Abstract All forms of asbestos are proven human carcino-
gens. All forms of asbestos cause malignant mesothelioma,
lung, laryngeal, and ovarian cancers, and may cause gastro-
inestinal and other cancers. No exposure to asbestos is
without risk, and there is no safe threshold of exposure to
asbestos. Nonetheless, a large number of countries still use,
import, and export asbestos and asbestos-containing prod-
ucts. And still today in many countries that have banned
other forms of asbestos, the so-called “controlled use” of
chrysotile asbestos continues to be permitted, an exemption
that has no basis in medical science but rather reflects the
political and economic influence of the asbestos mining and
manufacturing industry. To protect the health of all people
in the world – industrial workers, construction workers,
dental professionals, women, and children, now and in
future generations – the Collegium Ramazzini calls again
today on all countries of the world, as we have repeatedly
in the past, to join in the international endeavor to ban all
forms of asbestos. An international ban on asbestos is
urgently needed.

Key words Asbestos · Ban · Cancer · Chrysotile ·
Mesothelioma

Introduction

Asbestos cancer victims die painful, lingering deaths. These
deaths are almost entirely preventable. When evidence of
the carcinogenicity of asbestos became incontrovertible,
concerned parties, including the Collegium Ramazzini,
called for a universal ban on the mining, manufacture, and
use of asbestos in all countries around the world. Asbestos
is now banned in 52 countries, and safer products have
replaced many materials that once were made with
asbestos.

Occupational exposure to asbestos in dentistry, even at
low levels of dust exposure, may cause pleural lesions. Of
far more significance, there is a potential for an increase in
the occurrence of mesothelioma among dentists and techni-
cians. The carcinogenic potential of asbestos has led to the
development of non-asbestos materials in dentistry. Early
reports of health risks associated with occupational expo-
sure to asbestos in dentistry were not followed by extensive
study. Civil lawsuits have alleged wrongful deaths of at
least one dentist and one dental technician from asbestos
exposure. However, some dental researchers take the posi-
tion that scientific studies do not support such allegations.
The debate over asbestos exposure in dentistry should end
with a total ban on the use of asbestos in the dental
profession.

Asbestos is a term applied to six naturally occurring
fibrous minerals. These minerals occur in two configura-
tions: serpentine and amphibole. The only type of asbestos
derived from serpentine minerals, chrysotile, also known as
white asbestos, accounts for 95% of the asbestos ever used
around the world, and it is the only type of asbestos in com-
mercial use today. Amphibole minerals include five asbestos
species: amosite, crocidolite, tremolite, anthophyllite, and
actinolite. The two forms of amphibole asbestos that pre-
viously were most commercially important – amosite, or
brown asbestos, and crocidolite, or blue asbestos – are no
longer in use.

Asbestos fibers can withstand fire, heat, and acid. They
have great tensile strength. They provide thermal insulation
and acoustic insulation. For these reasons, asbestos came into wide commercial use and gave rise to a burgeoning industry many years before its detrimental health effects, which often take years to appear, became known.

All forms of asbestos cause asbestosis, a progressive, debilitating fibrotic disease of the lungs. All forms of asbestos cause human cancer. All forms of asbestos cause malignant mesothelioma, lung, laryngeal, and ovarian cancers. All forms of asbestos may cause gastrointestinal and other cancers.13

Asbestos was declared a proven human carcinogen by the U.S. Environmental Protection Agency, the International Agency for Research on Cancer of the World Health Organization (WHO), and the National Toxicology Program more than 20 years ago.14–16 The scientific community is in overwhelming agreement that there is no safe level of exposure to asbestos.17 Moreover, there is no evidence of a threshold level below which there is no risk of mesothelioma.18

The asbestos cancer pandemic

Occupational exposures to asbestos

About 125 million people around the world are exposed to asbestos in their work environments,18 and many millions more workers have been exposed to asbestos in years past. About 20%–40% of adult men report having worked in occupations that may have entailed asbestos exposure.20 In the most highly affected age groups, mesothelioma may account for over 1% of all deaths.21,22 In addition to mesothelioma, 5%–7% of all lung cancers are potentially attributable to occupational exposures to asbestos.23

Worldwide, the yearly number of asbestos-related cancer deaths in workers is estimated to be 100000–140000. In Western Europe, North America, Japan, and Australia, 20000 new cases of lung cancer and 10000 cases of mesothelioma result every year from exposures to asbestos.24 In the United Kingdom at least 3500 people die from asbestos-related illnesses each year, and this number is expected to increase to 5000 in future years.21 The British mesothelioma death-rate is now the highest in the world, with 1740 deaths in men (1 in 40 of all cancer deaths in men below age 80) and 316 in women in 2006. About 1 in 170 of all British men born in the 1940s will die of mesothelioma.22 Australia’s high incidence of mesothelioma is expected to reach 18000 by 2020, with 11000 cases yet to appear.25

The U.S. National Institute for Occupational Safety and Health estimates that current occupational exposures to asbestos even at the permissible exposure limit of the U.S. Occupational Safety and Health Administration will cause five deaths from lung cancer and two deaths from asbestosis in every 1000 workers exposed for a working lifetime.26

Environmental exposures to asbestos

Nonoccupational, environmental exposure to asbestos from the use of asbestos in construction materials is a serious and often neglected problem in countries throughout the world. In developed countries large quantities of asbestos are found today as a legacy of past construction practices in many thousands of schools, homes, and commercial buildings. And in developing countries, where asbestos continues to be used in large quantities in construction, asbestos-contaminated dust is now accumulating in thousands of communities.

More than 90% of the asbestos used worldwide today is used in the manufacture of asbestos-cement sheets and pipes, and most of this material is used in developing countries. Use of asbestos in these materials continues despite repeated warnings that the use of asbestos in these products is highly dangerous because of the large numbers of people exposed to the airborne dust and the extreme difficulty of controlling exposures once these materials have been disseminated into communities where people of all ages, including young children, are at risk of exposure.27 A pervasive problem with use of asbestos-containing materials in construction is that asbestos fibers are released to air and dust as these materials weather, erode, break, or are cut by saws and other power tools.19 Community-wide exposure to persons of all ages is the end result.

Both community-based and industrial exposures to asbestos and asbestiform fibers increase risks for mesothelioma.28 Thus, a study of women residing in Canadian asbestos mining communities found a sevenfold increase in the mortality rate from pleural cancer.29 The risk of developing asbestos-related cancer following in-home exposures in communities near Canadian mines over a 30-year period is estimated to be 1 in 10000.30 Likewise, environmental exposures to asbestos waste on the surfaces of roads and yards in a contaminated community of 130000 residents in The Netherlands result each year in several cases of malignant mesothelioma.31 And in a third example, the currently observed increase in cases of mesothelioma in females in the United Kingdom, many with no occupational exposure to asbestos, suggests widespread environmental contamination.32

Chrysotile asbestos

Chrysotile represents 95% of all the asbestos ever used worldwide. It is the only variety in international trade in the 21st century. There is general agreement among scientists and physicians, and widespread support from numerous national health agencies in countries around the world, United Nations agencies, and the World Trade Organization, that chrysotile causes various cancers, including mesothelioma and lung cancer.32–41

Early suggestions that chrysotile might be less dangerous than other forms of asbestos have not been substantiated. Although chrysotile accounts for almost all the asbestos