

Asbestos

Ministry of Health responses to questions posed by Bayfield Primary School parents

Background

In May 2014, Bayfield Primary School closed after discovering that work underway had disturbed asbestos-containing materials and because of concerns that dust generated may be contaminated with asbestos. The Ministry of Education and WorkSafe NZ assisted the school to respond to parents' concerns, including environmental and air sampling from the site. Ministry of Health officials worked with Auckland Regional Public Health Service's Medical Officer of Health to answer a number of questions from parents. The questions and answers are shown below.

For further information about asbestos in the non-occupational environment, please see <http://www.health.govt.nz/your-health/healthy-living/environmental-health/hazardous-substances/asbestos>

A more technical guideline on the Management of Asbestos in the Non-Occupational Environment is found at <http://www.health.govt.nz/publication/management-asbestos-non-occupational-environment>

Questions and answers

Q1 What long-term health issues does an exposure of this type pose for our children?

A If there is any risk of health effects in the future from this exposure it is so low that published studies have not been able to quantify it, or separate it from the 'background' levels of the same health conditions.

Q2 What level and duration of exposure poses a real health risk? Granted, it appears that if there was asbestos dust around the kids it may have been only a small amount – but do we still need to be concerned? Put another way, have there been cases of people developing asbestos-related illness from only a minor, and relatively short, exposure?

A Such exposure does not seem to cause asbestos-related diseases. This is based on studies of people who may have repeated, short and relatively high exposures during their work (eg, maintenance and renovation workers who can disturb asbestos-containing materials). The actual exposures could not be accurately determined after the event, but there was no evidence that these short-term exposures caused asbestos-related diseases. However, these exposures do contribute to the person's overall lifetime risk from all exposures to asbestos. In other words, repeated short-term exposures add up over the person's lifetime and, if the total of all these exposures is great enough, this might cause disease in some people.

There is no good evidence that short-term exposure causes asbestos-related diseases such as mesothelioma. Most cases are associated with occupational exposure to asbestos or contact with contaminated clothing of asbestos workers; in other words, people who have been exposed to significant amounts of asbestos over long periods of time. To pose a risk, sufficient quantities of asbestos fibres of the right size would have to be present in the air. WorkSafe NZ's sampling did not detect airborne asbestos at the site (although there are no air sample results for the period prior to closure of school).

Q3 It seems that you need to be exposed to asbestos for quite some period of time before it is a danger – is a few day's exposure (or two weeks in the neighbour's case) therefore relatively safe?

A Yes, a few day's exposure to low concentrations, particularly in open air, is relatively safe. If there is an elevated risk it is so low that the studies that have been able to be done have not clearly detected any elevated risk. Environmental sampling has so far only found asbestos in two places outside the worksite on the outside of buildings. Air sampling results so far are negative (although there are no air sample results for the period prior to closure of school).

Q4 What is the difference in risk between skin contact and breathing it in?

A The greatest risk from asbestos is breathing the fibres. Prolonged exposure to sufficient amounts of asbestos can cause a range of cancers and other lung diseases. Asbestos fibres can penetrate into the skin, producing asbestos warts, but do not appear to pass through the skin into the blood.

Q5 Do we all have the same risk (ie, children vs adults)?

A Yes. Health risks from asbestos depend on a number of factors:

- the amount of asbestos fibres in the air
- how long your exposure lasts
- how often you were exposed
- the size of the asbestos fibres inhaled
- the amount of time since your first exposure
- the type of asbestos fibre.

Q6 How long before any health condition would occur?

A Asbestos-related diseases take many years, usually decades, to develop.

Q7 What do we do with school bags, clothing etc that were possibly exposed on Monday/Tuesday/Wednesday when rubble was around (ie, what is the risk of contamination spreading offsite)?

A If parents are concerned about dust on children's clothes or school gear, these can be laundered or wiped with a damp cloth. Dispose of the cloth in a tied off plastic bag.

Q8 Should any specific monitoring of the children's health be considered now or when they are older?

A No.

Q9 What are the health risks of asbestos?

A Breathing asbestos in significant quantities can cause fibrosis of the lungs and pleura, as well as cancer of the lungs, pleura and peritoneum and, possibly, at distant sites.

Asbestosis: Asbestosis is scarring in the lungs from inhaling asbestos fibres. It occurs in people who have been exposed to considerable concentrations of asbestos over a long time. The symptoms do not usually appear until about 20 to 30 years after the first exposure to asbestos. The person develops shortness of breath and dull chest pains, and sometimes scarring and fibrosis (thickening). The extent of lung damage is related to the amount of asbestos retained in the lungs, the fibre type and length, and individual susceptibility. Cigarette smoking increases the risk of lung damage. The risk of asbestosis is insignificant for those who do not work with asbestos. Asbestosis means the person has had high asbestos exposure.

Non-malignant pleural conditions: Pleural plaques, and diffuse pleural fibrosis, occur when there are large amounts of asbestos fibres in the lungs. They do not usually cause symptoms. Plaques tend to develop more than 20 years after exposure, and are related to length of exposure and possibly to peaks of exposure. Pleural plaques are not precursors to lung cancers, but means the person has had high asbestos exposure.

Carcinoma of the lung: There is an association between asbestos exposure and lung cancer, and those with higher exposures are more likely to get lung cancer than those with lower exposures. The symptoms do not usually appear for years after the first exposures to asbestos. Asbestos workers who smoke are about 90 times more likely to develop lung cancer than people who neither smoke nor have been exposed to asbestos. High incidence rates of lung cancer have been documented among people with short periods of exposure to large amounts of amosite (brown asbestos).

Mesothelioma: Mesothelioma is a rare cancer of the cells lining body cavities. It is the classic tumour associated with asbestos exposure, and is unrelated to smoking. It develops 35 to 40 years or more after the time of first exposure, although shorter periods have been recorded. Most cases are in workers or people in regular contact with contaminated clothing of asbestos workers.

Skin contact, ingestion: Asbestos fibres can penetrate into the skin, producing asbestos warts, but have not been shown to pass through the skin into the blood. The evidence for adverse effects following consumption of asbestos is not clear. However, there is some evidence that ongoing exposures in the diet may increase the risk of gastrointestinal tumours and that short-term high levels of ingestion may lead to precursor lesions of colon cancer.

Q10 What should I do if my child is sick?

A If your child is sick, you should contact your local GP, Healthline on 0800 611 116, or call 111 if it's an emergency. Sickness will not be asbestos-related because diseases caused by asbestos take many years (often decades) to develop.

Q11 What is asbestos (a definition) and what are the different types?

A Asbestos is a common term describing a variety of naturally occurring silicate minerals. The most commonly mined forms of fibrous asbestos are chrysotile ('white asbestos'), crocidolite ('blue asbestos') and amosite ('brown asbestos'). Other types of asbestos are actinolite, tremolite and anthophyllite but have rarely been mined as commercial asbestos.

Serpentine group	Chrysotile (white)
Amphibole group	Crocidolite (blue)
	Amosite (brown)

Both groups are naturally fibrous but the sizes (length and width) and the shapes differ.

Chrysotile fibres are a bundle of thousands of fibrils which, if cut across, would look like a scroll of paper. Chrysotile fibres tend to break across the fibre, so become shorter and remain thicker than the amphibole group. The amphibole group are straight, hard, sharp, needle-like structures that may break longitudinally to form very fine fibrils. In other words, the fibres remain long but become finer. Fibres are 1–2 µm in width and up to 70 mm long.

The fibres of health significance are those that can be inhaled. Longer fibres present a greater risk to human health as they are less easily removed by the body's defences.

Because of their exceptional insulating, fire-resistant and reinforcing properties, asbestos-containing materials have been widely used.

The presence of asbestos in materials cannot be determined definitively by visual inspection. Actual determinations can only be made by instrumental analysis.

By far the largest quantity of asbestos-containing materials is found in textured ceilings and wall cladding, followed by cement sheet. These materials usually do not present a high risk unless they are disturbed. They are gradually being removed as upgrading or demolition takes place. Asbestos-containing materials might be found in the home in:

- asbestos-cement cladding and roofing
- decorative/textured internal coatings on ceilings
- thermal and fire insulation
- asbestos-cement gutters and down-pipes
- electrical backboards
- backings to vinyl sheet floor coverings, and in the matrix of vinyl tiles.

Less commonly, asbestos-containing material may occur in:

- lagging or insulation in old heating appliances, or around pipes and older hot water cylinders
- some external textured coatings
- plastic products, caulking and other composites
- a woven sheath around old vulcanised India rubber-insulated wiring
- built-up roofing felts.

Q12 How much asbestos is safe, if any?

A All forms of asbestos can cause cancer, but the risk of disease depends on how much exposure occurred and over what time period. No specific dose can be determined because everyone will have different susceptibility, and different risk factors. For example, people who are frequently exposed to asbestos, and who also smoke, are at a much greater risk of lung disease. In developed countries like New Zealand, most concerns about asbestos are for people who were heavily exposed to asbestos in their workplaces, prior to the 1980s.

Exposure to all forms of asbestos at sufficiently high concentrations of airborne fibres over long periods increases the risk of asbestos-related diseases. The risk from exposure to asbestos in the non-occupational setting is considered to be low because the concentrations of airborne asbestos fibres are low and people are not exposed very often, compared with asbestos workers who may be exposed to significant amounts of asbestos on a daily basis

(which is why asbestos workers now use personal protective clothing and follow rigorous workplace practices).

Q13 How does it become dangerous (ie, when it is broken up, in building)?

A Intact asbestos-containing material is not a risk merely by its presence. Potential health problems only occur if asbestos fibres become airborne. In other words, asbestos fibres must become airborne, be present in sufficient concentration, and be of respirable size (able to be breathed in) to pose a risk.

Fibres are released when physical actions (deliberate or accidental) disturb the surface. Asbestos-cement materials will release fibres when sawed, drilled or otherwise worked or damaged. Materials such as asbestos-cement pipe can release asbestos fibres if broken or crushed when buildings are demolished. Other asbestos-containing material, such as decorative coatings, acoustic insulation and thermal system insulation, is vulnerable to damage during building maintenance operations, from vandalism and accidental damage. The use of power tools to drill and cut through asbestos-cement material can generate a significant number of airborne fibres.

In other words, if asbestos-cement products are intact, they do not pose a health risk. However, if they become damaged or are disturbed (particularly with power tools) they can release asbestos fibres. The material also tends to become more brittle with age. Surface deterioration can occur due to acid rain, abrasion, or persistent damp conditions aided by organic growths.

Q14 Is it correct that asbestos cannot travel far in the air?

A This would depend on the wind, particle size and density, and how the dust was disturbed to make it airborne.

Q15 Can you see it (ie, dust etc)?

A No. The presence of asbestos in materials cannot be determined definitively by visual inspection. Asbestos-cement products were used widely in New Zealand buildings until the mid 1980s, and care needs to be taken with any suspected asbestos-containing materials that date to before the mid 1980s. Actual determinations of the presence, type and level of asbestos in a cement matrix or other product can only be made by laboratory analysis. In asbestos-cement products, the asbestos fibres are bound in the cement/sand matrix, often in small bundles just visible to the naked eye (usually about 10–12 percent asbestos).

Q16 What health conditions can occur with exposure to asbestos and are there different risks associated with the different varieties of asbestos?

A All forms of asbestos cause cancer if a person is exposed to sufficient amounts over a long enough period. Exposure to chrysotile (white asbestos) is thought to be of lower risk than amosite or crocidolite because it is a different type of fibre. Breathing airborne asbestos in significant quantities can cause fibrosis of the lungs and pleura, as well as cancer of the lungs, pleura and peritoneum and, possibly, at distant sites. Asbestos workers who smoke are about 90 times more likely to develop lung cancer than people who neither smoke nor have been exposed to asbestos. Asbestos fibres can penetrate into the skin, producing asbestos warts, but do not appear to pass through the skin into the blood. There is no clear evidence that consuming asbestos causes adverse effects, but there is some evidence that long-term consumption of asbestos in the diet may increase the risk of gastrointestinal tumours and short-term high levels of consumption lead to precursor lesions of colon cancer.

Q17 What factors affect the risk of developing an asbestos-related disease?

A Generally, asbestos-related diseases occur in workers, often from historical and heavy exposures (before modern laws and controls were introduced). Asbestos workers who smoke are about 90 times more likely to develop lung cancer than people who neither smoke nor have been exposed to asbestos. The general population is exposed to asbestos from small quantities of asbestos fibres in air, arising from natural sources, wind-blown soil from hazardous waste sites, deterioration of automobile clutches and brakes, or breakdown of asbestos-containing materials.

The highest risk of exposure to asbestos in the home is through home renovating, by cutting or drilling through asbestos-cement sheeting or sanding down asbestos-backed linoleum or tiles. Left undisturbed, these materials pose a negligible risk and it is recommended that asbestos-containing material in good condition be left alone.

There is an ongoing, although low, risk of exposure to asbestos fibres in a home from damaged or deteriorating asbestos-containing insulation, walls, ceiling or floor tiles.

Friable asbestos (which would crumble easily if handled) is more likely to generate airborne fibre, hence increasing the risk of exposure to asbestos. The risk of generating airborne asbestos fibres can be reduced by appropriate management measures (eg, removing the friable material or sealing the surface).

Q18 What are asbestos symptoms?

A Asbestos-related diseases affect the lungs, so symptoms may start as shortness of breath, tiredness, pain on breathing, etc. These symptoms are general and may indicate other health conditions. Anyone with symptoms or concerns about their health should seek medical attention, and inform their medical practitioner if they have been employed in a high-risk industry (such as asbestos removal) or are a smoker.

Q19 Can a person be tested for exposure and if so how?

A No.

Exposure to asbestos cannot be measured by absorbed dose or other biological measurement (in other words there is not a blood test, unlike lead exposure for example). Exposure can only be estimated by:

- personal air sampling (a monitor worn in the breathing zone)
- air and environmental sampling (see Q9 for results of air sampling so far)
- questionnaires, interviews, inspections, historical records and/or exposure simulations.

For all measures of exposures there are limitations, and expert laboratory and epidemiological advice is generally needed.

Q20 Can the risk be expressed as 1 in 10 or 1 in 100,000 may develop the non-lethal condition of pleural plaque and 1 in xxxx might develop the specific cancer mesothelioma – I think that would help explain the actual risk. Sometimes they can compare it to the chance of developing cancer from smoking or the health risk of smoking x number of cigarettes per day.

A This is not possible, because there are too many variables and it is not ethical to do exposure experiments. Most studies are of workers who have been heavily exposed to asbestos over long periods. Extrapolation from asbestos workers to predict the risk for people in non-occupational situations is very complex and does not give any precise information. It involves estimating exposure and establishing a formula for the relationship between exposure and

risk. If there is a risk it is likely to be in the range of one in the hundreds of thousands or millions.

There are a number of uncertainties in this process and the information we have from overseas studies shows:

- it can be difficult to identify and characterise the hazards
- risk estimation for non-occupational exposure relies on extrapolation from much higher levels of exposure in industry
- assessment of risk at low concentrations of asbestos fibres can be only indirect
- the concentrations of asbestos fibres to which people may be exposed are far below the levels at which adverse effects have been reported for workers in the past.

Reported cases of mesothelioma from ‘non-occupational’ exposure to asbestos have been associated with para-occupational exposures (workers’ families exposed via clothing or materials brought from the workplace) and/or neighbourhood exposure near asbestos mines or asbestos-using industries.

For lung cancer, there are data to support increased incidence related to cumulative dose at high and moderate levels, but there are no real grounds for considering exposures in non-occupational settings.

There may also have been a low incidence of lung cancer as a consequence of para-occupational exposure to asbestos but it has not been possible to demonstrate this epidemiologically (because of the high background incidence of this disease). Alternatively, the inability to measure an effect of low levels of asbestos on lung cancer may be because lung cancer is not caused by low levels of exposure to asbestos.

For more information

Information about asbestos is available on the ARPHS website at <http://www.arphs.govt.nz/health-information/healthy-environments/asbestos>

Further information is available on the Ministry of Health website:

- Asbestos – <http://www.health.govt.nz/your-health/healthy-living/environmental-health/hazardous-substances/asbestos>
- The Management of Asbestos in the Non-Occupational Environment – <http://www.health.govt.nz/publication/management-asbestos-non-occupational-environment>

If anyone is concerned about asbestos-containing materials in their home, they can contact their Public Health Service (available 24 hours, 7 days a week) for advice. Health Protection Officers can provide advice on the likely presence of asbestos, and recommend testing if considered necessary. It is strongly recommended that people do not attempt to undertake DIY work with asbestos but seek professional help.



May 2014