Negative: Asbestos

By “Coach Vance” Trefethen

The AFF plan bans imports of Chrysotile asbestos into the U.S. Asbestos is a naturally-occurring mineral commonly found in the earth's crust. It was widely used in the 20th century up until the 1970s because of its low cost and qualities that were highly valuable to industry, particularly being fire-resistant. It has a hazardous quality, however, which is that it contains fibers that come loose and blow into the air wherever it is mined, processed, or used. Those fibers are easy to breathe in, and once inhaled they stick to the interior of the lungs. They can gunk up the lungs and cause disease, including cancer. However, the diseases takes decades to develop. Someone exposed to asbestos in the 1970s might only today be getting sick. Asbestos usage in the U.S. peaked in 1973. It was never banned, but its use has dropped 99.94% compared to that peak and very little is used today, mostly because it has such a terrible reputation.
 There are no mines producing asbestos in the US today, but we still import a tiny quantity for use by a few factories that haven't yet switched to substitute materials. However, this tiny amount is all "Chrysotile" asbestos, which has different characteristics from "Amphibole" asbestos. Chrysotile has different characteristics from Amphibole and isn't dangerous. But it gets labeled as "bad" because it's "Asbestos" and we all know "asbestos is bad." Not so fast.
 What's different? Studies have found that "long" fibers from asbestos are the ones that cause disease. The fibers in Chrysotile are mostly shorter, and its longer ones break down quickly into shorter ones. Short fibers are eliminated by the body's own defenses, just like any other dust that might get into the lungs. Amphibole fibers, which can be short or long, do not break down so easily. The long ones don't break down and they trap themselves and the shorter ones into the lungs. They persist in the lungs, irritate the lungs, and lead to diseases, including cancer.
 In addition, modern industries have much better safety precautions than we had a generation ago before the risks of asbestos were known. So even if a few factories are still using Chrysotile asbestos, the workers are not at risk.
 Note:
"Carcinogen" = something that causes cancer
"Mesothelioma" = a type of cancer often linked to exposure to asbestos
"Amphibole" = a type of asbestos linked to causing cancer
"Chrysotile" = another type of asbestos that has different characteristics from Amphibole and isn't as dangerous

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Link: ALL Status Quo imports are "Chrysotile" [This is in AFF's evidence, but if you need proof…] 4

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Negative: Asbestos

INHERENCY

1. Effective safeguards in place

Lots of safety regulations in place to protect workers from asbestos exposure, and they work

National Cancer Institute 2021 (agency of the US government) updated 29 Nov 2021 "Asbestos Exposure and Cancer Risk" (accessed 7 Mar 2023) https://www.cancer.gov/about-cancer/causes-prevention/risk/substances/asbestos/asbestos-fact-sheet

The Occupational Safety and Health Administration (OSHA) is a component of the U.S. Department of Labor (DOL) and is the Federal agency responsible for health and safety regulations in maritime, construction, manufacturing, and service workplaces. OSHA established regulations dealing with asbestos exposure on the job, specifically in construction work, shipyards, and general industry, that employers are required to follow. In addition, the Mine Safety and Health Administration (MSHA), another component of DOL, enforces regulations related to mine safety. Workers should use all protective equipment provided by their employers and follow recommended workplace practices and safety procedures. For example, National Institute for Occupational Safety and Health (NIOSH)-approved respirators that fit properly should be worn by workers when required. Workers who are concerned about asbestos exposure in the workplace should discuss the situation with other employees, their employee health and safety representative, and their employers. If necessary, OSHA can provide more information or make an inspection.
**END QUOTE. ELSEWHERE IN THE ARTICLE, THEY CONCLUDE QUOTE:**
As a result of government regulations and improved work practices, today’s workers (those without previous exposure) are likely to face smaller risks than did those exposed in the past.

HARMS / SIGNIFICANCE

1. Tiny asbestos usage

Use of asbestos in the US has dropped 99.94% since its peak in 1973 (520 tons today compared to 803,000 tons then)

Tim Potvik 2022 (journalist) 9 June 2022 "Sudden Rise in Asbestos Imports as Ban Draws Closer" (accessed 7 Mar 2023) https://www.asbestos.com/news/2022/06/09/sudden-rise-asbestos-imports-ban-draws-closer/

The consumption of asbestos in the U.S. peaked in 1973, falling from a record high of 803,000 tons to less than 520 tons in each of the past five years. Asbestos, a naturally-occurring mineral, was once used ubiquitously in the U.S. and coveted for its ability to fireproof and strengthen almost anything with which it was mixed.

Amounts used in the US are "tiny"

Miguel Leyva 2022 (attorney) January 2022 "Could the United States Legally Ban Asbestos Forever?" (accessed 7 Mar 2023) https://www.lawyer-monthly.com/2022/01/could-the-united-states-legally-ban-asbestos-forever/

Over 60 nations and territories have outlawed asbestos, but the business sector has consistently thwarted efforts to prohibit it entirely in the US. Although asbestos mining was forbidden in 2002, when the last asbestos mine in the US officially closed, it is still lawful to import and utilise tiny amounts of this toxic substance. Due to the lack of a comprehensive prohibition, certain items may legally contain up to 1% asbestos.

2. Chrysotile [pronounced "KRIS - o - tile"] asbestos isn't harmful

**All asbestos isn't created equal. There are different forms of it, some of which are dangerous. But some are not. The type that the US currently imports tiny quantities of is called "Chrysotile" and it isn't dangerous. This means that all of the Affirmative's evidence about the dangers of asbestos must be dropped from the round unless it is specific to Chrysotile.**

 Link: ALL Status Quo imports are "Chrysotile" [This is in AFF's evidence, but if you need proof…]

US Geological Survey 2021. "ASBESTOS" (accessed 8 Mar 2023) https://pubs.usgs.gov/periodicals/mcs2021/mcs2021-asbestos.pdf

The last U.S. producer of asbestos ceased operations in 2002 as a result of the decline in domestic and international asbestos markets associated with health and liability issues. The United States has since been wholly dependent on imports to meet manufacturing needs. All of the asbestos fiber currently imported into and used within the United States consists of chrysotile.

Chrysotile is NOT the same as other forms of asbestos (like amphibole) and is FAR LESS hazardous

Dr. Michel Camus 2001. (with the Health Environments and Consumer Safety Branch, Health Canada, Montreal) A ban on asbestos must be based on a comparative risk assessment 20 Feb 2001 CANADIAN MEDICAL ASSOCIATION JOURNAL (accessed 8 Mar 2023) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC80777/

What risks are associated with chrysotile fibres? The Collegium claims that all asbestos fibres are associated with similar risks of lung cancer and asbestosis, and only marginally different risks of mesothelioma. Experienced scientists in the field strongly disagree with this view.  Risk assessments and reviews generally attribute peritoneal mesotheliomas exclusively to amphibole fibres. The 47 cohorts of individuals working with asbestos reviewed in the most recent and comprehensive risk assessments show higher risks in those working with amphibole than in those working with chrysotile. Thus, excess lung cancers occur 3 times, pleural mesothelioma 12 times and peritoneal mesotheliomas 30 times more frequently in mainly amphibole than in chrysotile industries for an equal number of expected cases (see additional data in the Table on the CMAJ Web site at [www.cma.ca/cmaj/vol-164/issue-4.htm](http://www.cma.ca/cmaj/vol-164/issue-4.htm)). Exposure–response comparisons of studies with meaningful exposure data suggest that chrysotile workers were 4–24 times less at risk of asbestos-induced lung cancer than amphibole workers at equal exposure.

Berstein Study finds Chrysotile exposure doesn't cause cancer (no "carcinogenic response")

Dr David M. Bernstein 2022. (PhD; consultant in toxicology) published 15 June 2022 CRITICAL REVIEWS IN TOXICOLOGY "The health effects of short fiber chrysotile and amphibole asbestos" (accessed 10 Mar 2023) https://www.tandfonline.com/doi/full/10.1080/10408444.2022.2056430 (Bernstein in this quote is citing his own study, which is not unusual in the literature)

In the subchronic inhalation study discussed above (Bernstein et al. [2021](https://www.tandfonline.com/doi/full/10.1080/10408444.2022.2056430)), has shown through collagen quantification and histopathological examination the important role of inflammation in association with tumorigenesis of the long fibers of amosite and crocidolite asbestos. The inflammation also extended to the visceral and parietal pleura with significant increases in thickening and collagen formation. The lack of inflammation and pathogenesis in the control and chrysotile containing brake dust groups of this study and the lack of persistence in response in the chrysotile groups, which largely resolved by 24 months, provides a further explanation as to why the exposures in these groups did not produce a carcinogenic response in this study.

Canada study finds cancer risk from Chrysotile is 1/15 to 1/50 the risk of other forms of asbestos

Dr. Michel Camus 2001. (with the Health Environments and Consumer Safety Branch, Health Canada, Montreal) A ban on asbestos must be based on a comparative risk assessment 20 Feb 2001 CANADIAN MEDICAL ASSOCIATION JOURNAL (accessed 8 Mar 2023) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC80777/

The mining and milling industry is most informative because fibre types are not mixed, and because it produces fibres of different sizes for all the asbestos industries. Of all the pleural mesotheliomas reported among chrysotile workers, 70% occurred among Quebec miners and millers, and most were traced to coexposures to amphiboles.  The dose-specific risks of asbestosis, lung cancer and mesothelioma are 15–50 times lower in chrysotile miners than in amphibole miners.  This seems true also for nonoccupationally exposed populations.  In contrast to the Collegium's interpretation of our research, my colleagues and I found that the absence of excess lung cancers among residents of chrysotile mining towns implies a risk at least 15 times smaller than that predicted with the EPA model,  and the number of mesotheliomas observed is at least 20 times smaller than that predicted by the EPA model.

Russia Study finds zero increase in cancer deaths from use of Chrysotile, both among workers and surrounding communities

Sergei V. Jargin 2022 (Department of Pathology, People’s Friendship University of Russia) Sept 2022 JOURNAL OF SURGERY "**Exaggerated Risk Perception of Low-Dose Exposures to Asbestos: Cui Bono?" (accessed 9 Mar 2023) https://www.avensonline.org/fulltextarticles/JSUR-2332-4139-10-0054.html (brackets added)**

Similarly to asbestos-cement, carcinogenicity of fibres in asbestos board is decreased due to aggregation with cellulose. There is no considerable air pollution by fibres from car brakes, while the traffic is safer with asbestos-containing linings. In the process of braking, asbestos is transformed to forsterite that is practically harmless. Asbestos-containing materials (flat sheets, millboard, paper, clothing, gaskets, etc.) are broadly used now as before. Installation and repair without processing of asbestos-containing parts is deemed safe. No increase in the registered incidence of mesothelioma has been found either among asbestos workers or residents of the areas with modern asbestos industry. It was concluded on the basis of 3576 MPM [mesothelioma] cases that asbestos is neither a leading nor obligate causative factor. Asbestos produced in Russia is almost exclusively chrysotile; it is broadly used and exported to the countries where it is not banned.

Amphibole asbestos has longer fibers that don't break down, so they cause disease. Chrysotile fibers break down and the body eliminates them - they don’t stick around and clog up the lungs

Dr David M. Bernstein 2022. (PhD; consultant in toxicology) published 15 June 2022 CRITICAL REVIEWS IN TOXICOLOGY "The health effects of short fiber chrysotile and amphibole asbestos" (accessed 10 Mar 2023) https://www.tandfonline.com/doi/full/10.1080/10408444.2022.2056430

With short fibers, the lymphatic system is one of the major routes of clearance. However, in the standard biopersistence study, the entire lung is digested with no differentiation of where the fibers are in the lung. Short fibers can accumulate in the lymphatic system. With amphibole asbestos, there is often a difference in short-term clearance between long and short fibers. However, with the presence of long fibers, the developing inflammatory response has been shown to, in effect lock up the remaining short fibers as well (Bernstein et al. [Citation2020a](https://www.tandfonline.com/doi/full/10.1080/10408444.2022.2056430), [Citation2020b](https://www.tandfonline.com/doi/full/10.1080/10408444.2022.2056430)). With chrysotile, the long fibers have been shown to be considerably less biopersistent and to quickly break apart into shorter fibers which augment the number of shorter fibers present (Bernstein et al. [Citation2013](https://www.tandfonline.com/doi/full/10.1080/10408444.2022.2056430); Bernstein and Kunzendorf [Citation2018](https://www.tandfonline.com/doi/full/10.1080/10408444.2022.2056430)). Thus following lung digestion and quantification, the apparent biopersistence of the shorter chrysotile fibers is a function of the increase in numbers from the breakdown of the longer fibers and the accumulation in the lymphatic system. In these inhalation toxicology studies, such accumulation has not been associated with disease.

Chrysotile fibers are smaller and quickly eliminated from the lungs, and even when Chrysotile has long fibers, they break down quickly into small fibers and are eliminated

Dr David M. Bernstein 2022. (PhD; consultant in toxicology) published 15 June 2022 CRITICAL REVIEWS IN TOXICOLOGY "The health effects of short fiber chrysotile and amphibole asbestos" (accessed 10 Mar 2023) https://www.tandfonline.com/doi/full/10.1080/10408444.2022.2056430

Chrysotile inhalation biopersistence studies performed with aerosol exposure concentrations at a few orders of magnitude higher than past human exposures have shown that even with significant long fiber (>20 µm) exposure, chrysotile breaks down into smaller particles and fibers which are cleared from the lung with half-times of ∼1 day to 15 days, following a 5 day exposure, depending on the source.

EPA study claiming Chrysotile causes cancer was flawed because they studied facilities where Chrysotile and other forms of asbestos were mixed

Dr. Dennis Paustenbach, Dr David Brew, Sabina Ligas, Jonathan Heywood 2021. (Paustenbach - board-certified toxicologist and industrial hygienist. Brew - PhD in environmental health science. Ligas - Master's degree in toxicology. Heywood - MPH in Environmental and Occupational Health) July 2021 CRITICAL REVIEWS IN TOXICOLOGY" A critical review of the 2020 EPA risk assessment for chrysotile and its many shortcomings" (accessed 10 Mar 2023) https://pubmed.ncbi.nlm.nih.gov/34651555/

Fourth, the concern about chrysotile asbestos being a mesothelioma hazard was based on populations in two facilities where mixed exposure to chrysotile and commercial amphibole asbestos (amosite and crocidolite) occurred. All 8 cases of pleural cancer and mesothelioma in the examined populations arose in facilities where amphiboles were present. It was therefore inappropriate to rely on these cohorts to predict the health risks of exposure to short fiber chrysotile, especially of those fibers filled with phenolic resins.

3. Tiny exposure risk

**There are 2 factors that determine the risk of getting cancer from asbestos: 1) how dangerous the mineral itself is - which isn't much, since it's the other forms of asbestos that are dangerous, not Chrysotile; and 2) how much you are exposed to it. If you wear protective gear all the time, or rarely come in contact with it, you won't get cancer because you weren't exposed to much of it.**

Exposure risk today compared to the past is 1000 times lower (because people today know the risks), and Chrysotile risk is even lower

Dr. Michel Camus 2001. (with the Health Environments and Consumer Safety Branch, Health Canada, Montreal) A ban on asbestos must be based on a comparative risk assessment 20 Feb 2001 CANADIAN MEDICAL ASSOCIATION JOURNAL (accessed 8 Mar 2023) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC80777/

Controlled occupational exposures today are about 1000 times lower than in the past.  Accordingly, lifetime risks of asbestos-related deaths in today's chrysotile-exposed workers should be at least 1000 times lower than in individuals who worked with an “asbestos mixture” in the past, or less than 1–5 per 100 000 lives, that is, 20–100 times less than the Collegium's estimate. Such risks are comparable to or lower than risks accepted by the US National Institute for Occupational Safety and Health in the workplace. Risk estimates based only on chrysotile friction products and cement industries may be lower still.

Low-level exposure isn't harmful. The risk is coming into constant/continual contact directly with asbestos

National Cancer Institute 2021 (agency of the US government) updated 29 Nov 2021 "Asbestos Exposure and Cancer Risk" (accessed 7 Mar 2023) https://www.cancer.gov/about-cancer/causes-prevention/risk/substances/asbestos/asbestos-fact-sheet

Everyone is exposed to asbestos at some time during their life. Low levels of asbestos are present in the air, water, and soil. However, most people do not become ill from their exposure. People who become ill from asbestos are usually those who are exposed to it on a regular basis, most often in a job where they work directly with the material or through substantial environmental contact.

4. A/T "Industrial greed motivates use of asbestos " - Anti-asbestos advocates are biased by money and greed too

Advocacy for banning asbestos is motivated by financial interests too. Manufacturers of substitutes make money. Lawyers and activists make money too, by opposing asbestos

Sergei V. Jargin 2022 (Department of Pathology, People’s Friendship University of Russia) Sept 2022 JOURNAL OF SURGERY "**Exaggerated Risk Perception of Low-Dose Exposures to Asbestos: Cui Bono?" (accessed 9 Mar 2023) https://www.avensonline.org/fulltextarticles/JSUR-2332-4139-10-0054.html**

Most importantly, asbestos-related science must be separated from industrial interests. Asbestos bans have been partly based on the research influenced by industrial and political interests. Some anti-asbestos activists may have conflicts of interest related to the manufacturing of chrysotile or asbestos substitutes, lawyers’ earnings from litigation, or interests of construction firms performing asbestos removal with exposures of abatement workers. It was noticed that “grassroots intimidated governments into approving more restrictive regulations”. Apparently, some anti-asbestos activists served certain companies or governments. Asbestos is banned in some countries, while others are increasing production and exports. The same considerations pertain also to the anti-nuclear activism and Green movement in general.

5. A/T "Thousands of deaths in the US today from asbestos-related disease"

It's because of past exposure when asbestos was widely used, not anything happening today: It takes 20-50 years for symptoms to develop

Camryn Keeble 2022 (content writer and editor for Mesothelioma Guide)9 June 2022 "Chrysotile Asbestos: Deadly Mesothelioma Mineral" (accessed 10 Mar 2023) https://www.mesotheliomaguide.com/community/chrysotile-asbestos-deadly-mesothelioma-mineral/

Mesothelioma is a rare cancer of the lungs or abdominal cavity and can remain dormant for up to 70 years after asbestos fibers enter your body. Most patients start experiencing symptoms 20-50 years after asbestos exposure. [Common mesothelioma symptoms](https://www.mesotheliomaguide.com/mesothelioma/symptoms/) include shortness of breath, chest or abdominal pain, persistent coughing, fluid buildup in the lungs or abdomen, weight loss, fatigue and more.

SOLVENCY

1. The natural environment. Most asbestos exposure is in the natural environment, not in the work place

63% of people in the general population (not asbestos-industry workers) have asbestos in their body at autopsy

Sergei V. Jargin 2022 (Department of Pathology, People’s Friendship University of Russia) Sept 2022 JOURNAL OF SURGERY "**Exaggerated Risk Perception of Low-Dose Exposures to Asbestos: Cui Bono?" (accessed 9 Mar 2023) https://www.avensonline.org/fulltextarticles/JSUR-2332-4139-10-0054.html**

Asbestos fibres are present in the natural environment due to erosion of surface deposits. Naturally occurring asbestos has been commonly found in populated areas. The natural emission contributes to a dispersion of chrysotile and amphibole asbestos fibres. Presumably, natural releases dwarf anthropogenic contributions to the atmospheric dispersion of the above-named fibres. Air, soil and water may be contaminated by asbestos and other potentially harmful fibres due to human activities unrelated to asbestos e.g. land excavation, slopes reprofiling and tunneling. In one study, asbestos fibres were found in 35 of 55 (63.6%) autopsy cases from the general population.

2. Substitutes aren't safer

Substitutes for asbestos would not necessarily eliminate health risks. They can be carcinogenic (causing cancer) just like asbestos

Sergei V. Jargin 2022 (Department of Pathology, People’s Friendship University of Russia) Sept 2022 JOURNAL OF SURGERY "**Exaggerated Risk Perception of Low-Dose Exposures to Asbestos: Cui Bono?" (accessed 9 Mar 2023) https://www.avensonline.org/fulltextarticles/JSUR-2332-4139-10-0054.html**

 A substitution of asbestos by artificial fibres would not necessarily eliminate health risks. The carcinogenicity of asbestos substitutes e.g. carbon nanotubes comes to light these days. Studies indicate that asbestos fibres and carbon nanotubes with certain dimensions exert toxic effects through similar mechanisms such as macrophage activation resulting in inflammation. As mentioned above, carbon nanotubes are biopersistent, certain varieties being classified as possible human carcinogens.

If the study methods used to prove "substitutes are safer" had been used on asbestos years ago, they would have found that asbestos wasn't dangerous either

**Analysis: The substitutes were found to be "safe" in modern tests with safety processes being used. The old studies that found asbestos to be "bad" were studied with raw asbestos and fibers floating around without any safety precautions. If they had used the same safety precautions with asbestos that they used with the substitutes, they would have found no health effects with asbestos and we wouldn't be having this debate.**

Dr. Michel Camus 2001. (with the Health Environments and Consumer Safety Branch, Health Canada, Montreal) A ban on asbestos must be based on a comparative risk assessment 20 Feb 2001 CANADIAN MEDICAL ASSOCIATION JOURNAL (accessed 8 Mar 2023) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC80777/

Finally, the most comprehensive and recent review of human and animal data on man-made mineral fibres concludes that ceramic fibres, rock and slag wools are “probably” and glass wool is “possibly” carcinogenic, whereas the health effects of other man-made substitutes cannot be evaluated at the present time. The Institut National de la Santé et de la Recherche Médicale (INSERM) in France deplores the fact that man-made fibres have been tested without the dust-suppressing agents and binders normally added in the industrial process, and that experiments are now conducted at much lower doses than those used in past studies of asbestos fibres: they state that similar doses in carcinogenic assays of asbestos fibres would likely have resulted in absent or nonsignificant health effects.

DISADVANTAGES

1. Substitutes are worse for cancer risk

Substitutes for Chrysotile asbestos are as bad or worse for cancer risk

Dr. Michel Camus 2001. (with the Health Environments and Consumer Safety Branch, Health Canada, Montreal) A ban on asbestos must be based on a comparative risk assessment 20 Feb 2001 CANADIAN MEDICAL ASSOCIATION JOURNAL (accessed 8 Mar 2023) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC80777/

There are reasons to doubt the safety of substitutes for chrysotile. Glass and ceramic fibres, silicon carbide whiskers, and rock and slag wools have been classified by the International Agency for Research on Cancer as possible or probable carcinogens. Any fibre can carry chemical and biological contaminants such as cigarette tars deeply into the lung by adsorption. The lung cancer and fibrosis health risks of asbestos substitutes depend on the dose, dimensions, biopersistence and surface reactivity, as is the case for asbestos fibres, but they also depend on dissolution by-products.  PVA and p-aramid (Kevlar) fibres are less respirable but more biopersistent than chrysotile, and p-aramid fibres have induced fibrosis and mesothelioma in inoculation studies.  The biopersistence of cellulose exceeds that of chrysotile,  cytotoxic effects have been observed  and an epidemiological study has found chronic airflow limitations.  Refractory ceramic fibres that complement p-aramid materials in brake pads may be more carcinogenic than chrysotile,  although one experiment failed to replicate these findings.  All man-made fibres are carcinogenic when inoculated into the peritoneum. One review concluded that they are at least as carcinogenic as “asbestos” fibres when inhaled.

False sense of security will cause people to accept higher levels of exposure to the substitutes than they would to Chrysotile, resulting in more risk

Dr. Michel Camus 2001. (with the Health Environments and Consumer Safety Branch, Health Canada, Montreal) A ban on asbestos must be based on a comparative risk assessment 20 Feb 2001 CANADIAN MEDICAL ASSOCIATION JOURNAL (accessed 8 Mar 2023) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC80777/

Under what exposure conditions are substitutes safer? Although INSERM insists that exposure to asbestos substitutes should be kept as low as possible, the Collegium does not caution against such exposures and communicates a false sense of security that might result in higher exposure to substitutes than to chrysotile. Today's health standards tolerate 5–20 times more exposure to glass, rock and slag wools than to chrysotile fibres. If those standards were applied after an asbestos ban, the substitutes would have to be more than 5–20 times less toxic than chrysotile to reduce risk. If substitutes are less hazardous than chrysotile by an unknown factor, then the same exposure limits and standards should apply to substitutes as to chrysotile. Indeed, even present exposures to substitutes could entail greater health risks than chrysotile exposures.

Assumption that the substitutes are safer would make the Chrysotile ban do more harm than good

Dr. Michel Camus 2001. (with the Health Environments and Consumer Safety Branch, Health Canada, Montreal) A ban on asbestos must be based on a comparative risk assessment 20 Feb 2001 CANADIAN MEDICAL ASSOCIATION JOURNAL (accessed 8 Mar 2023) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC80777/

Over the last 20 years, risk assessment methods have been developed for regulating or recommending exposure standards. In this context, the uncertainties, inconsistencies and gaps in knowledge in risk assessments have been dealt with by the *precautionary principle*, namely, by making assumptions and choosing models that tend to overestimate risks. In this case, to ban is to substitute and one must apply the precautionary principle equally to chrysotile and to its substitutes. This *comparative risk* approach differs from traditional risk assessment. The Collegium applies the precautionary principle to chrysotile but not to its substitutes, with the result that the proposed ban could do more harm than good.

2. Substitutes cause accidental deaths due to product failures

Substitutes for Chrysotile will cause deaths due to failures of the manufactured products that don't work as well

Dr. Michel Camus 2001. (with the Health Environments and Consumer Safety Branch, Health Canada, Montreal) A ban on asbestos must be based on a comparative risk assessment 20 Feb 2001 CANADIAN MEDICAL ASSOCIATION JOURNAL (accessed 8 Mar 2023) https://www.ncbi.nlm.nih.gov/pmc/articles/PMC80777/

Are substitutes as efficient as chrysotile in safety applications? Some important product safety issues have been raised by ancillary sources. Asbestos–cement pipes are being replaced by PVC and ductile steel pipes. Yet, as mentioned in the 1991 ruling that overturned the EPA's asbestos ban, “The EPA agency concedes the population cancer risk for production of ductile iron pipe could be comparable to the population cancer risk for production of A/C pipe.”  Apparently, PVC pipe systems in buildings can spread flames from floor to floor and can release hydrogen chloride gas, dioxin and other organochlorines in the case of a fire.  Concerning brakes, the head of the Society of Automotive Engineers' Brake Committee stated, “P-aramid, glass fiber and several glass-like fibers have substantially higher friction wet than dry and provide less dimensional stability to friction materials, especially large drum brake lining segments.”  According to this engineer, substitute products have been responsible for brake problems with General Motors X-body cars and for the fracturing of thousands of heavy-truck brake drums each year. Asbestos brakes are now installed again in US luxury cars to lower insurance expenses.  Substitutes may be more efficient in other safety applications, however, the performance risks of asbestos substitutes are poorly documented. Such safety issues cannot simply be ignored and should be addressed in a proper risk assessment of the substitutes for chrysotile.