Cancer Association of South Africa (CANSA)

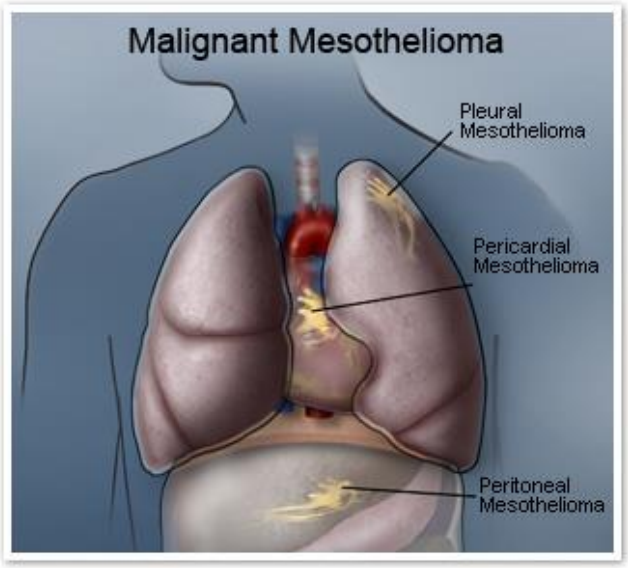
Research • Educate • Support

Fact Sheet
on
Mesothelioma

Introduction

Mesothelioma (also known as malignant mesothelioma) is a rare type of cancer that occurs in the thin layer of cells lining the body's internal organs, known as the mesothelium. There are three recognised types of mesothelioma.

Pleural mesothelioma is the most common form of the disease, accounting for roughly 70% of cases, and occurs in the lining of the lung known as the pleura. Peritoneal mesothelioma occurs in the lining of the abdominal cavity, known as the peritoneum and Pericardial mesothelioma originates in the pericardium, which covers the heart.



[Picture Credit: Mesothelioma]

Making a correct mesothelioma diagnosis is often difficult for doctors because the disease usually presents with symptoms that mimic other common ailments. There is currently no known cure for mesothelioma, but treatments such as surgery and chemotherapy can help to improve the typical mesothelioma prognosis and even increase life expectancy of sufferers.

Jain, S.V. & Wallen, J.M. 2020.

"Malignant mesothelioma is a rare growth of mesothelial cells strongly associated with asbestos exposure. Mesothelial cells form the lining layers of the viscera. Mesothelioma can occur at any mesothelial layer such as the peritoneum or pericardium. The pleural layer is by far the most commonly affected, giving rise to malignant pleural mesothelioma. The subtypes of asbestos strongly associated with malignant mesothelioma are the amosite and crocidolite asbestos."

Researched and Authored by Prof Michael C Herbst
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Incidence of Mesothelioma in South Africa

There are no separate statistics for the different types of mesothelioma available in South Africa. According to the National Cancer Registry (2016) the following number of Mesothelioma cases was histologically diagnosed in South Africa during 2016. Histologically diagnosed means that a tissue sample (biopsy) was referred to a recognised laboratory where a specially trained pathologist confirmed the cancer diagnosis.

According to the National Cancer Registry (2017) the following number of mesothelioma cases were histologically diagnosed in South Africa during 2017:

Group - Males 2017	Actual No of Cases	Estimated Lifetime Risk	Percentage of All Cancers
All males	**145**	**1:1 107**	**0,36%**
Asian males	**3**	**1:2 809**	**0,31%**
Black males	**41**	**1:2 437**	**0,31%**
Coloured males	**13**	**1:1 235**	**0,28%**
White males	**88**	**1:448**	**0,41%**

Group - Females 2017	Actual No of Cases	Estimated Lifetime Risk	Percentage of All Cancers
All females	**71**	**1:3 140**	**0,17%**
Asian females	**3**	**1:2 431**	**0,23%**
Black females	**21**	**1:6 699**	**0,11%**
Coloured females	**11**	**1:2 476**	**0,24%**
White females	**36**	**1:1 283**	**0,21%**

The frequency of histologically diagnosed cases of mesothelioma in South Africa for 2017 was as follows (National Cancer Registry, 2017):

Group - Males 2017	**0 – 19 Years 2008**	**20 – 29 Years 2008**	**30 – 39 Years 2008**	**40 – 49 Years 2008**	**50 – 59 Years 2008**	**60 – 69 Years 2008**	**70 – 79 Years 2008**	**80+ Years 2008**
All males	**0**	**0**	**1**	**3**	**27**	**45**	**50**	**20**
Asian males	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**0**
Black males	**0**	**0**	**0**	**0**	**16**	**15**	**7**	**3**
Coloured males	**0**	**0**	**0**	**0**	**1**	**4**	**5**	**3**
White males	**0**	**0**	**1**	**2**	**9**	**25**	**37**	**14**

Group - Females 2017	**0 – 19 Years 2008**	**20 – 29 Years 2008**	**30 – 39 Years 2008**	**40 – 49 Years 2008**	**50 – 59 Years 2008**	**60 – 69 Years 2008**	**70 – 79 Years 2008**	**80+ Years 2008**
All females	**0**	**0**	**0**	**3**	**15**	**16**	**24**	**13**
Asian females	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**
Black females	**0**	**0**	**0**	**3**	**6**	**2**	**9**	**1**
Coloured females	**0**	**0**	**0**	**0**	**5**	**2**	**2**	**2**
White females	**0**	**0**	**0**	**0**	**2**	**11**	**13**	**10**

N.B. In the event that the totals in any of the above tables do not tally, this may be the result of uncertainties as to the age, race or sex of the person. The totals for 'all males' and 'all females' are, however, always reflect the correct total.

Causes of Mesothelioma

Studies have shown that asbestos causes inflammation of mesothelial cells, which leads to cellular damage and cancer. Up to nine out of 10 individuals suffering from mesothelioma have been exposed to asbestos. When asbestos fibres are accidentally swallowed, mesothelioma affects the abdomen.

People who have been exposed to high levels of asbestos at a young age are most likely to develop mesothelioma. Furthermore, many industrial factories and commercial buildings were constructed with products containing asbestos, putting those who have lived or worked in these places at risk. Other asbestos diseases triggered by asbestos exposure include diffuse pleural thickening, asbestos lung cancer and fibrosis.

The fibres of the following types of asbestos are implicated in mesothelioma:

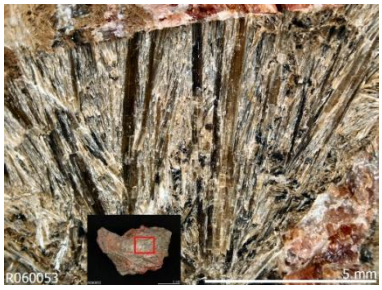
Chrysotile

Amosite

Crocidolite

Tremolite

Anthophyllite



Actinolite

In addition to asbestos exposure, mesothelioma can be caused by radiation therapy and tobacco use. Individuals who have a family history of mesothelioma are more likely to develop this condition. Living with someone who works with this substance increases the risk of mesothelioma as well. Sometimes this condition occurs in people who have never been exposed to asbestos. The chances of developing this form of cancer does not decrease with time after exposure to asbestos.

Other Possible Causes of Mesothelioma

Other possible causes include:

Thorium Dioxide - Thorium dioxide was used for X-ray enhancement back in the 1930s. Patients who received this substance developed pleural mesothelioma and peritoneal mesothelioma. Identified as a powerful carcinogen in the late 1950s, thorium dioxide caused this form of cancer in up to 10 million people from all over the world.

[Picture Credit: Erionite]

Erionite - Erionite is a non-asbestos naturally occurring, microscopic, fibrous mineral. It usually is found in volcanic ash that has been altered by weathering and ground water. Erionite forms brittle, wool-like fibrous masses in the hollows of rock formations. Its colour varies from white to clear, and it looks like transparent, glass-like fibres.

Like asbestos, erionite may pose health risks to those who breathe in the fibres. It appears to be associated with increased risks of fibrogenic lung disease, lung cancer and mesothelioma.

Unlike the six asbestos fibres, erionite is currently not regulated in South Africa under the Asbestos Regulations, 2001, neither by the US Environmental Protection Agency.

Taconite – Taconite is a low-grade siliceous iron formation in Minnesota, U.S., from which high-grade iron ore is derived. The iron formation consists of fine-grained silica with variable ratios of hematite and magnetite totaling less than 30 percent iron. Recovery of the iron requires fine grinding and concentration of iron-bearing phases, which in turn are formed into pellets suitable for blast furnaces. As high-grade deposits of iron ore have become depleted, taconite deposits have increased in importance as a source of iron ore.

[Picture Credit: Taconite]

Taconite iron ore mining and processing presents significant health risks to both workers in the strip mines and residents living near the mine site and is

responsible for increased rates of silicosis and mesothelioma, a rare and aggressive cancer. Taconite is regulated in the United States of America under the Taconite Regulations, The Code of Federal Regulations of the United States of America. Taconite is also not regulated in South Africa under the Asbestos Regulations, 2001.

Simian Virus 40 (SV40) - a contaminant of polio vaccines administered in the 1950s and 1960s. SV40 was the 40th virus found in rhesus monkey kidney cells when these cells were used to make the polio vaccine. This virus contaminated both the Inactivated Polio Vaccine (IPV) created by Dr. Jonas Salk and the Oral or 'Live' Polio Vaccine (OPV) created by Dr. Albert Sabin.
In 1961, SV40 was discovered by Dr. Bernice Eddy of the National Institute of Health, Division of Biologics, when she took the material used to grow polio vaccines and injected it into hamsters. Tumours grew in the hamsters. Her discovery was subsequently validated by Drs. Maurice Hilliman and Benjamin Sweet of Merck.

Upon the discovery that SV40 was an animal carcinogen that had found its way into the polio vaccines, a new federal law was passed in 1961 that required that no vaccines contain this virus. However, this law did not require that SV40 contaminated vaccines be discarded or that the contaminated seed material (used to make all polio vaccines for the next four decades) be discarded. As a result, known SV40 contaminated vaccines were injected into children up until 1963. In addition, it has been alleged that there have been SV40-contaminated batches of oral polio vaccine administered to some children until the end of the 1990's.

Diagnosis of Mesothelioma

The diagnosis of mesothelioma is very complex.

Pass, H.I., Alimi, M., Carbone, M., Yang, H. & Goparaju, C.M. 2020.
"Malignant pleural mesothelioma (MPM) is an asbestos-related neoplasm that can only be treated successfully when correctly diagnosed and treated early. The asbestos-exposed population is a high-risk group that could benefit from sensitive and specific blood- or tissue-based biomarkers. We review recent work with biomarker development in MPM and literature of the last 20 years on the most promising blood- and tissue-based biomarkers. Proteomic, genomic, and epigenomic platforms are covered. SMRP is the only validated blood-based biomarker with diagnostic, monitoring and prognostic value. To strengthen development and testing of MPM biomarkers, cohorts for validation must be established by enlisting worldwide collaborations."

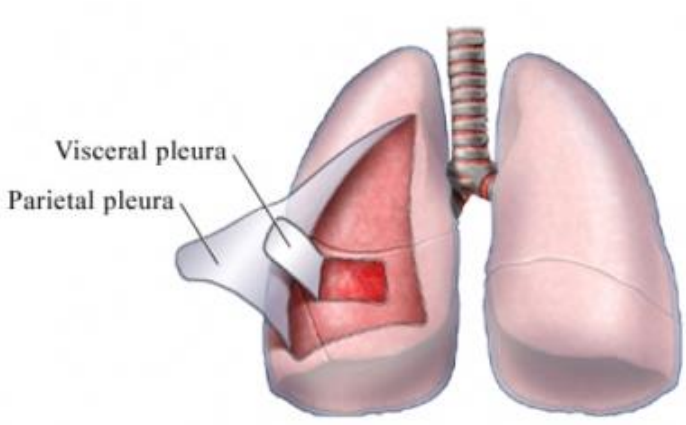
Schulte, J.J. & Husain, A.N. 2020.
"Malignant mesothelioma is an uncommon tumor that may be difficult to diagnose. The International Mesothelioma Interest Group has been writing guidelines for pathological diagnosis that are periodically updated. The guidelines are being updated based on published literature in the last 3 years, and experience of more than 20 leading international pathologists in the field who will be co-authors. Updates were discussed by attendees of the Pulmonary Pathology Society Biennial Meeting (Dubrovnik, Croatia, June 2019). Areas with significant advancements/changes include utilization of immunohistochemistry (establishing mesothelial lineage and benign versus malignant), prognosis and nuclear grading, biphasic malignant mesothelioma, transitional pattern, malignant mesothelioma *in situ*, and therapeutic/molecular targets."

Elliot, D.R.F. & Jones, K.D. 2020.
"Mesothelioma is a rare neoplasm that arises from mesothelial cells lining body cavities including the pleura, pericardium, peritoneum, and tunica vaginalis. Most malignant mesotheliomas occur in the chest and are frequently associated with a history of asbestos exposure. The diagnosis of malignant mesothelioma is challenging and fraught with pitfalls, particularly in small biopsies. This article highlights what the pathologist needs to know regarding the clinical and radiographic presentation of mesothelioma, histologic features including subtypes and variants, and recent advances in immunohistochemical markers and molecular testing."

Pleural Mesothelioma and Its Treatment
Pleural mesothelioma is cancer of the cells that make up the *pleura*, a membrane that covers the outside of the lungs and lines the inside of the chest cavity.

Pleural mesothelioma is a challenging disease for doctors to treat, but numerous therapies have shown to significantly extend survival and improve quality of life for patients. Pleural mesothelioma is the most widely diagnosed form of the disease - a vast majority of mesothelioma clinical trials, therefore, aim to discover a cure for this condition.

Standard treatment options for this rare asbestos-related cancer usually include surgery, chemotherapy and radiation therapy. As research on mesothelioma treatment grows, the combination of two or more treatment options has become increasingly accepted as a promising approach for extending survival.



Picture Credit: Visceral and Parietal Pleura]

Cinausero, M., Rihawi, K., Cortiula, F., Follador, A., Fasola, G. & Ardizzoni, A. 2019.
"Malignant pleural mesothelioma (MPM) is a rare cancer of the pleural surfaces frequently related to asbestos exposure. It is characterized by a poor prognosis even for patients treated with trimodality therapy, including surgery, chemotherapy and radiotherapy. Moreover, the majority of patients are not candidates for surgery due to disease advanced stage or medical comorbidities. For these patients, the survival rate is even lower and few therapeutic options are currently available. Nevertheless, many interesting novel approaches are under investigation, among which immunotherapy represents one of the most promising emerging strategies. In this review, we will discuss the role of new therapeutic options, particularly immunotherapy, and present the results of the most important and promising clinical trials."

Pleural Mesothelioma Surgery - Doctors can perform numerous types of surgery to treat pleural mesothelioma. Some surgical options aim to cure the disease with aggressive tumour removal, while others are palliative, which means they are mainly done to relieve painful symptoms.

Extrapleural Pneumonectomy (EPP) - EPP is a radical surgery where doctors completely remove the affected lung, as well as the pleura, diaphragm and covering of the heart (pericardium). It is typically performed on patients with early stage pleural mesothelioma.

Pleurectomy/Decortication (P/D) - When performed on patients in the early stages of pleural mesothelioma, P/D can be just as effective as EPP for removing all signs of cancer with significantly less risk. With P/D, surgeons remove the entire pleura, pericardium and sometimes the diaphragm while leaving the lung intact. As a result, there is less sacrifice of lung function.

Chemotherapy - Chemotherapy involves the use of one or more drugs to kill cancer cells and shrink tumours. The drugs are usually delivered into the patient's vein or taken orally in pill form. While chemotherapy cannot cure pleural mesothelioma, it can slow cancer progression, help with symptoms and prolong survival.

Radiation Therapy - Radiation therapy uses targeted, high-energy rays to kill cancer cells. This treatment may be given to cure mesothelioma, control its growth or help alleviate its symptoms. Radiation therapy works by damaging the cancer cells' DNA, which prevents the cells from growing and spreading.

Multimodal Therapy - While aggressive surgery was once the preferred treatment for extending the life span of pleural mesothelioma patients, multimodal therapy has become a much more favourable option.

Multimodal therapy combines two or more treatments, typically surgery, chemotherapy and/or radiation therapy. These options generally offer little to no survival benefit when given individually, but several studies suggest that certain combinations can have excellent results.

Some common multimodal treatment plans that have been found to improve survival for pleural mesothelioma patients include:

- Surgery with preoperative chemotherapy
- Surgery with preoperative radiation therapy and postoperative chemotherapy
- Intrapleural chemotherapy before or after surgery
- Radiation therapy before or after surgery
- Radiation therapy and chemotherapy

Emerging Therapies - As researchers strive to improve the effectiveness of current treatments, they are also investigating new therapies to provide more options to pleural mesothelioma patients. Doctors are testing several innovative therapies in clinical trials, including photodynamic therapy, targeted therapy and gene therapy.

Photodynamic Therapy - Several clinical trials are investigating photodynamic therapy (PTD), which uses a special light-activated drug to kill cancer cells. The drug is usually injected into the patient's vein a few days before surgery so it has time to spread throughout the body and collect in cancer cells.

Targeted Therapy - Most chemotherapy side effects occur because the drugs attack all rapidly dividing cells, including healthy ones. To avoid this problem, researchers are developing and testing therapies that target processes unique to mesothelioma cancer cells.

Gene Therapy - Ongoing research into the genetic causes of mesothelioma has opened the door for novel therapies that treat the disease by altering the patient's genes. For this new type of treatment, known as gene therapy, doctors add special genes to cancer cells to shrink tumours, slow cancer growth or make the damaged cells easier to kill. Early clinical trials have shown that gene therapy can be safe and effective, but additional research is needed to perfect treatment techniques.

Peritoneal Mesothelioma and Its Treatment

Although most cases of mesothelioma start out in the lining of the lungs (pleura). Mesothelioma in the lining of the abdomen or peritoneum, known as peritoneal mesothelioma, accounts for an average of 15% of all cases

It is not known exactly how asbestos fibres reach this area of the body; however, it is likely that they are either swallowed and ingested, or inhaled into the lungs where it enters the bloodstream and lymphatic system and is carried to various parts of the body.

As the tumour grows, lymphatic fluid accumulates in the peritoneal space, which increases pressure on the organs in the abdomen, resulting in bowel obstruction and distention that can also affect breathing. As the malignancy spreads, it is referred to as 'diffuse'.

Signs of peritoneal mesothelioma may include:

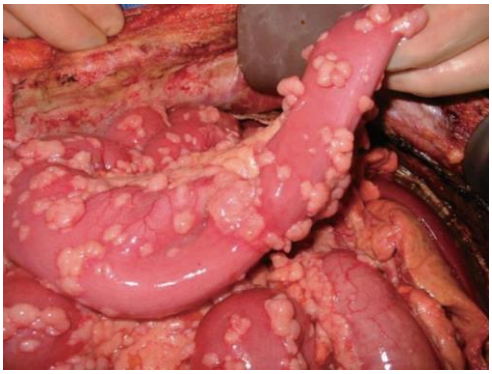
- abdominal pain and swelling
- sudden diarrhea or constipation
- lumps of tissue in the abdominal area
- unexplained weight loss

Diagnosis is usually accomplished with various imaging techniques, including examination with a *peritoneoscope.* This instrument is used for viewing and taking tissue samples (biopsy) of the abdominal wall and peritoneal cavity. The purpose is to rule out the possibility of pleural mesothelioma, as this form of the disease can metastasise to the peritoneum.

Treatment options include the standard cancer treatments, being radiation therapy, chemotherapy and surgery. Options for the latter are dependent on the size of the tumour and the degree metastasis; it may be necessary to remove a lung or part of the diaphragm. The fluid that accumulates between the membranes of the peritoneum may also be drained in order to relieve pain and discomfort (Mesothlioma.com).

Symptoms of Peritoneal Mesothelioma

Clinical symptoms at the time of presentation may include abdominal pain, abdominal mass, increased abdominal girth, distention of the abdomen, ascites (fluid in the abdomen), fever, weight loss, fatigue, anaemia and digestive disturbances. Some patients complain of more non-specific symptoms for a number of months prior to a confirmed diagnosis. In most cases peritoneal mesothelioma is found incidentally when the patient has sought help for other health problems experienced.



[Picture Credit: Peritoneal Mesothelioma]

Patients typically experience symptoms 6 months to 2 years before diagnosis. Men often first show up with an inguinal hernia (a bulge in the groin) or an umbilical hernia (bulge around the belly button). The first indication of a problem for some women comes during a pelvic examination when a tumor mass is discovered.

Late-stage peritoneal mesothelioma symptoms include bowel obstruction and increased tendency of the blood to clot. Blood tests show increased platelet count in half of peritoneal mesothelioma patients, although this is of little use in diagnosis as it can be caused by many other disorders. Anaemia and low albumin levels may also be present.

Diagnosis of Peritoneal Mesothelioma

As with all mesotheliomas, the diagnosis of peritoneal mesothelioma can be challenging. CT findings may help differentiate between the two clinical types of peritoneal mesothelioma, termed ‘dry’ or ‘wet’, since their appearances are very different upon imaging. In the “dry” type, CT may reveal multiple small masses or a single dominant localized mass. There is normally little or no ascites. In the “wet” type, CT may reveal widespread small nodules, but no dominant mass. Ascites is usually present.

If fluid is present, it may be removed in a procedure called paracentesis. Unfortunately, as is the case with pleural mesothelioma, fluid analysis offers limited diagnostic value. It is normally a tissue biopsy obtained in a laproscopic exploratory that will yield a definitive diagnosis.

Treatment of Peritoneal Mesothelioma

In recent years, multimodality treatment of peritoneal mesothelioma has become more common for a select patient population, since surgery alone and/or intraperitoneal chemotherapy alone have proven to be similarly ineffective. Depending on the choice of the physician/oncologist, cytoreductive (debulking) surgery which involves the removal of all or nearly all visible tumours, may be combined with Intra-Peritoneal Hyperthermic Chemotherapy (IPHC), intraperitoneal chemotherapy and/or radiation.

Warby, A., Dhillon, H.M., Kao, S. & Vardy, J.L. 2019.
BACKGROUND: Malignant pleural mesothelioma (MPM) has a poor prognosis and heavy symptom burden. Here, we investigate health professionals' attitudes to management and decision-making in people with MPM.

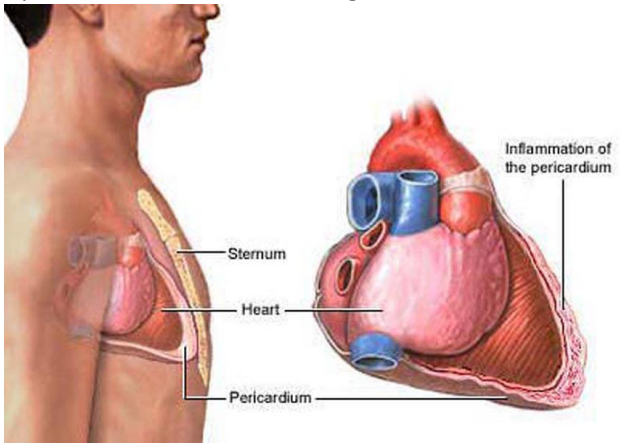
METHODS: Survey questions were based on previous interviews with health professionals, MPM patients, and caregivers. Surveys were sent to specialist doctors and nurses who treat MPM.
RESULTS: Surveys were completed by 107 doctors and 19 nurses from January-September 2014. Most doctors were respiratory physicians (50%) or medical oncologists (35%). Overall, 90% of doctors estimated > 10% of eligible MPM patients did not receive chemotherapy; 43% estimated the rate was > 20%. Doctors believed clinical barriers to chemotherapy were clinician nihilism (70%); non-referral to medical oncology (49%); and lack of specialists in rural/regional areas (44%). Nurses perceived barriers as follows: delayed diagnosis (74%); non-referral to medical oncology (63%); lack of clinician knowledge (58%). Patient-related barriers were negative perception of chemotherapy (83%) and belief survival benefit not worthwhile (63%). Doctors' preference in decision-making was for the patient to make the decision while strongly considering the doctor's opinion (33%); equally with the doctor (29%); and using knowledge gained (23%). Nurses described their roles as providing patient support (100%); information (95%); intermediary (74%); and link to palliative care (74%). Overall, 95% believed they enabled better resource allocation and provided patients with holistic care (95%); clearer communication (89%); more time (89%); additional information (89%); timely referrals (89%).
CONCLUSIONS: Caring for patients with MPM is challenging and complex. Health care professionals believe under-utilisation of chemotherapy is occurring, primarily due to clinician nihilism and lack of medical oncology referral.

Pericardial Mesothelioma and Its Treatment
Pericardial Mesothelioma is a rare form of mesothelioma in which tumours form in the pericardium, a membrane of the heart. Most, if not all, cases of pericardial mesothelioma are thought to occur due to asbestos exposure.

Development of Pericardial Mesothelioma – many patients with pericardial mesothelioma have been exposed to asbestos in their homes or within their workplaces but based on the rarity of the disease the exact disease development and progress are unknown.

Asbestos is an insulation and building material composed of tiny shard-like fibres. Most cases of mesothelioma occur in patients who regularly inhales these fibres. The fibres typically become lodged in the mesothelium of the lungs and may cause development of tumours.

Pericardial mesothelioma is thought to develop when asbestos fibres are carried in the bloodstream to the heart where it lodges in the pericardium. In time malignant tumours can develop, sometimes over the course of many years. It is considered to be the rarest form of mesothelioma as well as one of the rarest types of cancer.



[Picture Credit: Pericardial Mesothelioma]

<u>Symptoms of Pericardial Mesothelioma</u>
Most patients with pericardial mesothelioma do not notice symptoms until the later stages of the disease or mistake early symptoms as signs of another type of heart condition. The extreme

rarity of pericardial mesothelioma can also make it difficult to diagnose.

Common mesothelioma symptoms include chest pain, fatigue, heart murmurs and respiratory issues. To separate pericardial mesothelioma from other conditions and to ensure an accurate diagnosis, physicians will often recommend an MRI. The MRI can show the extent of the disease and allow the physician to make treatment recommendations.

Treating Pericardial Mesothelioma

Unfortunately, pericardial mesothelioma usually has a poor prognosis. This is partially due to the rarity of the disease and partially due to the fact that it tends to be diagnosed in a late stage only. Over half of patients with pericardial mesothelioma die within the first half year after a diagnosis.

McGehee, E., Gerber, D.E., Reisch, J. & Dowell, J.E. 2018.
Primary pericardial mesothelioma (PPM) is a rare cancer for which there is no consensus on treatment. We evaluated and summarized a large contemporary population of published PPM cases to characterize risk factors, treatment patterns, and clinical outcomes. Using Ovid and PubMed, literature published from 2000 through 2016 was searched using the terms "primary pericardial mesothelioma," "pericardial mesothelioma," and "malignant pericardial mesothelioma." We identified 6 case series and 84 case reports for a total of 103 PPM cases published from 2000 through 2016. The median age at diagnosis was 55 years, and the median overall survival was 6 months. In univariate analyses of clinical characteristics including gender, asbestos exposure, tobacco use, prior radiation exposure, histologic subtype, and metastasis and/or mediastinal spread, only the presence of metastasis and/or mediastinal spread was a significant predictor of decreased survival (P = .015). Surgery did not provide a statistically significant survival benefit (P = .12). A survival benefit was noted in those who received chemotherapy (median survival, 13 months vs. 0.5 months, P = .002), specifically chemotherapy with a platinum agent with or without pemetrexed. In multivariate analysis, only the receipt of chemotherapy was associated with improved survival. PPM remains a rare and poorly understood malignancy with unclear etiology and a poor prognosis. In this retrospective systematic review, a survival benefit was seen in patients who received chemotherapy.

Staging of Mesothelioma

Since the most common type of mesothelioma is pleural mesothelioma, it is the most studied and is the only type of mesothelioma for which there is a well-defined staging system.

Once mesothelioma is diagnosed, further tests will be conducted to ascertain if the cancer cells have spread to other parts of the body and to what extent. The stage of the cancer must be known for suitable treatment to be started.

Reducing the Risk for Mesothelioma

Being exposed to asbestos is by far the biggest risk factor for mesothelioma, so the best way to reduce the risk is to limit exposure to asbestos in homes, in public buildings, and in the workplace.

People who might be exposed to high levels of asbestos in the workplace include miners, factory workers, insulation manufacturers and installers, railroad and automotive workers, ship builders, gas mask manufacturers as well as construction workers. If there is a chance of on-the-job exposure, such as during the renovation of old buildings, then one should use all protective equipment, work practices, and safety procedures designed for working around asbestos.

Older homes may have asbestos-containing insulation or other materials. A knowledgeable expert can check homes to find out if there is any asbestos and whether it poses any risk of exposure. This may mean testing the air for asbestos levels. Asbestos present in a home, does not necessarily mean that it needs to be removed. As long as the material is not damaged or disturbed, for example by drilling or remodelling, the fibres are not released into the air. If asbestos needs to be removed from a home, one should hire a registered asbestos contractor in terms of the Asbestos Regulations, 2001, to perform this job to avoid contaminating the home or causing any exposure to persons and the environment. One should not attempt to remove asbestos-containing material oneself.

Asbestos can also be found in some commercial and public buildings (including some schools), where the same basic principles apply. Intact, undisturbed asbestos-containing materials generally do not pose a health risk. It may pose a risk by releasing asbestos fibres into the air when damaged, disturbed or even through deterioration over time fibres into the air.

Correct and appropriate rehabilitation of all sites where asbestos has been mined is essential in preventing the risk of exposure to asbestos fibres.

About Clinical Trials

Clinical trials are research studies that involve people. They are conducted under controlled conditions. Only about 10% of all drugs started in human clinical trials become an approved drug.

Clinical trials include:

- Trials to test effectiveness of new treatments
- Trials to test new ways of using current treatments
- Tests new interventions that may lower the risk of developing certain types of cancers
- Tests to find new ways of screening for cancer

The South African National Clinical Trials Register provides the public with updated information on clinical trials on human participants being conducted in South Africa. The Register provides information on the purpose of the clinical trial; who can participate, where the trial is located, and contact details.

For additional information, please visit: www.sanctr.gov.za/

Medical Disclaimer

This Fact Sheet is intended to provide general information only and, as such, should not be considered as a substitute for advice, medically or otherwise, covering any specific situation. Users should seek appropriate advice before taking or refraining from taking any action in reliance on any information contained in this Fact Sheet. So far as permissible by law, the Cancer Association of

South Africa (CANSA) does not accept any liability to any person (or his/her dependants/ estate/heirs) relating to the use of any information contained in this Fact Sheet.

Whilst the Cancer Association of South Africa (CANSA) has taken every precaution in compiling this Fact Sheet, neither it, nor any contributor(s) to this Fact Sheet can be held responsible for any action (or the lack thereof) taken by any person or organisation wherever they shall be based, as a result, direct or otherwise, of information contained in, or accessed through, this Fact Sheet.

Additional Information

MesotheliomaGuide

www.mesotheliomaguide.com
888-572-9011

The South African Asbestos Regulations

DEPARTMENT OF LABOUR

Government Notice. R: 155 **10 February 2002**

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO. 85 OF 1993)

Asbestos Regulations, 2001

The Minister of Labour has under section 43 of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), after consultation with the Advisory Council for Occupational Health and Safety, made the regulations in the Schedule.

SCHEDULE

Definitions

1. In these Regulations, any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the text otherwise indicates—

"approved asbestos inspection authority" means an approved inspection authority for the monitoring of asbestos concentrations in the air;

"asbestos" means any of the following minerals:

(*a*) Amosite
(*b*) Chrysotile
(*c*) Crocidolite
(*d*) Fibrous actinolite
(*e*) Fibrous anthophyllite; and
(f) Fibrous tremolite,

or any mixture containing any of these minerals;

"asbestos dust" means airborne or settled dust, which contains or is likely to contain regulated asbestos fibres;

"asbestos waste" means an undesirable or superfluous asbestos-containing by-product, emission or residue of any process or activity that has been—

(a) discarded by any person;
(b) accumulated and stored by any person with the purpose of eventually discarding it with or without prior treatment connected with the discarding thereof; or
(c) stored by any person with the purpose of recycling, re-using or extracting a usable product from such matter.

"asbestos work" means work that exposes or is likely to expose any person to asbestos dust;

"demolition work" includes demolition, alteration, stripping, removing, repair, gleaning of any spilt asbestos, or high-pressure water jetting of any structure containing asbestos lagging or insulation, but does not include work performed on asbestos cement sheeting and related products and asbestos cement products that form part of the structure of a workplace, building, plant or premises;

"exposed to asbestos" means exposed or likely to be exposed to asbestos dust while at the workplace, and "exposure" has a corresponding meaning;

"HSG 173" means the Monitoring Strategies for Toxic Substances, HSG 173, published by the Health and Safety Executive of the United Kingdom;

"MDHS 39/4" means the Methods for the Determination of Hazardous Substances 39/4 of the Health and Safety Executive of the United Kingdom: *Asbestos fibres in air, sampling and evaluation by phase contrast microscopy (PCM)* under the Control of Asbestos at Work Regulations, 1995 HSE ISBN 0 7176 0913 8, as revised from time to time;

"measurement programme" means a programme according to the monitoring strategy as contemplated in OESSM and HSG 173;

"monitoring" means the planning and carrying out of a measurement programme and the recording of the results thereof;

"occupational exposure limit" or "OEL" means a limit value set by the Minister for a stress factor in the workplace;

"OESSM" means the *Occupational Exposure Sampling Strategy Manual,* published by the National Institute for Occupational Safety and Health (NIOSH), United States of America: Department of Health, Education and Welfare;

"occupational exposure limit for asbestos" means an occupational exposure limit of 0,2 regulated asbestos fibres per milliliter of air averaged over any continuous period of four hours measured in accordance with MDHS 39/4;

"provincial director" means the provincial director as defined in regulation 1 of the General Administrative Regulations published under Government Notice R. 1449 of September 1996;

"registered asbestos contractor" means a mandatory or employer conducting demolition work, who is registered with the chief inspector;

"regulated asbestos fibre" means a particle of asbestos with a length-to-diameter ratio greater than 3 to 1, a length greater than 5 micrometres and a diameter less than 3 micrometres;

"respiratory protective equipment" means a device which is worn over at least the mouth and nose to prevent the inhalation of air that is not safe, and which device conforms to a standard approved by the Minister;

"respirator zone" means a respirator zone contemplated in regulation10(*a*);

"SABS 0228" means the Code of Practice for the Identification and Classification of Dangerous Substances and Goods, SABS 0228, published by the South African Bureau of Standards (SABS);

"SABS 0229" means the Code of Practice for Packaging of Dangerous Goods for Road and Rail Transportation in South Africa, SABS 0229, published by the South African Bureau of Standards (SABS);

"short-term exposure limit" means the concentration to which workers can be exposed continuously for a short period of time, which is a 10-minute Time-Weighted Average (TWA) exposure for asbestos, which should not be exceeded at any time during the working day even if the 4-hour TWA is within the OEL-TWA;

"short term exposure limit for asbestos" means an exposure limit of 0,6 regulated asbestos fibres per milliliter of air averaged over any 10 minutes;

"the Act" means the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

Scope of application

2.(1) Subject to subregulation 2, these Regulations shall apply to every employer and self-employed person who carries out work at a workplace that may expose any person to asbestos dust at that workplace.

(2) Regulations 5(1), 5(2), 5(3), 5(4), 5(6), 7(2), 8, 9, 11(2)(f), 14(2), 14(3), 14(4) 16(*c*), 16(*f*) and 17(6) shall not apply in the case of self-employed persons.

Notification of asbestos work

3. No employer or self-employed person shall carry out any asbestos work unless he or she has notified the provincial director in writing thereof prior to the commencement of such work.

Exposure to asbestos

4. Subject to regulation 17(1) no employer or self-employed person shall require or permit any person to work in an environment in which he or she would be exposed to asbestos in excess of the prescribed occupational exposure limit.

Information and training

5.(1) An employer shall, before any employee is exposed or may be exposed to asbestos dust, after consultation with the health and safety committee established for that section of the workplace, ensure that the employee is adequately and comprehensively informed and trained, on both practical aspects and theoretical knowledge, with regard to—

(*a*) the contents and scope of these Regulations;

(*b*) the potential sources of exposure, including the recognition of derelict asbestos-containing materials;

(*c*) the potential health risk caused by exposure to asbestos, including the health risks to employees' families and others, which could result from taking home asbestos contaminated equipment and clothing, and the dramatically increased risk of lung cancer for asbestos workers who smoke;

(*d*) the measures taken by the employer to protect an employee against any risk from exposure;

(*e*) the precautions to be taken by the employee to protect himself or herself against the health risks associated with the exposure, which precautions include the wearing and use of protective clothing and respiratory protective equipment;

(*f*) the necessity, correct use, maintenance and limitations of protective equipment, facilities and engineering control measures provided;

(g) the assessment of exposure, the purpose of air sampling, the necessity for medical surveillance and the long term benefits and limitations thereof;

(*h)* the occupational exposure limit and its meaning;

(i) the importance of good housekeeping at the workplace and personal hygiene;

(j) the safe working procedures regarding the use, handling, processing, and storage of any material containing asbestos, which procedures include the correct use of control measures to limit the spread of asbestos dust outside the work area, and to limit the exposure of workers inside the work area as far as is reasonably practicable;

(k) procedures to be followed in the event of an accidental spillage or any other similar emergency situation likely to result in the release of asbestos dust;

(l) procedures for reporting and correcting defects likely to result in the release of asbestos dust;

(m) safe disposal of asbestos waste;

(n) procedures for record keeping; and

(o) matters contemplated in regulation 6.

(2) Refresher training on matters contemplated in subregulation (1) shall be given at least every year or at more frequent intervals that may be recommended by the health and safety committee.

(3) Training should be given more frequently than once a year if—

(a) work methods change;

(b) the type of work carried out changes significantly; or

(c) the type of equipment used to control exposure changes.

(4) Training shall be provided by somebody who is competent to provide it and has adequate personal practical experience and theoretical knowledge of all aspects of the work being carried out by the employer.

(5) An employer or a self-employed person shall ensure, as far as is reasonably practicable, that his or her mandatory or any person other than employees who may be exposed to asbestos at the workplace are given adequate information, instruction and training.

(6) An employer shall keep a record of any training, both practical and theoretical, that was given to an employee.

(7) An employer or a self-employed person shall give instructions in writing of the procedures contemplated in subregulation (1)(*k*) to the drivers of vehicles carrying asbestos or asbestos-containing material, that has the potential of causing environmental pollution or affecting human health.

Duties of persons who may be exposed

6. Any person who is or may be exposed to asbestos in the workplace, shall obey any lawful instruction given by or on behalf of the employer or a self-employed person, regarding—

(a) the prevention of asbestos dust from becoming airborne;

(b) the wearing and use of personal protective equipment and clothing;

(c) the wearing of monitoring equipment to measure personal exposure to asbestos;

(d) the reporting for medical surveillance as required by Regulation 9;

(e) the cleaning up and disposal of nay material containing asbestos;

(f) housekeeping at the workplace, personal hygiene, good environmental and health practices, including eating, drinking and smoking in designated places provided; and

(g) information and training received contemplated in regulation 5.

Assessment of potential exposure

7.(1) An employer or self-employed person shall cause—

(a) his or her undertaking to be assessed within six months after the commencement of these regulations, and thereafter at intervals not exceeding two years, to determine if any person may be exposed to asbestos; and

(b) the assessment results contemplated in paragraph (*a*) to be recorded as required by regulation 16.

(2) An employer contemplated in subregulation (1) shall, before causing an assessment to be made, consult with the relevant health and safety representative or relevant health and safety committee and thereafter inform them in writing of the arrangements made for the assessment, give them reasonable time to comment thereon and ensure that the results of the assessment are made available to them for comment.

(3) When making the assessment contemplated in subregulation (1)(*a*), the employer or self-employed person shall take the following into account:

(a) The presence of any material containing asbestos being used, processed, handled or stored;

(b) where asbestos may be present, the ease with which the asbestos dust may be released and the extent to which a person may be exposed;

(c) the nature of the work, process and any likely deterioration in or failure of any control measures;

(d) the details of expected exposures, in particular—

(i) whether the expected exposure is above the OEL for asbestos, so that the appropriate respiratory protective equipment can be selected pending the implementation of engineering control measures;

(ii) whether such exposures are intermittent, including the frequency and duration of exposures;

(iii) the number of employees exposed and any other person who may be exposed, and their expected exposure values; and

(iv) where applicable, results which may be available from any previous monitoring performed at that workplace;

(e) the steps to be taken to reduce exposure to the lowest level reasonably practicable and the steps to be taken to reduce the release of asbestos dust into the environment;

(f) procedures for dealing with emergencies; and

(g) procedures for the removal of asbestos waste from the workplace, and the disposal thereof.

(4) If the assessment or any of its reviews made in accordance with subregulation (1) and (5) indicates that any person is likely to be exposed to asbestos, the employer or self-employed person shall ensure that the exposure is adequately controlled as contemplated in regulation 11.

(5) An employer or self-employed person shall forthwith review the assessment required by subregulation (1) if—

(a) there is reason to believe that the previous assessment is no longer valid;

(b) control measures are no longer efficient;

(c) technological or scientific advances allow for more efficient control methods; or

(d) there has been a significant change in—

(i) work methods;

(ii) the type of work carried out; or

(iii) the type of equipment used to control exposure;

and subregulations (2) and (3) shall apply.

Air monitoring

8.(1) Where exposure is in excess of half the OEL for asbestos, an employer shall ensure that a measurement programme of the concentration of airborne regulated asbestos fibres to which an employee is exposed, is—

(a) carried out in accordance with these Regulations;

(b) carried out only after the relevant health and safety representative or relevant health and safety committee has been informed thereof and was given a reasonable opportunity, as mutually agreed upon, to comment thereon;

(c) carried out by—

(i) an approved asbestos inspection authority; or

(ii) a person whose ability to do the measurements is verified by an approved asbestos inspection authority;

(d) representative of the exposure of employees to the airborne asbestos fibres in accordance with subregulation (2); and

(e) verified in accordance with subregulation (3) if the measurements are carried out by a person contemplated in subregulation (1)(*c*)(ii).

(2) In order to comply with the provisions of subregulation (1)(*d*), an employer shall ensure—

(a) that the measurement programme—

(i) in the case of a group measurement, makes provision for the selection of the number of persons for a sample to be done as contemplated in chapters 3 and 4 and table A-2 of Technical Appendix A of the OESSM: Provided that measurements of exposure shall be by personal sampling taken in accordance with MDHS 39/4: Provided further that in so far as any provision of the OESSM and the MDHS 39/4 is repugnant to a provision of the Occupational Health and Safety Act, 1993, and these Regulations, the provisions of the Act and these Regulations shall take precedence; and

(ii) if in the case of the most exposed employee measurement, the exposure exceeds the OEL for asbestos, then any other employee whose exposure could be above the OEL for asbestos is identified and that measurements representative of typical exposure shall be carried out on every employee identified; and

(*b)* that representative measurements contemplated in subregulation 1(*d)* are carried out at least every 12 months: Provided that whenever the OEL for asbestos is exceeded, regulation 11 shall apply.

(3) In order to comply with subregulation (1)(*e*), an employer shall obtain the services of an approved asbestos inspection authority who shall, at intervals not exceeding 12 months, do the required verification—

(a) by examining the measurement and analysis equipment of the employer;

(b) by questioning the person contemplated in subregulation (1)(*c)(*ii) regarding the measurement programme;

(c) by carrying out, together with the person contemplated in subregulation (1)(*c*)(ii), the measurement programme required by subregulation (2) for any one group; and

(d) by ensuring that the results of the measurement and investigation as contemplated in subregulation (2) and (3) respectively, have been recorded as required by regulation 16.

Medical surveillance

9.(1) An employer shall ensure that an employee is under the medical surveillance of an occupational medical practitioner if—

(a) an employee is exposed or is likely to be exposed to asbestos dust exceeding the OEL for asbestos; or

(b) an occupational medicine practitioner certifies that the relevant employee should be under medical surveillance.

(2) In order to comply with subregulation (1), an employer shall, as far as is reasonably practicable, ensure that a structured medical surveillance programme be drawn up by an occupational medicine practitioner which shall include at least the following:

(a) An initial health evaluation, carried out by an occupational health practitioner immediately or within 14 days after a person commences employment, which comprises—

(i) an evaluation of the employee's medical and occupational history;

(ii) medical examinations and tests which should include chest X-rays, pulmonary function testing and an appropriate physical examination; and

(iii) any other essential medical examination which in the opinion of the occupational medicine practitioner is necessary in order to enable such practitioner to do a proper evaluation; and

(b) subsequent to the initial health evaluation contemplated in paragraph (*a*), evaluations of the relevant employee as contemplated in paragraph (*a*)(ii) and (iii), at intervals not exceeding two years, or at shorter intervals specified by an occupational medicine practitioner.

(3) An employer shall not permit or allow an employee who has been certified unfit for work by an occupational medicine practitioner to work in a workplace or part of a workplace in which he or she will be exposed or is likely to be exposed to asbestos dust: Provided that the relevant employee may be permitted to return to work if he or she is certified fit for that work beforehand by an occupational medicine practitioner.

(4) Where the reason for the employee being certified unfit as contemplated in subregulation (3) is as a result of exposure to asbestos in that workplace, the employer shall record and investigate the incident in compliance with regulation 8 of the General Administrative Regulations.

Respirator zone

10. An employer or self-employed person shall ensure that—

(a) any workplace or part of a workplace under his or her control, where the concentration of regulated asbestos fibres in the air is, or may be, such that the exposure of persons in that workplace exceeds the OEL for asbestos without the wearing of respiratory protective equipment, is zoned as a respirator zone;

(b) a respirator zone is clearly demarcated and identified by notice indicating that the relevant area is a respirator zone and that the respiratory protective equipment and protective clothing contemplated in regulation 17 must be worn there;

(c) no person enters or remains in a respirator zone unless he or she wears the required respiratory protective equipment and protective clothing; and

(d) the reason why the OEL for asbestos is exceeded is identified and action is taken, as soon as is reasonably practicable, to lower the concentration of asbestos in the air by means other than respiratory protective equipment, so that it does not exceed the OEL for asbestos.

Control of exposure to asbestos

11.(1) An employer or self-employed person shall ensure that the exposure of a person to asbestos is either prevented, or, where this is not reasonably practicable, adequately controlled: Provided that the control of the exposure shall be regarded as adequate if the level of exposure is—

(a) at or below the OEL for asbestos; or

(b) above the OEL for asbestos but the reason has been identified and action is taken, as soon as is reasonably practicable to lower exposure by means other than respiratory protective equipment, so that it does not exceed the OEL for asbestos.

(2) Where reasonably practicable, an employer or self-employed person shall control the exposure of a person—

(a) by using a substitute for asbestos;

(b) by limiting the number of persons who will be exposed or may be exposed;

(c) by limiting the period during which persons will be exposed or may be exposed;

(d) by limiting the amount of asbestos dust that may contaminate the working environment;

(e) by introducing, inter alia, the following engineering control measures for the control of exposure:

(i) Process separation, automation or enclosure;

(ii) bonding of asbestos fibres with other material to prevent the release of asbestos dust;

(iii) the installation of local extraction ventilation systems to processes, equipment or tools for the control of emissions of asbestos dust;

(iv) the use of wet methods where appropriate;

(v) separate workplaces for carrying out different processes; and

(vi) a fault indicator to enable early corrective action to be taken; and

(f) by introducing appropriate written work procedures that an employee must follow to ensure that —

(i) asbestos is safely handled, used and disposed of;

(ii) process machinery, installations, equipment, tools and local extraction and general ventilation systems are safely used and maintained; and

(iii) early corrective action regarding the control exposure.

Cleanliness of premises and plant

12. Every employer or self-employed person shall take steps to ensure, as far as is reasonably practicable, that—

(a) workplaces are maintained in a clean state and are free of asbestos waste and, whenever asbestos is accidentally spilled or asbestos dust is accidentally released into the workplace, that remedial measures are taken immediately before work is resumed;

(b) machinery, plant and equipment, as well as external surfaces of ventilation equipment and internal surfaces of buildings, are kept free of asbestos dust;

(c) cleaning is carried out by vacuum-cleaning equipment with a filtration efficiency of at least 99 per cent for particles one micrometre in size, or in such other manner that asbestos dust neither escapes nor is discharged into the air to such an extent that it contaminates any workplace or the environment;

(d) the vacuum-cleaning equipment is regularly serviced and its external surfaces are kept in a clean state and free from asbestos dust; and

(e) where the use of vacuum-cleaning equipment is impracticable, the relevant surfaces are first dampened and that persons undertaking such cleaning are wearing appropriate protective clothing and respiratory protective equipment.

Control of exposure to asbestos of persons other than employees

13.(1) An employer or self-employed person shall ensure that the release of asbestos dust into any environment or water system complies with the provisions of the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), the Environment Conservation Act, 1989 (Act No. 73 of 1989), the National Water Act, 1998 (Act No. 36 of 1998), and the National Environmental Management Act, 1998 (Act No. 107 of 1998).

(2) In respect of asbestos dust which may be released from a workplace into any environment or water system which may affect the health of persons other than persons at his or her workplace, an employer or self-employed person shall ensure—

(a) with regard to airborne emissions—

(i) that all work performed with asbestos be controlled as far as is reasonably practicable; and

(ii) that suitable filtration systems are used to control the release of asbestos dust into the environment to levels as low as is reasonably practicable;

(b) with regard to the contamination of water with asbestos—

(i) that any water that is contaminated with asbestos as a result of work being performed is passed through a filtration system before being released into any environment or water system; and

(ii) that a suitable water filtration system is used which will ensure that the asbestos being released or entering into any environment or water system are reduced as far as is reasonably practicable;

(c) that contaminated parts of the filtration system, when discarded, are disposed of as asbestos waste; and

(d) that appropriate measures are taken to prevent the release of asbestos dust into the environment arising from the transport of asbestos.

Asbestos that forms part of structure of workplace, building, plant or premises

14.(1) Where asbestos forms part of the structure of a workplace, building, plant or premises, the employer or self-employed person shall—

(a) take reasonable steps to ensure that he or she determines the location of asbestos in such workplace, buildings, plant or premises, where that asbestos is likely to release asbestos dust that could impact on health or pollute the environment;

(b) make and maintain a written inventory of the location of asbestos in such workplace, buildings, plant or premises.

(2) An employer shall inform the relevant health and safety representative or relevant health and safety committee in writing of the arrangements made for the identification and location procedure contemplated in subregulation (1), give them reasonable time to comment thereon and ensure that the asbestos inventory is made available to the relevant representative or committee who may comment thereon.

(3) The health or safety representative, or a person nominated by the health and safety committee, shall be entitled to take part in the identification and location procedure contemplated in subregulation (1).

(4) With regard to any dispute as to whether any substance is in fact asbestos, the health and safety representative or a person nominated by the employees may require that a sample of that

substance be taken and the true nature of the substance be determined by an approved asbestos inspection authority: Provided that the cost of the identification shall be borne by the employer.

(5) The employer or self-employed person shall regularly examine the condition of asbestos recorded in the inventory for deterioration or damage.

(6) The employer or self-employed person shall assess the risk of exposure to such asbestos as contemplated in subregulation (1) and document the action necessary to ensure that—

(a) information about the location and condition of material containing asbestos is given to anyone likely to disturb it;

(b) any material containing asbestos is maintained in a good state of repair and that, where necessary, a planned maintenance program is implemented;

(c) any material containing asbestos and which may create a risk of exposure because of its state and location, is repaired or, if necessary, removed: Provided that, if the removal constitutes demolition work, the asbestos shall be removed in accordance with regulation 21; and

(d) procedures and arrangements are in place so that work that may disturb the material complies with all other requirements of these Regulations.

Asbestos cement sheeting and related products

15.(1) An employer or self-employed person who erect, maintain, alter, renovate, repair, dismantle or add asbestos-cement roof sheeting, wall paneling, gutters, fascia boards and related products to a building shall ensure that—

(a) if any roof work is performed, suitable roof ladders or duckboards or crawling boards are used in accordance with regulation 12 of the General Safety Regulations published by Government Notice No. R. 1031 of 30 May 1986;

(b) written work procedures are laid down and followed to prevent the release of asbestos dust into the environment;

(c) any water which contains asbestos dust as a result of the activities contemplated in subregulation (1), shall be treated in accordance with regulation 13(2)(*b*) and (*c*);

(d) the work procedures contemplated in paragraph (*b*) shall be available for perusal by the relevant health and safety representative or relevant health and safety committee and for inspection by an inspector;

(e) removal work is conducted under controlled conditions in accordance with regulations 11 and 13;

(f) cutting or drilling is performed under controlled conditions in accordance with regulation 11 and 13, including the use of wet methods where possible, and a

suitable slow-speed cutter is used, provided that a respirator shall be used by the operator and others at risk of exposure;

(g) asbestos waste of any form, including dust, is collected and disposed of in accordance with regulation 20;

(h) once installed and where reasonably practicable, the relevant items are painted or otherwise sealed with a protective coating to limit the release of asbestos dust, combat weathering and inhibit growth of lichen or moss;

(i) cleaning is done under controlled conditions ensuring that—

(i) dry-brushing, scraping, sanding or abrasion techniques are not used;

(ii) where reasonably practicable, high-pressure water jetting is not used unless in conjunction with a suitable profiled hood that limits dispersal of contaminated water and, if the said jetting is used, that suitable control methods are used in accordance with regulation 13(2)(*b*); and

(iii) when fungicidal solution or moss killer is applied, a standing time of 24 hours or any other period specified by the manufacturer is allowed, and a low-pressure hose is used after such period to keep the sheets wet whilst employing a stiff broom or any similar means to remove any moss or lichens.

Records

16. An employer shall—

(a) keep records of the results of all assessments, air monitoring, medical surveillance reports and the asbestos inventory required by regulations 7, 8, 9 and 14(1)(*b*), respectively: Provided that personal medical records shall only be made available to an occupational health practitioner;

(b) subject to paragraph (*c*), make the records contemplated in paragraph (a), excluding personal medical records, available for inspection by an inspector;

(c) allow any person, subject to formal consent in writing of an employee, to peruse the records with respect to that particular employee;

(d) make the records of all assessments and air monitoring, and the asbestos inventory available for perusal by the relevant health and safety representative or relevant health and safety committee;

(e) keep all records of assessments and air monitoring, and the asbestos inventory for a minimum period of 40 years;

(f) keep all medical surveillance records for a minimum period of 40 years and, if the employer ceases activities relating to asbestos work, shall hand over or forward by

registered post all these records to the relevant provincial director: Provided that those records contain at least the following information:

(i) Surname, forenames, gender, date of birth, name of spouse or closest relative and where available, permanent address and postal code;

(ii) a record of types of work carried out with asbestos and, where relevant, its location, the starting and ending dates of exposure and average duration of exposure in hours per week;

(iii) a record of any work with asbestos prior to this employment; and

(iv) dates of medical surveillance reports;

(g) keep a record of the tests and investigations carried out in terms of regulation 18 (*b*) and of any repairs resulting from the relevant tests and investigations, and keep that record for at least three years; and

(h) keep a record of training given to an employee in terms of regulation 5(5) for as long as the employee remains employed at the workplace in which he or she is being exposed to asbestos.

Personal protective equipment and facilities

17.(1) An employer or self-employed person shall provide—

(a) all persons exposed to asbestos at the workplace with suitable protective clothing; and

(b) a person with suitable respiratory protective equipment to ensure that the person's exposure is adequately controlled as contemplated in regulation 11(1).

(2) Where respiratory protective equipment is provided, the employer or self-employed person shall ensure that—

(a) the relevant equipment is capable of keeping the exposure level at or below the OEL for asbestos;

(b) the relevant equipment is correctly and properly used;

(c) information, instruction, training and supervision that are necessary with regard to the use of the equipment are provided to the persons; and

(d) the equipment is kept in good condition and efficient working order.

(3) An employer or self-employed person shall, as far as is reasonably practicable—

(a) issue no personal protective equipment to a person, unless such equipment is cleaned, decontaminated and, where appropriate, sterilised;

(b) provide separate containers or storage facilities for personal protective equipment when not in use; and

(c) ensure that all personal protective equipment not in use is stored only in the place provided.

(4) An employer or self-employed person shall, as far as is reasonably practicable, ensure that all personal protective equipment contaminated with asbestos dust is cleaned and handled in accordance with the following procedures:

(a) Where the equipment is cleaned on the premises of the employer or self-employed person, care shall be taken to prevent contamination during handling, transport and cleaning;

(b) Where the equipment is sent off the premises to a contractor for cleaning purposes—

(i) the equipment shall be packed in impermeable containers;

(ii) the container shall be tightly sealed and clearly labeled in the form of Annexure 1; and

(iii) the relevant contractor shall be informed of these Regulations and the precautions to be taken for the handling of the asbestos contaminated equipment; and

(c) water that is used for decontamination or cleaning of equipment shall be filtered in accordance with regulation 13(2)(*b*) before being released into any water system.

(5) Subject to subregulation (4)(*b*), an employer or self-employed person shall ensure that no person removes dirty or contaminated personal protective equipment from the workplace: Provided that where personal protective equipment contaminated with asbestos dust has to be disposed of, it shall be treated as asbestos waste as contemplated in regulation 20.

(6) Subject to the provisions of the Facilities Regulations published by Government notice R. 1593 of 12 August 1988, the employer shall, where reasonably practical, provide employees who use personal protective equipment as contemplated in subregulation (1), with—

(a) adequate washing facilities which are readily accessible and located in an area where the facilities will not become contaminated, in order to enable the employees to meet a standard of personal hygiene consistent with the adequate control of exposure, and to avoid the spread of asbestos dust;

(b) two separate lockers labeled “protective clothing” and “personal clothing” respectively, and shall ensure that the clothing is kept separately in the lockers concerned; and

(c) separate change rooms labeled “clean change room” and “dirty change room”, with suitable barrier and bathing facilities between to prevent the contamination of personal clothes with asbestos dust.

Maintenance of control measures

18. An employer or self-employed person shall ensure that—

(a) all control equipment and facilities provided in terms of regulations 11, 12, 13, and 17 are maintained in good working order; and

(b) examinations and tests of engineering control measures are carried out at intervals not exceeding 24 months by an approved inspection authority or by a person whose ability to do such examinations and tests is verified by an approved inspection authority.

Labeling, packaging, transportation and storage

19. An employer or self-employed person shall, in order to avoid the spread of asbestos dust, take steps, as far as is reasonably practicable, to ensure that—

(a) the asbestos in storage or being distributed is properly identified, classified and handled in accordance with SABS 0228;

(b) a container or a vehicle in which asbestos is transported is clearly identified, classified and packed in accordance with SABS 0228 and SABS 0229; and

(c) any article or substance which contains asbestos is clearly labeled, in the form of Annexure 1.

Disposal of asbestos

20. An employer or self-employed person shall as far as is reasonably practicable ensure that—

(a) all asbestos waste is placed in containers that will prevent the likelihood of exposure during handling;

(b) all vehicles, re-usable containers or any other similar articles which have been in contact with asbestos waste are cleaned and decontaminated after use, in such a way that such vehicles, containers or similar articles do not cause a hazard inside or outside the workplace concerned;

(c) all asbestos waste which can cause exposure, is disposed of only on sites specifically designated for this purpose in terms of the Environment Conservation Act, 1989 (Act

No. 73 of 1989), and the National Environmental Management Act,1998 (Act No. 107 of 1998), and in such a manner that it does not cause a hazard inside or outside the site concerned;

(d) all persons occupied in the collection, transport and disposal of asbestos waste, who may be exposed to that waste, are provided with suitable personal protective equipment; and

(e) where the services of a contractor for the disposal of asbestos waste are used, a provision is incorporated into the contract stating that the contractor shall also comply with the provisions of these Regulations.

Demolition

21. Any person who intends to have demolition work carried out, shall—

(a) before the commencement of that work, take steps to ensure that—

(i) demolition work is carried out by a person who is a registered asbestos contractor;

(ii) all asbestos materials likely to become airborne are identified;

(iii) a plan of work is submitted for approval at least 30 days prior to the commencement of that work to an approved asbestos inspection authority who may at its discretion allow a shorter period of time for such submission and may approve standardised procedures for routine alterations or repairs: Provided that the stipulated time period shall not apply if the plan of work is drawn up by an approved asbestos inspection authority;

(iv) a copy of the approved plan of that work, which has been signed by the approved asbestos inspection authority, the employer and, if the person performing that work is not the employer or self-employed person, the mandatory of the employer or self-employed person, is submitted to the provincial director at least 14 days prior to commencement of such demolition work: Provided that an inspector may allow a shorter period for such submission; and

(v) copies of approved standardised procedures for demolition work are submitted to the provincial director at least 14 days prior to commencement of that work; and

(b) during and after the completion of demolition work, take steps to ensure that—

(i) all asbestos and materials containing asbestos are handled and disposed of in accordance with these regulations;

(ii) all persons exposed to or likely to be exposed to asbestos are issued with appropriate personal protective equipment and that such equipment is used properly; and

(iii) the premises, structure or area are thoroughly checked to ensure that all asbestos waste has been removed.

Prohibition

22. No person shall—

(a) use compressed air or permit the use of compressed air to remove asbestos dust from any surface or person;

(b) smoke, eat, drink or keep food or beverages in an area not specifically designated for it or require or permit any other person to smoke, eat, drink or keep food or beverages in such area; or

(c) apply asbestos by means of spraying or any other similar process or require or permit any other person to apply asbestos by means of such process.

Offences and penalties

23. Any person who contravenes or fails to comply with any provision of regulations 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13(2), 14, 15, 16, 17,18, 19, 20, 21 or 22 shall be guilty of an offence and liable on conviction to a fine not exceeding R1000 or imprisonment for a period not exceeding 12 months and, in the case of a continuous offence, to an additional fine of R200 for each day on which the offence continues or to additional imprisonment of one day for each day on which the offence continues: Provided that the period of such additional imprisonment shall in no case exceed 90 days.

Repeal of regulations

24. The Asbestos Regulations published under Government Notice No. R. 773 of 10 April 1987, as Government notice No. R. 1637 of 4 August 1989, are hereby repealed.

Short title

25. These Regulations shall be called the Asbestos Regulations, 2001.

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