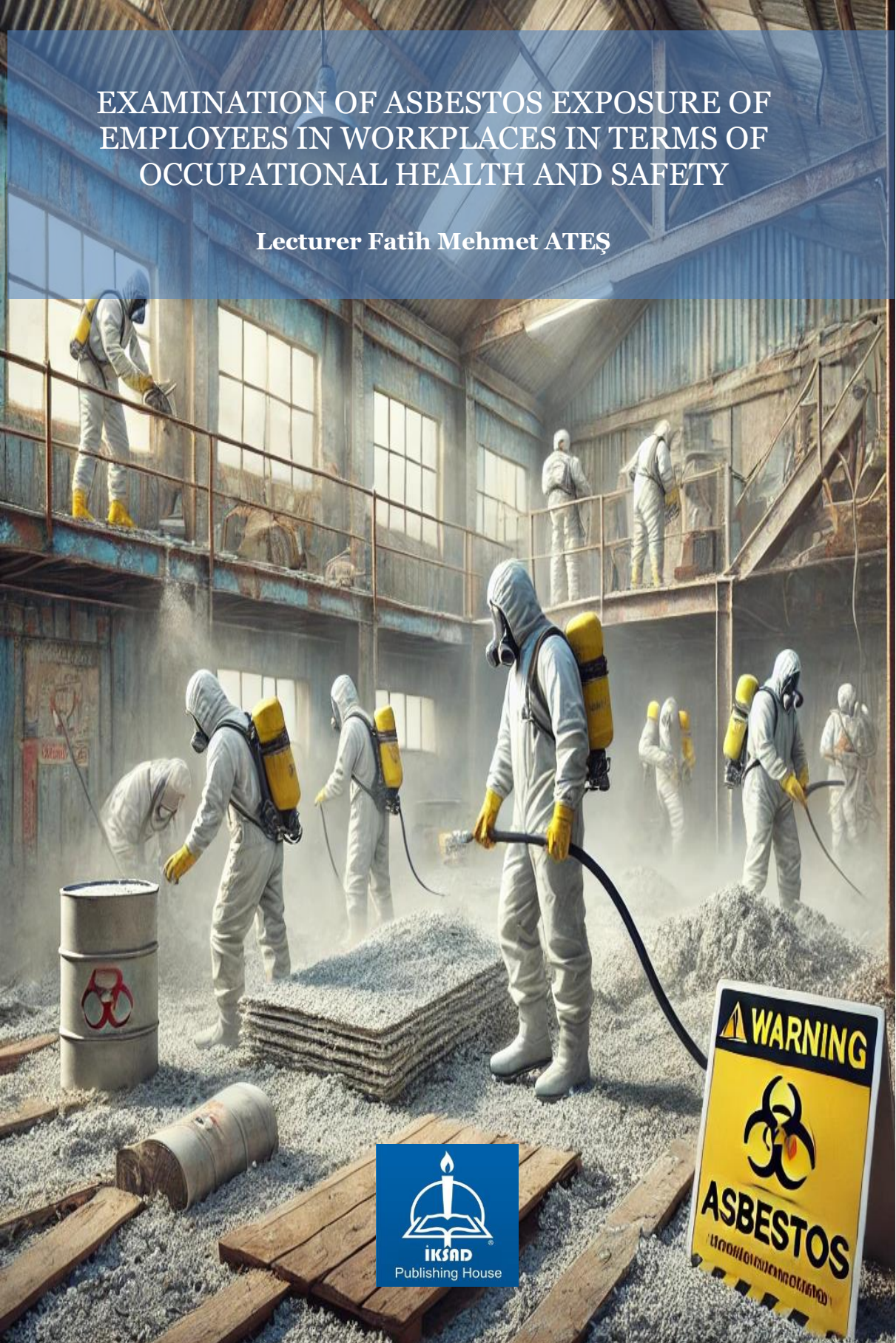
EXAMINATION OF ASBESTOS EXPOSURE OF EMPLOYEES IN WORKPLACES IN TERMS OF OCCUPATIONAL HEALTH AND SAFETY

Lecturer Fatih Mehmet ATEŞ



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PREFACE

Especially in workplace environments, it is possible to stay away from asbestos exposure that employees may encounter during their activities by first identifying the relevant asbestos. In order to enable the relevant parties to easily perceive the asbestos exposure of employees in workplaces in terms of Occupational Health and Safety, our book includes seven chapters: ancient and early uses of asbestos, health implications of asbestos exposure, occupational exposure to asbestos, regulatory frameworks and standards, preventive measures and risk mitigation, case studies and global perspectives and future directions and recommendations for asbestos. In this context, our book has provided the necessary information about the dangers and risks of asbestos exposure of employees in workplaces and the necessary information to ensure that employees can work safely in their workplaces.

At the same time, information about the responsibilities and obligations for the parties of working life has also been provided. I believe that if this information is read by the readers, it will contribute to the elimination of asbestos exposure of employees and the formation of safe working environments in the activities to be carried out in the workplaces.

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Born on 03.10.1976 in Konya, he completed his primary education in Konya, secondary education in Izmir and high school education in Izmir Ödemiş High School in 1993. In 1998, he received his associate degree from Erciyes University Communication program; In 2003, he received his bachelor's degree from Ege University Chemistry department; Pedagogical Formation from Ege University in 2012; In 2021, he received his master's degree from Atatürk University Biochemistry department. He is currently pursuing his doctorate degree in Occupational Health and Safety at Eurasia University. In 2014, he became a Class A Occupational Safety Specialist; In 2022, he became an Asbestos Removal Specialist. In 2022, he became a Fire, Working at Height, Emergency Crisis Management Trainer. He also has certificates in Total Quality Management, ISO-9000, ISO-9001:2008, ISO-9001:2015, ISO-19011, 6-Sigma R&D Techniques Management. He is currently working as a lecturer at Bayburt University Property Protection and Security Department Occupational Health and Safety Program. He attended many meetings and congresses in Turkey and abroad. He has articles in national and international refereed journals. He has congress papers, scientific research projects and international journal referees. He has lectured in many fields such as Occupational Health and Safety, Risk Management and Assessment,

Biological Risk Factors, Chemical Risk Factors, First Aid, Basic Anatomy and Physiology, Occupational Health and Safety in Construction Works, Fire Safety and Chemistry, Information Technologies and has been conducting many studies in this field.

Research Areas: Public Health, Pharmaceutical Sciences, Occupational Health and Safety (OHS), Asbestos, Fire Safety, OHS in Work at Height, Emergency Management

1. INTRODUCTION

Asbestos, a group of naturally occurring silicate minerals, has been widely used in various industries due to its heat resistance, tensile strength, and insulating properties. However, its extensive use has led to significant occupational health risks, including asbestosis, lung cancer, and mesothelioma. This review examines the historical context of asbestos use, its health implications, regulatory frameworks, and preventive measures to mitigate exposure in workplaces. The findings emphasize the importance of stringent occupational health and safety (OHS) practices to protect workers from asbestos-related diseases.

Asbestos has been utilized for centuries, with its industrial applications peaking in the 20th century. Despite its beneficial properties, the adverse health effects of asbestos exposure have been well-documented, leading to its classification as a Group 1 carcinogen by the International Agency for Research on Cancer (IARC) (IARC, 2012). Occupational exposure remains a critical concern, particularly in industries such as construction, shipbuilding, and manufacturing. This review aims to provide a comprehensive analysis of asbestos exposure in workplaces, focusing on its health impacts, regulatory measures, and strategies for risk mitigation.

2. ANCIENT AND EARLY USES OF ASBESTOS

2.1 Industrial Revolution and the Rise of Asbestos

The Industrial Revolution marked a turning point in the use of asbestos. The 19th century saw a dramatic increase in its application, driven by the need for heat-resistant and insulating materials in

burgeoning industries. Asbestos became a key component in steam engines, boilers, and machinery, where its ability to withstand high temperatures and reduce friction made it invaluable (Tweedale, 2000).

By the late 19th century, asbestos was being mined on an industrial scale. Major deposits were discovered in Canada, Russia, South Africa, and Australia, leading to the establishment of large-scale mining operations. The town of Asbestos in Quebec, Canada, became one of the world's largest producers, symbolizing the mineral's growing economic importance (McCulloch, 2002).

2.2 The Golden Age of Asbestos: 20th Century

The 20th century is often referred to as the "golden age" of asbestos. Its use expanded exponentially, particularly during and after World War II. Asbestos was incorporated into a wide range of products, including:

- ***Construction Materials:*** Asbestos cement, roofing shingles, and insulation boards became staples in the construction industry.
- ***Shipbuilding:*** Asbestos was used extensively in naval ships for insulation, fireproofing, and gaskets.
- ***Automotive Industry:*** Brake pads, clutch linings, and gaskets relied on asbestos for its heat resistance.
- ***Textiles:*** Fireproof clothing, gloves, and curtains were made from asbestos fibers.

The versatility and affordability of asbestos made it a ubiquitous

material in modern industrial societies. By the mid-20th century, global asbestos production had reached millions of tons annually, with the United States, the Soviet Union, and the United Kingdom being major consumers (Virta, 2006).

2.3 Early Warnings and the Emergence of Health Concerns

Despite its widespread use, concerns about the health effects of asbestos began to emerge in the early 20th century. The first documented case of asbestos-related disease was reported in 1906, when a British factory inspector noted the premature death of a worker in an asbestos textile factory (Murray, 1906). In 1924, Dr. William Cooke published a landmark study linking asbestos exposure to pulmonary fibrosis, coining the term "asbestosis" (Cooke, 1924).

Throughout the 1930s and 1940s, additional studies confirmed the link between asbestos exposure and respiratory diseases. In 1935, Lynch and Smith reported cases of lung cancer among asbestos workers, marking the first association between asbestos and cancer (Lynch & Smith, 1935). By the 1950s, the carcinogenic potential of asbestos was becoming increasingly clear, with studies linking it to mesothelioma, a rare and aggressive cancer of the lining of the lungs or abdomen (Wagner et al., 1960).

2.4 Regulatory Responses and the Decline of Asbestos Use

The mounting evidence of asbestos-related diseases led to the first regulatory actions in the mid-20th century. In 1931, the United Kingdom introduced the Asbestos Industry Regulations, which aimed to reduce dust levels in factories (Tweedale, 2000). Similar regulations were

adopted in other industrialized nations, but enforcement was often lax, and asbestos use continued to grow.

The 1970s marked a turning point in the regulation of asbestos. In 1971, the International Agency for Research on Cancer (IARC) classified asbestos as a Group 1 carcinogen, confirming its role in causing cancer in humans (IARC, 1971). The United States Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) introduced stricter regulations, including permissible exposure limits and requirements for protective equipment (OSHA, 1971).

By the 1980s and 1990s, many countries began to ban or severely restrict the use of asbestos. The European Union implemented a comprehensive ban in 2005, while countries like Australia and Japan also adopted stringent measures (Kazan-Allen, 2005). However, asbestos continues to be used in some parts of the world, particularly in developing countries, where regulatory frameworks are less robust.

2.5 Case Studies and Statistics on Asbestos-Related Diseases

The health impacts of asbestos exposure are best illustrated through case studies and statistical data. Below are some notable examples:

- ***Case Study 1: Wittenoom, Australia***

Wittenoom, a small town in Western Australia, was the site of a blue asbestos (crocidolite) mine operated by CSR Limited from 1943 to 1966. Despite early warnings about the dangers of asbestos, the company continued operations, exposing thousands of workers and

residents to high levels of asbestos fibers. By the 1980s, Wittenoom had become synonymous with asbestos-related diseases. A study conducted in the 1990s found that over 2,000 former residents and workers had died from mesothelioma, with many more suffering from Asbestosis and lung cancer (Musk et al., 1992). The town was officially closed in 2007, but the legacy of asbestos exposure continues to affect survivors and their families.

- ***Case Study 2: Libby, Montana, USA***

Libby, Montana, was the site of a vermiculite mine contaminated with asbestos. The mine, operated by W.R. Grace and Company from 1963 to 1990, exposed workers and residents to tremolite asbestos, a highly toxic form of the mineral. By the early 2000s, hundreds of cases of asbestos-related diseases had been reported in Libby, leading to one of the largest environmental health investigations in U.S. history. The EPA declared Libby a public health emergency in 2009, and cleanup efforts are ongoing (ATSDR, 2002).

- ***Global Statistics on Asbestos-Related Diseases***

According to the World Health Organization (WHO), approximately 125 million people worldwide are exposed to asbestos in the workplace, and over 107,000 deaths annually are attributed to asbestos-related diseases (WHO, 2014). Mesothelioma, a rare cancer caused almost exclusively by asbestos exposure, has a particularly high incidence in countries with a history of asbestos use. For example:

- The United Kingdom reports over 2,700 mesothelioma deaths

annually, with men aged 75 and older being the most affected group (Cancer Research UK, 2020).

- Japan, which used asbestos extensively in the post-war period, has seen a steady increase in mesothelioma cases, with over 1,500 deaths reported in 2018 (Japan Ministry of Health, Labour and Welfare, 2019).
- In developing countries such as India and Brazil, where asbestos use remains prevalent, the full extent of asbestos-related diseases is not yet known due to underreporting and lack of diagnostic infrastructure (Joshi et al., 2015).

2.6 Legacy of Asbestos Use

The legacy of asbestos use is a global public health crisis. Millions of workers have been exposed to asbestos, and the latency period of asbestos-related diseases means that new cases continue to emerge decades after exposure has ceased. The World Health Organization (WHO) estimates that asbestos-related diseases cause approximately 107,000 deaths annually worldwide (WHO, 2014).

The history of asbestos serves as a stark reminder of the importance of balancing industrial progress with public health. It underscores the need for rigorous scientific research, proactive regulation, and global cooperation to address emerging occupational and environmental hazards.

3. HEALTH IMPLICATIONS OF ASBESTOS EXPOSURE

Asbestos exposure is associated with a wide range of severe health conditions, primarily affecting the respiratory system. The

latency period of these diseases, often spanning decades, complicates early diagnosis and intervention. Below, we explore the major health implications of asbestos exposure, supported by epidemiological data, case studies, and mechanistic insights.

3.1 Asbestosis

Asbestosis is a chronic lung disease characterized by fibrosis (scarring) of lung tissue. It results from prolonged exposure to asbestos fibers, which cause inflammation and irreversible damage to the alveoli, the tiny air sacs in the lungs responsible for oxygen exchange.

- ***Mechanism:*** Asbestos fibers penetrate deep into the lungs, where they are engulfed by macrophages. The immune response leads to the release of pro-inflammatory cytokines and growth factors, causing fibrosis over time (Kamp & Weitzman, 1999).

- ***Symptoms:***

➢ Progressive shortness of breath (dyspnea)
➢ Persistent dry cough
➢ Chest tightness and pain
➢ Clubbing of fingers in advanced cases

- ***Diagnosis:***

➢ Chest X-rays: Reveal a "ground-glass" appearance or linear opacities.
➢ High-Resolution Computed Tomography (HRCT): Provides detailed images of lung fibrosis.
➢ Pulmonary Function Tests (PFTs): Show reduced lung capacity

and impaired gas exchange (American Thoracic Society, 2004).

- ***Epidemiology:***

➢ A study of asbestos workers in the United States found that 20-30% of those exposed for more than 20 years developed asbestosis (Markowitz et al., 2013).

➢ In the UK, asbestosis accounts for approximately 1,000 deaths annually, with the highest incidence among construction and shipyard workers (Health and Safety Executive, 2020).

- ***Case Study:***

➢ A cohort of asbestos insulation workers in New York was followed for 30 years. The study found that 25% of workers developed asbestosis, with a strong correlation between the duration of exposure and disease severity (Selikoff et al., 1964).

3.2 Lung Cancer

Asbestos exposure significantly increases the risk of lung cancer, particularly among smokers. The synergistic effect of asbestos and tobacco smoke multiplies the risk of developing lung cancer.

- ***Mechanism:*** Asbestos fibers cause DNA damage through the generation of reactive oxygen species (ROS) and chronic inflammation. This leads to mutations in oncogenes and tumor suppressor genes, promoting the growth of malignant cells (Liu et al., 2013).

- ***Symptoms:***

➢ Persistent cough, often with blood (hemoptysis).

- Unexplained weight loss.
- Chest pain and recurrent respiratory infections.

- ***Diagnosis:***
- Imaging: Chest X-rays and CT scans reveal lung nodules or masses.
- Biopsy: Confirms the presence of malignant cells.

- ***Epidemiology:***
- A meta-analysis of 55 studies found that asbestos-exposed workers had a 5-fold increased risk of lung cancer compared to the general population (Boffetta et al., 1999).
- In the United States, asbestos-related lung cancer accounts for 4-12% of all lung cancer cases, with an estimated 6,000 deaths annually (National Cancer Institute, 2021).

- ***Case Study:***
- A study of insulation workers in the United States revealed that 10% of asbestos-exposed workers developed lung cancer, with a latency period of 20-30 years. Smokers in the cohort had a 50-fold increased risk compared to non-smokers (Selikoff et al., 1964).

3.3 Mesothelioma

Mesothelioma is a rare and aggressive cancer affecting the lining of the lungs (pleura), abdomen (peritoneum), or heart (pericardium). It is almost exclusively linked to asbestos exposure.

- ***Mechanism:*** Asbestos fibers migrate to the pleural or peritoneal

lining, where they cause chronic inflammation and genetic mutations. The long latency period (20-50 years) complicates early detection (Carbone et al., 2012).

• ***Symptoms:***

- Pleural mesothelioma: Chest pain, shortness of breath, and pleural effusion (fluid buildup).
- Peritoneal mesothelioma: Abdominal pain, swelling, and weight loss.

• ***Diagnosis:***

- *Imaging:* CT and MRI scans reveal thickening of the pleura or peritoneum.
- *Biopsy:* Confirms the presence of malignant mesothelial cells.

• ***Epidemiology:***

- The incidence of mesothelioma is highest in countries with a history of asbestos use. For example, the United Kingdom reports over 2,700 mesothelioma deaths annually, with men aged 75 and older being the most affected group (Cancer Research UK, 2020).
- In Australia, the mesothelioma incidence rate is 3.8 per 100,000 population, largely due to past asbestos mining in Wittenoom (Australian Institute of Health and Welfare, 2019).

• ***Case Study:***

- In Wittenoom, Australia, a town with a history of asbestos mining, the mesothelioma incidence rate is 10 times higher than the national average. A study of former residents found that 10%

developed mesothelioma, with a latency period of 30-40 years (Musk et al., 1992).

3.4 Other Health Effects

In addition to the major diseases, asbestos exposure is associated with several other health conditions:

• ***Pleural Plaques:***

- Non-cancerous thickening of the pleural lining, often seen in asbestos-exposed individuals.
- While not malignant, pleural plaques are a marker of asbestos exposure and can cause discomfort.
- Prevalence: Found in 20-60% of asbestos-exposed workers (Hillerdal, 1980).

• ***Pleural Effusion:***

- Accumulation of fluid in the pleural space, causing breathing difficulties.
- Can be benign or malignant, depending on the presence of cancer cells.

• ***Laryngeal Cancer:***

- Asbestos exposure has been linked to an increased risk of laryngeal cancer, particularly among smokers.
- A meta-analysis found a 40% increased risk of laryngeal cancer in asbestos-exposed workers (Smith et al., 2016).

• ***Ovarian Cancer:***

- Emerging evidence suggests a link between asbestos exposure

and ovarian cancer, possibly due to the migration of fibers to the ovaries.

- A study of women exposed to asbestos through household contact (e.g., washing contaminated clothing) found a 2-fold increased risk of ovarian cancer (Reid et al., 2009).

3.5 Global Burden of Asbestos-Related Diseases

The global burden of asbestos-related diseases is substantial, with millions of workers and their families affected worldwide.

- ***Statistics:***

- The World Health Organization (WHO) estimates that 125 million people are exposed to asbestos in the workplace, and over 107,000 deaths annually are attributed to asbestos-related diseases (WHO, 2014).
- Mesothelioma accounts for approximately 38,400 deaths annually worldwide, with the highest incidence in industrialized nations (Global Burden of Disease Study, 2017).

- ***Regional Variations:***

- Developed Countries: In countries like the United States and the United Kingdom, strict regulations have reduced asbestos use, but the legacy of past exposure continues to cause disease.
- Developing Countries: In countries such as India, Brazil, and Russia, asbestos use remains widespread, and the full extent of asbestos-related diseases is not yet known due to underreporting and lack of diagnostic infrastructure (Joshi et al., 2015).

3.6 Mechanisms of Disease Development

Understanding the mechanisms by which asbestos causes disease is critical for developing preventive and therapeutic strategies.

- ***Physical Damage:*** The needle-like structure of asbestos fibers allows them to penetrate lung tissue, causing direct physical damage.

- ***Oxidative Stress:*** Asbestos fibers generate reactive oxygen species (ROS), which damage DNA, proteins, and lipids, contributing to carcinogenesis (Kamp & Weitzman, 1999).

- ***Chronic Inflammation:*** Persistent inflammation caused by asbestos fibers leads to the release of pro-inflammatory cytokines and growth factors, promoting fibrosis and cancer development (Liu et al., 2013).

The health implications of asbestos exposure are severe and far-reaching, affecting millions of individuals worldwide. While progress has been made in regulating asbestos use, much work remains to be done to eliminate asbestos-related diseases. A proactive approach, grounded in robust scientific research and global cooperation, is essential to safeguarding public health.

4. MECHANISMS OF DISEASE DEVELOPMENT

Occupational exposure to asbestos remains a significant public health concern, particularly in industries where asbestos-containing materials (ACMs) are used, disturbed, or removed. Despite regulatory efforts to limit its use, asbestos continues to pose serious health risks to

workers in various sectors. This section explores the industries most affected by asbestos exposure, the specific activities that increase risk, and the global burden of occupational asbestos-related diseases.

4.1 Industries with High Risk of Asbestos Exposure

Asbestos exposure is most prevalent in industries where workers handle or come into contact with ACMs. Below are the key industries and occupations at risk:

4.1.1 Construction Industry

The construction industry is one of the most affected by asbestos exposure, particularly during the renovation, demolition, or maintenance of older buildings constructed before the 1980s.

- ***Activities:***
  - Cutting, drilling, or sanding ACMs such as insulation, roofing, and flooring.
  - Removing or replacing asbestos-containing insulation, tiles, or cement products.
  - Working in confined spaces where asbestos dust may accumulate.

- ***Case Study:***
  - A study of construction workers in the United States found that 20% of mesothelioma cases were attributed to occupational asbestos exposure (Robinson, 2012).
  - In the UK, construction workers account for over 50% of all asbestos-related disease cases, with an estimated 1,000 deaths

annually (Health and Safety Executive, 2020).

- ***Statistics:***

➢ In the European Union, construction workers represent 70% of all occupational asbestos exposure cases (European Agency for Safety and Health at Work, 2019).

➢ A survey of construction workers in Australia found that 60% had been exposed to asbestos during their careers (Safe Work Australia, 2018).

4.1.2 Shipbuilding Industry

Asbestos was extensively used in shipbuilding for insulation, fireproofing, and gaskets. Shipyard workers, including welders, pipefitters, and electricians, are at high risk of exposure.

- ***Activities:***

➢ Handling asbestos-containing insulation materials during ship construction or repair.

➢ Removing or replacing asbestos gaskets and seals in engines and boilers.

➢ Working in poorly ventilated areas where asbestos dust accumulates.

- ***Case Study:***

➢ A cohort study of shipyard workers in the United Kingdom found a 10-fold increased risk of mesothelioma compared to the general population (Peto et al., 1995).

➢ In the United States, shipyard workers accounted for 30% of all

mesothelioma cases reported between 1999 and 2015 (National Institute for Occupational Safety and Health, 2017).

- ***Statistics:***

➢ In Japan, shipyard workers have one of the highest rates of asbestos-related diseases, with mesothelioma incidence rates 5 times higher than the national average (Japan Ministry of Health, Labour and Welfare, 2019).

4.1.3 Manufacturing Industry

Workers in manufacturing industries that produce asbestos containing products, such as textiles, cement, and brake linings, are also at risk.

- ***Activities:***

➢ Processing raw asbestos fibers into textiles or cement products.

➢ Handling finished asbestos-containing products, such as brake pads or insulation boards.

➢ Cleaning or maintaining machinery that generates asbestos dust.

- ***Case Study:***

➢ A study of asbestos textile workers in North Carolina found a significant increase in lung cancer mortality, with a standardized mortality ratio (SMR) of 2.5 (Dement et al., 1983).

➢ In Brazil, workers in asbestos cement factories have a 3-fold increased risk of developing Asbestosis compared to the general population (Algranti et al., 2016).

- ***Statistics:***

➢ In India, where asbestos use remains widespread, workers in asbestos cement factories have a 5-fold increased risk of lung cancer (Joshi et al., 2015).

4.1.4 Mining Industry

Asbestos miners and millers are at the highest risk of exposure due to the direct handling of raw asbestos fibers.

- ***Activities:***

➢ Extracting asbestos ore from mines.

➢ Crushing and milling asbestos fibers for industrial use.

➢ Transporting raw asbestos materials.

- ***Case Study:***

➢ A study of asbestos miners in Quebec, Canada, found that 30% of workers developed asbestosis after 20 years of exposure (McDonald et al., 1980).

➢ In South Africa, miners exposed to crocidolite asbestos had a mesothelioma incidence rate 10 times higher than the general population (Rees et al., 1999).

• ***Statistics:***

➢ In Russia, asbestos miners have a 15-fold increased risk of lung cancer compared to non-exposed populations (WHO, 2014).

4.2 Sources of Occupational Asbestos Exposure

Occupational asbestos exposure can occur through various sources, including:

- ***Primary Sources:***

➢ Handling raw asbestos fibers during mining or manufacturing.

➢ Working with ACMs such as insulation, tiles, or cement products.

- ***Secondary Sources:***

➢ Disturbing ACMs during renovation or demolition activities.

➢ Cleaning or maintaining equipment contaminated with asbestos dust.

- ***Environmental Exposure:***

➢ Working in buildings with deteriorating ACMs, such as schools or offices.

➢ Living near asbestos mines or factories, where fibers may contaminate the air.

4.3 Global Burden of Occupational Asbestos-Related Diseases

The global burden of occupational asbestos-related diseases is substantial, with millions of workers affected worldwide.

- ***Statistics:***

➢ The World Health Organization (WHO) estimates that 125 million people are exposed to asbestos in the workplace, and over 107,000 deaths annually are attributed to asbestos-related diseases (WHO, 2014).

➢ Mesothelioma accounts for approximately 38,400 deaths annually worldwide, with the highest incidence in industrialized nations (Global Burden of Disease Study, 2017).

- ***Regional Variations:***

➢ Developed Countries: In countries like the United States and the United Kingdom, strict regulations have reduced asbestos use, but the legacy of past exposure continues to cause disease.

➢ Developing Countries: In countries such as India, Brazil, and Russia, asbestos use remains widespread, and the full extent of asbestos-related diseases is not yet known due to underreporting and lack of diagnostic infrastructure (Joshi et al., 2015).

4.4 Preventive Measures and Occupational Safety Practices

To reduce occupational asbestos exposure, the following measures are essential:

- ***Engineering Controls:***

➢ Using ventilation systems and enclosures to minimize fiber release.

➢ Wetting ACMs during cutting or removal to reduce dust.

- ***Administrative Controls:***

➢ Implementing work practices such as restricted access and training programs.

➢ Conducting regular risk assessments and monitoring asbestos levels in the workplace.

- ***Personal Protective Equipment (PPE):***

➢ Providing respirators and protective clothing to workers.

➢ Ensuring proper disposal of contaminated PPE to prevent secondary exposure.

- ***Regulatory Frameworks:***

➢ Enforcing strict exposure limits and banning the use of asbestos in high-risk industries

➢ Providing compensation and medical surveillance for workers exposed to

Occupational exposure to asbestos remains a significant public health concern, with millions of workers at risk of developing asbestos-related diseases. While progress has been made in regulating asbestos use, much work remains to be done to eliminate asbestos-related diseases. A proactive approach, grounded in robust scientific research and global cooperation, is essential to safeguarding worker health.

5. REGULATORY FRAMEWORKS AND STANDARDS

The health risks associated with asbestos exposure have led to the development of stringent regulatory frameworks and standards worldwide. These regulations aim to limit occupational and environmental exposure, promote safer alternatives, and provide compensation for affected individuals. This section explores the key regulatory frameworks, their implementation, and their effectiveness in reducing asbestos-related diseases.

5.1 International Regulatory Frameworks

Several international organizations have established guidelines and standards to address the hazards of asbestos exposure. These frameworks provide a basis for national regulations and promote global cooperation in eliminating asbestos-related diseases.

5.1.1 World Health Organization (WHO)

The WHO has been at the forefront of global efforts to eliminate asbestos-related diseases. Key initiatives include:

- ***Global Campaign for the Elimination of Asbestos-Related Diseases:*** Launched in 2005, this campaign aims to raise awareness, promote bans on asbestos use, and support affected countries in implementing preventive measures (WHO, 2014).

- ***Recommendations:*** The WHO recommends a complete ban on all forms of asbestos and the use of safer alternatives. It also emphasizes the importance of early diagnosis, treatment, and social protection for affected individuals.

5.1.2 International Labour Organization (ILO)

The ILO has developed several conventions and recommendations to protect workers from asbestos exposure:

- ***ILO Convention No. 162 (1986):*** Focuses on the safe use of asbestos in the workplace, including measures to control exposure, provide protective equipment, and ensure medical surveillance (ILO, 1986).

- ***ILO Code of Practice on Safety in the Use of Asbestos (2006):*** Provides practical guidance for employers, workers, and governments on minimizing asbestos exposure and implementing safety measures.

5.1.3 International Agency for Research on Cancer (IARC)

The IARC has classified asbestos as a Group 1 carcinogen, confirming its role in causing cancer in humans. This classification has been instrumental in shaping global regulatory policies (IARC, 2012).

5.2 International Labour Organization (ILO)

National regulations vary widely depending on the level of asbestos use and the political will to address its hazards. Below are examples of regulatory frameworks in key countries:

5.2.1 United States

The United States has implemented comprehensive regulations to limit asbestos exposure, although a complete ban has not been enacted.

- ***Occupational Safety and Health Administration (OSHA):***
  - Sets permissible exposure limits (PELs) for asbestos in the workplace (0.1 fibers per cubic centimeter of air over an 8-hour workday).
  - Requires employers to provide protective equipment, conduct regular monitoring, and offer medical surveillance for exposed workers (OSHA, 2020).

- ***Environmental Protection Agency (EPA):***
  - Regulates asbestos under the Toxic Substances Control Act (TSCA) and the Clean Air Act.
  - Requires schools to inspect for asbestos and implement management plans to protect students and staff (EPA, 1987).

5.2.2 European Union (EU)

The EU has implemented some of the strictest asbestos regulations in the world, including a complete ban on asbestos use.

- ***Directive 2009/148/EC:***

➢ Establishes strict exposure limits (0.1 fibers/cm³) and requires employers to assess risks, implement control measures, and provide training for workers (European Commission, 2009).

- ***Asbestos Ban:*** The EU banned the use of asbestos in 2005, with limited exceptions for certain military and research applications.

5.2.3 Australia

Australia has a comprehensive regulatory framework to address asbestos exposure, including a complete ban on asbestos use.

- ***Asbestos Safety and Eradication Agency (ASEA):***

➢ Oversees the implementation of the National Strategic Plan for Asbestos Awareness and Management, which aims to eliminate asbestos-related diseases by 2030 (ASEA, 2019).

- ***Work Health and Safety Regulations:***

➢ Set strict exposure limits and require employers to identify and manage asbestos risks in the workplace (Safe Work Australia, 2018).

5.2.4 Japan

Japan has implemented regulations to limit asbestos exposure, but

challenges remain due to the legacy of past use.

- ***Asbestos Safety Law (2006):***

➢ Prohibits the use of asbestos in most products and requires employers to monitor exposure levels and provide protective equipment (Japan Ministry of Health, Labour and Welfare, 2006).

- ***Compensation System:***

➢ Provides compensation for workers and their families affected by asbestos-related diseases, including mesothelioma and lung cancer.

5.2.5 Developing Countries

Many developing countries continue to use asbestos due to its affordability and lack of awareness about its hazards. However, some countries have taken steps to regulate its use:

- ***Brazil:***

➢ Banned the use of asbestos in 2017, following years of advocacy by public health organizations and labor unions (Algranti et al., 2016).

- ***India:***

➢ Continues to use asbestos, but the government has introduced regulations to limit exposure in certain industries (Joshi et al., 2015).

5.3 Key Components of Effective Regulatory Frameworks

Effective regulatory frameworks for asbestos management typically include the following components:

• ***Exposure Limits:*** Setting strict permissible exposure limits to minimize worker exposure.

• ***Risk Assessment and Management:*** Requiring employers to identify asbestos risks and implement control measures.

• ***Training and Education:*** Providing workers with training on asbestos hazards and safe work practices.

• ***Medical Surveillance:*** Offering regular health check-ups for workers exposed to asbestos.

• ***Compensation and Support:*** Providing financial and medical support for individuals affected by asbestos-related diseases.

5.4 Challenges in Implementing Regulations

Despite the existence of regulatory frameworks, several challenges hinder their effective implementation:

- ***Lack of Enforcement:*** In many countries, weak enforcement mechanisms allow non-compliance with asbestos regulations.
- ***Economic Pressures:*** The affordability of asbestos makes it difficult for developing countries to transition to safer alternatives.

- ***Legacy of Past Use:*** The widespread use of asbestos in the past continues to pose risks, particularly during renovation and demolition activities.

- ***Global Trade:*** The continued production and export of asbestos in some countries undermine global efforts to eliminate its use.

5.5 Case Studies of Regulatory Success

Several countries have successfully implemented asbestos regulations, leading to a significant reduction in asbestos-related diseases:

- ***United Kingdom:***

➢ The UK banned asbestos use in 1999 and implemented strict regulations for its removal and disposal. As a result, mesothelioma incidence rates have stabilized, although the legacy of past exposure continues to cause disease (Health and Safety Executive, 2020).

- ***Sweden:***

➢ Sweden banned asbestos in 1982 and implemented comprehensive regulations for its management. The country has seen a steady decline in asbestos-related diseases since the ban (Tossavainen, 2004).

Regulatory frameworks and standards play a critical role in reducing occupational and environmental asbestos exposure. While progress has been made in many countries, global cooperation is needed to address the challenges of enforcement, economic pressures, and the legacy of past use. A proactive approach, grounded in robust scientific

research and public health advocacy, is essential to eliminating asbestos-related diseases worldwide.

6. PREVENTIVE MEASURES AND RISK MITIGATION

The health risks associated with asbestos exposure necessitate the implementation of comprehensive preventive measures and risk mitigation strategies. These measures aim to minimize exposure, protect workers, and ensure the safe handling and disposal of asbestos-containing materials (ACMs). This section explores engineering controls, administrative controls, personal protective equipment (PPE), and public awareness initiatives that are critical for reducing asbestos-related risks.

6.1 Engineering Controls

Engineering controls are the first line of defense against asbestos exposure. These measures focus on eliminating or reducing the release of asbestos fibers into the air.

6.1.1 Ventilation Systems

• ***Local Exhaust Ventilation (LEV):*** Installing LEV systems at the source of asbestos dust generation, such as during cutting or sanding, to capture fibers before they disperse into the air.

• ***High-Efficiency Particulate Air (HEPA) Filters:*** Using HEPA filters in ventilation systems to trap asbestos fibers and prevent their circulation in enclosed spaces.

6.1.2 Enclosures and Barriers

- ***Enclosed Work Areas:*** Creating sealed enclosures around work areas where asbestos is being handled to prevent fiber release.

- ***Negative Pressure Units:*** Using negative air pressure systems to ensure that any released fibers are contained within the work area.

6.1.3 Wet Methods

- ***Wetting ACMs:*** Applying water or wetting agents to ACMs during cutting, drilling, or removal to suppress dust and reduce fiber release.

- ***Example:*** In the United States, the Occupational Safety and Health Administration (OSHA) mandates the use of wet methods during asbestos abatement projects (OSHA, 2020).

6.2 Administrative Controls

Administrative controls involve implementing policies and procedures to minimize asbestos exposure in the workplace.

6.2.1 Work Practices

- ***Restricted Access:*** Limiting access to areas where asbestos is present to trained and authorized personnel only.
- ***Safe Work Procedures:*** Developing and enforcing standard operating procedures (SOPs) for handling ACMs, including proper disposal methods.

6.2.2 Training and Education

- ***Worker Training:*** Providing comprehensive training programs for workers on asbestos hazards, safe work practices, and emergency response procedures.

- ***Example:*** In Australia, the Asbestos Safety and Eradication Agency (ASEA) offers nationally accredited training courses for asbestos removal workers (ASEA, 2019).

6.2.3 Regular Monitoring and Inspections

- ***Air Monitoring:*** Conducting regular air quality tests to measure asbestos fiber concentrations and ensure compliance with exposure limits.

- ***Building Inspections:*** Inspecting buildings for ACMs before renovation or demolition activities to identify and manage risks.

6.3 Personal Protective Equipment (PPE)

PPE is essential for protecting workers from asbestos exposure, particularly when engineering and administrative controls are insufficient.

6.3.1 Respiratory Protection

- ***Powered Air-Purifying Respirators (PAPRs):*** Providing PAPRs with HEPA filters for workers handling ACMs in high-risk situations.

- ***Disposable Respirators:*** Using N95 or P100 respirators for low-risk tasks, such as minor repairs or inspections.

6.3.2 Protective Clothing

- ***Disposable Coveralls:*** Wearing full-body coveralls to prevent asbestos fibers from contaminating clothing and skin.

- ***Footwear and Gloves:*** Using disposable boot covers and gloves to minimize the risk of fiber transfer.

6.3.3 Decontamination Procedures

- ***Decontamination Units:*** Setting up decontamination areas with showers and clean changing rooms for workers to remove contaminated clothing and equipment.

- ***Example:*** The European Union mandates the use of decontamination units during asbestos removal projects (European Commission, 2009).

6.4 Safe Handling and Disposal of ACMs

Proper handling and disposal of ACMs are critical to preventing environmental contamination and secondary exposure.

6.4.1 Removal and Encapsulation

- ***Removal:*** Safely removing ACMs from buildings and structures using wet methods and enclosed work areas.

- ***Encapsulation:*** Applying sealants or coatings to ACMs to prevent fiber release when removal is not feasible.

6.4.2 Waste Disposal

- ***Sealed Containers:*** Placing ACMs in sealed, labeled containers to prevent fiber release during transport.
- ***Licensed Landfills:*** Disposing of asbestos waste in licensed landfills equipped to handle hazardous materials.
- ***Example:*** In the UK, asbestos waste must be disposed of at licensed facilities in accordance with the Control of Asbestos Regulations (2012).

6.5 Public Awareness and Advocacy

Raising public awareness about the dangers of asbestos is essential for preventing exposure and promoting safer alternatives.

6.5.1 Education Campaigns

- ***Community Outreach:*** Conducting workshops and seminars to educate the public about asbestos hazards and safe practices.
- ***Online Resources:*** Providing accessible information through websites, videos, and social media platforms.

6.5.2 Advocacy for Asbestos Bans

- ***Global Campaigns:*** Supporting international efforts to ban asbestos use and promote safer alternatives.
- ***Example:*** The Global Ban Asbestos Network (GBAN) advocates for a worldwide ban on asbestos and provides resources for affected communities (GBAN, 2021).

6.6 Case Studies of Successful Risk Mitigation

Several countries and organizations have successfully implemented preventive measures to reduce asbestos exposure:

6.6.1 Japan

- ***Asbestos Safety Law (2006):*** Japan introduced strict regulations for asbestos handling and disposal, leading to a significant reduction in exposure cases (Japan Ministry of Health, Labour and Welfare, 2006).

6.6.2 Australia

- ***National Strategic Plan for Asbestos Awareness and Management:*** Australia's comprehensive plan has reduced asbestos-related diseases through public education, training, and strict enforcement (ASEA, 2019).

6.6.3 United States

- ***OSHA Regulations:*** The implementation of OSHA's asbestos standards has significantly reduced occupational exposure in industries such as construction and shipbuilding (OSHA, 2020).

6.7 Challenges in Implementing Preventive Measures

Despite the availability of effective measures, several challenges hinder their implementation:

- ***Cost:*** The high cost of asbestos removal and disposal can be a barrier for small businesses and developing countries.

- ***Lack of Awareness:*** Limited knowledge about asbestos hazards among workers and the public can lead to unsafe practices.

- ***Enforcement:*** Weak enforcement of regulations in some regions allows non-compliance and continued exposure.

Preventive measures and risk mitigation strategies are essential for reducing asbestos exposure and protecting public health. While significant progress has been made in many countries, global cooperation and continued efforts are needed to address the challenges of cost, awareness, and enforcement. A proactive approach, grounded in robust scientific research and public health advocacy, is critical to eliminating asbestos-related diseases worldwide.

7. CASE STUDIES AND GLOBAL PERSPECTIVES

Asbestos exposure and its health implications vary significantly across different regions and industries. This section examines case studies from various countries, highlighting successes, challenges, and lessons learned in managing asbestos-related risks. Additionally, it provides a global perspective on the burden of asbestos-related diseases and the effectiveness of regulatory measures.

7.1 Case Studies

7.1.1 Wittenoom, Australia

Wittenoom, a small town in Western Australia, was the site of a blue asbestos (crocidolite) mine operated by CSR Limited from 1943 to 1966. Despite early warnings about the dangers of asbestos, the company continued operations, exposing thousands of workers and residents to

high levels of asbestos fibers.

- ***Health Impact:***

➢ A study of former Wittenoom residents found that 10% developed mesothelioma, with a latency period of 30-40 years (Musk et al., 1992).

➢ The mesothelioma incidence rate in Wittenoom is 10 times higher than the national average.

- ***Regulatory Response:***

➢ The mine was closed in 1966, and the town was officially de-gazetted in 2007.

➢ The Australian government has implemented a national asbestos ban and established the Asbestos Safety and Eradication Agency (ASEA) to manage asbestos risks (ASEA, 2019).

7.1.2 Libby, Montana, USA

Libby, Montana, was the site of a vermiculite mine contaminated with asbestos. The mine, operated by W.R. Grace and Company from 1963 to 1990, exposed workers and residents to tremolite asbestos, a highly toxic form of the mineral.

- ***Health Impact:***

➢ By the early 2000s, hundreds of cases of asbestos-related diseases had been reported in Libby, including mesothelioma, lung cancer, and asbestosis (ATSDR, 2002).

➢ The EPA declared Libby a public health emergency in 2009, marking the first time the agency used its authority under the

Superfund law to address a public health crisis.

- ***Regulatory Response:***

➢ Cleanup efforts are ongoing, with the EPA removing contaminated soil and providing medical care for affected residents.

➢ The case led to increased awareness of environmental asbestos exposure and stricter regulations on asbestos use in the United States.

7.1.3 Casale Monferrato, Italy

Casale Monferrato, a town in northern Italy, was home to an asbestos cement factory operated by Eternit from 1907 to 1986. The factory exposed workers and residents to high levels of asbestos fibers, leading to a public health crisis.

- ***Health Impact:***

➢ A study found that mesothelioma incidence rates in Casale Monferrato were 10 times higher than the national average (Magnani et al., 2001).

➢ Over 2,000 asbestos-related deaths have been recorded in the town, with many more cases expected due to the long latency period of mesothelioma.

- ***Regulatory Response:***

➢ Italy banned asbestos in 1992 and implemented strict regulations for its removal and disposal.

➢ The town has become a symbol of the fight against asbestos,

with ongoing efforts to provide compensation and support for affected individuals.

7.2 Global Perspectives

7.2.1 Developed Countries

Developed countries have made significant progress in regulating asbestos use, but the legacy of past exposure continues to cause disease.

- ***United States:***
  - Asbestos use has declined significantly since the 1970s, but the country has not implemented a complete ban.
  - The EPA estimates that asbestos-related diseases cause approximately 12,000-15,000 deaths annually (EPA, 2020).
- ***United Kingdom:***
  - The UK banned asbestos in 1999 and implemented strict regulations for its removal and disposal.
  - Mesothelioma incidence rates have stabilized, but the country still records over 2,700 deaths annually due to past exposure (Cancer Research UK, 2020).

- ***Japan:***
  - Japan banned asbestos in 2006 and implemented strict regulations for its handling and disposal.
  - Mesothelioma incidence rates remain high due to the legacy of past use, with over 1,500 deaths reported in 2018 (Japan Ministry of Health, Labour and Welfare, 2019).

7.2.2 Developing Countries

Many developing countries continue to use asbestos due to its affordability and lack of awareness about its hazards.

- ***India:***
  - India is one of the largest consumers of asbestos, primarily for roofing materials.
  - A study found that workers in asbestos cement factories have a 5-fold increased risk of lung cancer (Joshi et al., 2015).

- ***Brazil:***
  - Brazil banned asbestos in 2017, following years of advocacy by public health organizations and labor unions.
  - The country has seen a decline in asbestos-related diseases, but challenges remain in enforcing the ban and managing legacy exposure (Algranti et al., 2016).

- ***Russia:***
  - Russia is one of the largest producers of asbestos, with the mineral still widely used in construction and manufacturing.
  - Asbestos-related diseases are underreported, and regulatory enforcement is weak (WHO, 2014).

7.2.3 Global Burden of Asbestos-Related Diseases

The global burden of asbestos-related diseases is substantial, with millions of workers and their families affected worldwide.

- ***Statistics:***
  - The World Health Organization (WHO) estimates that 125

million people are exposed to asbestos in the workplace, and over 107,000 deaths annually are attributed to asbestos-related diseases (WHO, 2014).

- Mesothelioma accounts for approximately 38,400 deaths annually worldwide, with the highest incidence in industrialized nations (Global Burden of Disease Study, 2017).

- ***Regional Variations:***

- Developed Countries: In countries like the United States and the United Kingdom, strict regulations have reduced asbestos use, but the legacy of past exposure continues to cause disease.
- Developing Countries: In countries such as India, Brazil, and Russia, asbestos use remains widespread, and the full extent of asbestos-related diseases is not yet known due to underreporting and lack of diagnostic infrastructure (Joshi et al., 2015).

7.3 Lessons Learned and Future Directions

The case studies and global perspectives highlight several key lessons for managing asbestos-related risks:

- ***Importance of Early Action:*** Early identification and regulation of asbestos hazards can prevent widespread exposure and reduce the burden of disease.

- ***Need for Global Cooperation:*** Asbestos is a global issue that requires international collaboration to promote bans, share best practices, and support affected countries.

- ***Role of Public Awareness:*** Educating the public about the

dangers of asbestos is critical for preventing exposure and promoting safer alternatives.

The case studies and global perspectives presented in this section underscore the severe and far-reaching health impacts of asbestos exposure. While progress has been made in regulating asbestos use, much work remains to be done to eliminate asbestos-related diseases. A proactive approach, grounded in robust scientific research and global cooperation, is essential to safeguarding public health.

8. FUTURE DIRECTIONS AND RECOMMENDATIONS FOR ASBESTOS

The global burden of asbestos-related diseases underscores the urgent need for proactive measures to eliminate asbestos exposure. While significant progress has been made in many countries, challenges remain, particularly in developing nations where asbestos use continues. This section outlines future directions and recommendations for addressing asbestos-related risks, focusing on regulatory action, public awareness, research, and global cooperation.

8.1 Strengthening Regulatory Frameworks

Effective regulation is the cornerstone of asbestos risk management. The following recommendations aim to strengthen regulatory frameworks worldwide:

8.1.1 Global Asbestos Ban

- ***Recommendation:*** Implement a complete ban on the mining, production, and use of all forms of asbestos, including chrysotile (white asbestos), which is still widely used in some countries.

- ***Example:*** Over 60 countries, including the European Union, Australia, and Japan, have already banned asbestos. However, countries like Russia, India, and China continue to produce and use asbestos, highlighting the need for global action (Kazan-Allen, 2020).

8.1.2 Stricter Enforcement

- ***Recommendation:*** Strengthen enforcement mechanisms to ensure compliance with asbestos regulations, particularly in developing countries where enforcement is often weak.

- ***Example:*** In Brazil, the 2017 asbestos ban was accompanied by increased inspections and penalties for non-compliance, leading to a significant reduction in asbestos use (Algranti et al., 2016).

8.1.3 Harmonized Standards

- ***Recommendation:*** Develop harmonized international standards for asbestos exposure limits, handling, and disposal to ensure consistent protection for workers and communities.

- ***Example:*** The International Labour Organization (ILO) and the World Health Organization (WHO) could lead efforts to establish global guidelines for asbestos management (ILO, 2006; WHO, 2014).

8.2 Promoting Safer Alternatives

The transition to safer alternatives is critical for reducing reliance on asbestos. The following recommendations focus on promoting and

adopting non-asbestos materials:

8.2.1 Research and Development

- ***Recommendation:*** Invest in research and development of safer alternatives to asbestos, such as cellulose fibers, polyvinyl alcohol (PVA) fibers, and ceramic fibers.

- ***Example:*** The European Union has funded research projects to develop and commercialize asbestos-free construction materials, resulting in widespread adoption (European Commission, 2009).

8.2.2 Incentives for Adoption

- ***Recommendation:*** Provide financial incentives, such as tax breaks or subsidies, to encourage industries to adopt safer alternatives.

- ***Example:*** In India, the government could offer incentives to manufacturers of asbestos-free roofing materials to accelerate the transition (Joshi et al., 2015).

8.2.3 Public Awareness Campaigns

- ***Recommendation:*** Launch public awareness campaigns to educate consumers and industries about the availability and benefits of safer alternatives.

- ***Example:*** The Asbestos Safety and Eradication Agency (ASEA) in Australia has successfully promoted asbestos-free

products through targeted campaigns (ASEA, 2019).

8.3 Enhancing Public Awareness and Education

Raising awareness about the dangers of asbestos is essential for preventing exposure and promoting safer practices. The following recommendations focus on education and outreach:

8.3.1 Worker Training Programs

- ***Recommendation:*** Develop and implement comprehensive training programs for workers in high-risk industries, such as construction and shipbuilding, to educate them about asbestos hazards and safe work practices.
- ***Example:*** The UK Health and Safety Executive (HSE) offers accredited training courses for asbestos removal workers, significantly reducing exposure risks (HSE, 2020).

8.3.2 Community Outreach

- ***Recommendation:*** Conduct community outreach programs to educate the public about asbestos risks, particularly in areas with a history of asbestos use or mining.

- ***Example:*** In Libby, Montana, the EPA has organized community meetings and workshops to raise awareness about asbestos hazards and cleanup efforts (ATSDR, 2002).

8.3.3 Online Resources

- ***Recommendation:*** Create accessible online resources, such as websites, videos, and social media campaigns, to disseminate

information about asbestos risks and prevention.

- ***Example:*** The Global Ban Asbestos Network (GBAN) provides a wealth of online resources for affected communities and advocates (GBAN, 2021).

8.4 Advancing Research and Surveillance

Ongoing research and surveillance are critical for understanding and addressing asbestos-related risks. The following recommendations focus on advancing scientific knowledge and monitoring efforts:

8.4.1 Epidemiological Studies

- ***Recommendation:*** Conduct epidemiological studies to assess the burden of asbestos-related diseases, particularly in developing countries where data is scarce.

- ***Example:*** A study in India found that workers in asbestos cement factories have a 5-fold increased risk of lung cancer, highlighting the need for further research (Joshi et al., 2015).

8.4.2 Health Surveillance Programs

- ***Recommendation:*** Establish health surveillance programs to monitor and track asbestos-related diseases among exposed populations.

- ***Example:*** The Italian National Mesothelioma Registry has been instrumental in tracking mesothelioma cases and identifying high-risk areas (Magnani et al., 2001).

8.4.3 Mechanistic Research

- ***Recommendation:*** Invest in research to better understand the mechanisms of asbestos-induced diseases, such as mesothelioma and lung cancer, to develop targeted therapies.

- ***Example:*** Recent studies have identified genetic mutations associated with mesothelioma, paving the way for personalized treatments (Carbone et al., 2012).

8.5 Fostering Global Cooperation

Asbestos is a global issue that requires international collaboration to address effectively. The following recommendations focus on fostering global cooperation:

8.5.1 International Agreements

- ***Recommendation:*** Develop international agreements to promote asbestos bans, share best practices, and support affected countries in managing asbestos risks.

- ***Example:*** The Rotterdam Convention, which lists asbestos as a hazardous substance, could be strengthened to include a global ban (WHO, 2014).

8.5.2 Technical and Financial Assistance

- ***Recommendation:*** Provide technical and financial assistance to developing countries to help them transition to asbestos-free alternatives and implement effective regulations.

- ***Example:*** The World Bank and other international organizations could fund projects to replace asbestos-containing materials in developing countries.

8.5.3 Knowledge Sharing

- ***Recommendation:*** Establish platforms for knowledge sharing and collaboration among researchers, policymakers, and advocates to address asbestos-related challenges.

- ***Example:*** The International Mesothelioma Interest Group (iMig) organizes conferences and workshops to share the latest research and best practices (iMig, 2021).

8.6 Addressing Legacy Asbestos

The legacy of past asbestos use continues to pose risks, particularly during renovation and demolition activities. The following recommendations focus on managing legacy asbestos:

8.6.1 Safe Removal and Disposal

- ***Recommendation:*** Implement safe removal and disposal practices for asbestos-containing materials in buildings and infrastructure.

- ***Example:*** The UK Control of Asbestos Regulations (2012) require licensed contractors to remove and dispose of asbestos safely (HSE, 2020).

8.6.2 Public Awareness

- ***Recommendation:*** Raise awareness about the risks of legacy

asbestos and the importance of professional removal.

- ***Example:*** The Asbestos Diseases Foundation of Australia (ADFA) has launched campaigns to educate homeowners about the dangers of DIY asbestos removal (ADFA, 2021).

The future of asbestos risk management lies in a proactive and collaborative approach that addresses both current and legacy exposure. By strengthening regulatory frameworks, promoting safer alternatives, enhancing public awareness, advancing research, and fostering global cooperation, we can eliminate asbestos-related diseases and protect future generations. The time to act is now.

Asbestos exposure remains a significant occupational health issue, with far-reaching consequences for workers and society. While progress has been made in regulating its use, much work remains to be done to eliminate asbestos-related diseases. A proactive approach, grounded in robust OHS practices, is essential to safeguarding worker health.

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