadian Chrysotile Institute, the Brazilian Chrysotile Institute, and the Asbestos Cement Products Manufacturers' Association of India, actively and successfully defeated the recommendation of the Convention's expert scientific body to list chrysotile asbestos as a hazardous substance.

Thus, although the scientific evidence is overwhelming that all use of asbestos should stop, the asbestos industry denies the science and uses its political influence, particularly in Brazil, Canada, India, Kazakhstan, and Russia, to defeat efforts by public health officials to end the use of asbestos.

It should be noted that the government of Quebec's own public health authorities – the National Public Health Institute of Quebec (2003-2010) and all of Quebec's Directors of Public Health

(2011) – oppose the government's policy of promoting the mining, use, and export of asbestos. Likewise, as recently as 2010, Quebec's leading medical and public health authorities, including the Quebec Medical Association, the Quebec Cancer Society, and the Quebec Public Health Association, called on the government to halt its support of the asbestos industry's discredited misinformation that asbestos can be safely used, and to cease the mining and export of asbestos.

On June 9, 2010, the Ministers of Health of Argentina, Brazil, Paraguay, Uruguay, Venezuela, Bolivia, Chile, Ecuador, and Peru signed a Declaration on Asbestos of the XXVIII Meeting of Health Ministers of the State Parties and Associated States of MERCOSUR, which

> *"Expressed the commitment of their Ministries to take steps, involving other competent areas of their governments, to develop and effectively implement national policies that advance the prohibition of the import, mining, production and trade of asbestos and products containing asbestos, in all the countries of MERCOSUR and associated States in which a ban has not yet been established."*

It is significant that the Ministers of Health of Bolivia, Brazil, Ecuador, Paraguay, Peru, and Venezuela have not been able to achieve a ban on asbestos in their countries. Only Argentina, Uruguay, and Chile have defeated the efforts of the asbestos lobby and banned asbestos.

In March 2011, the Department of Occupational Safety & Health of Malaysia held hearings regarding its proposed ban on all forms of asbestos (Malaysia, 2011). Consensus was reached in support of the ban. However, the International Chrysotile Association hired a powerful public relations company – APCO Worldwide (based in Washington, D.C.) – to lobby against the ban of chrysotile asbestos, which represents 100% of the global asbestos trade. Progress to move ahead with the proposed ban on all forms of asbestos appears to have been effectively blocked.

The asbestos industry has also used the tactic of legal intimidation against scientists and academics to impede their writing about the threat to health posed by the use of chrysotile

asbestos. Indeed, this tactic is presently being employed in India, Brazil, and Thailand (documentation available on request[4]).

We thus believe that it is of critical importance to take a clear position in support of the objective scientific evidence that has been accumulated and reviewed by trusted, independent agencies and individual expert scientists, and in support of the health of the public. With irrefutable scientific evidence of harm to human health resulting from exposure to all forms of asbestos, we hereby express our grave concern that governments – particularly in Brazil, Canada, China, India, Indonesia, Iran, Kazakhstan, Russia, Sri Lanka, Thailand, Ukraine, Uzbekistan, and Vietnam – are recklessly putting not only their own citizens in peril by allowing asbestos mining and trading to take place, but also those people in countries where asbestos products continue to be used. We call upon these countries, consistent with the International Covenant on Economic, Social and Cultural Rights (UN General Assembly, 1966), to give priority to the right to health for all, including the workers and populations of asbestos-importing countries.

[4] The asbestos industry has served legal documents on several scientists, threatening to sue them in court. As of our Position Statement date, no case has proceeded to the courts.

Therefore, the Joint Policy Committee of the Societies of Epidemiology:

- Calls for a global ban on the mining, use, and export of all forms of asbestos;
- Calls specifically on the major asbestos exporting countries – Brazil, Canada, Kazakhstan, and Russia – to respect the right to health by ceasing the mining, use, and export of asbestos, and providing transition assistance to their asbestos-mining communities;
- Calls specifically on the major asbestos-using countries – Brazil, China, India, Indonesia, Iran, Kazakhstan, Russia, Sri Lanka, Thailand, Ukraine, Uzbekistan, and Vietnam – to cease use of asbestos;
- Urges sister societies of epidemiology and/or public health organisations and agencies, particularly in those countries that continue to mine, use and/or export asbestos, such as Brazil, Canada, China, India, Indonesia, Iran, Kazakhstan, Russia, Sri Lanka, Thailand, Ukraine, Uzbekistan, and Vietnam, to adopt a position calling for a ban on the mining, use, and export of all forms of asbestos;
- Urges all countries that have used asbestos to inform their citizens and their healthcare professionals of the hazards of asbestos and to implement safety measures to monitor the health of exposed citizens. To facilitate this, an inventory of asbestos already in place is needed, particularly in schools and places where children are present; and
- Urges all sister societies of epidemiology and/or public health organisations and agencies to support the right of scientists and academics to carry out their work free from intimidation. In situations where the asbestos industry files legal cases to silence scientists and academics, societies of epidemiology and/or public health organisations and agencies are urged to examine the situation and, if warranted by the facts, to support the scientists or academics being threatened and to denounce such tactics of intimidation. The procedure developed by the International Society for Environmental Epidemiology for dealing with beleaguered colleagues could be followed as a model. It is available at:
  http://www.iseepi.org/About/Docs/iseeprocedurefordealingwithbeleagueredcolleagues.pdf

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APPENDICES

Three appendices follow. Each of them is devoted to a category of endorser.

- Appendix A: JPC-SE Member-Society Endorsements
- Appendix B: Organisation/Association Endorsements
- Appendix C: Individual Endorsements

Since we anticipate that additional professional organisations and individual professionals may endorse this Position Statement over time, we shall maintain an on-going list of such parties.

Please register a professional organisation or agency endorsement by sending a signed letter on letterhead to JPCSE.Asbestos@gmail.com (or mailing it to Dr. Weiss care of the JPC-SE address on the cover page), providing the official full name of the organisation and its address, a statement to the effect that this endorsement was officially approved with date of approval, and contact information for whom you designate as a contact of your organisation including their full name, address, city, state or province, country, and e-mail address; their e-mail address will be listed.

Please register an individual endorsement by e-mailing JPCSE.Asbestos@gmail.com, providing your last name, first name plus initials, institutional affiliation, city, state or province, country, and e-mail address. Your e-mail address will not be listed.

Interested parties may contact us at the above e-mail address for an updated list of those who have endorsed this Position Statement.

APPENDIX A

NINE JPC-SE MEMBER ORGANISATIONS HAVE ENDORSED THE POSITION STATEMENT ON ASBESTOS AS OF JULY 24, 2012*

Member Organisation	Organisation contact(s):	e-Mail address(es)
JPC-SE Chair	Stanley H. Weiss	JPCSE.Chair@gmail.com
• **American College of Epidemiology (ACE)**	Robert A. Hiatt Robert E. McKeown	rhiatt@epi.ucsf.edu rmckeown@mailbox.sc.edu
• **American Public Health Association (APHA), Epidemiology Section**	James A. Gaudino, Jr. Wiley D. Jenkins Robin Taylor Wilson	jag8nw@comcast.net wjenkins@siumed.edu rwilson@psu.edu
• **Canadian Society for Epidemiology and Biostatistics (CSEB)**	Colin L. Soskolne	colin.soskolne@ualberta.ca
• **Council of State and Territorial Epidemiologists (CSTE)**	Pat McConnon	pmcconnon@cste.org
• **International Epidemiological Association (IEA)**	Eduardo Franco	eduardo.franco@mcgill.ca
• **International Society for Environmental Epidemiology (ISEE)**	Wael Al-Delaimy	waldelaimy@ucsd.edu
• **National Association of County & City Health Officials (NACCHO) Epidemiology Workgroup**	E. Oscar Alleyne	alleyneo@co.rockland.ny.us
• **Society for Epidemiologic Research (SER)**	Sandro Galea	sgalea@columbia.edu
• **Society for the Analysis of African American Public Health Issues (SAAPHI)**	Rebecca Hasson	hassonr@umich.edu

* For some organisations, some board members may have abstained from voting or voted against support for the Position Statement; the reader may obtain further information directly from the organisational contact listed. Organisation names are alphabetic, along with their designated contact(s) and respective e-mail address(es).