Links between tobacco and cardiovascular disease, stroke and diabetes

Information for Health Professionals

WARNING: Aboriginal and Torres Strait Islander peoples are warned that this resource may contain images of persons now deceased.
Acknowledgements

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What is in a cigarette?

Cigarettes and rolling tobacco are made from the leaves of tobacco plants. Once the leaves are dried they are treated with many chemicals. The smoke from cigarettes contains over 7000 chemicals.

Everyone who breathes in cigarette smoke is being exposed to these chemicals.

If people are exposed to cigarette smoke, either by smoking or being near smokers, they may be breathing in the following:

- Tar, a black sticky substance that contains many poisonous chemicals such as: ammonia (found in floor and window cleaner), toluene (found in industrial solvents) and acetone (found in paint stripper and nail polish remover).
- Nicotine, the addictive drug in tobacco.
- Hydrogen Cyanide, the poison used in gas chambers during World War 2.
- Metals, including lead, nickel, arsenic (white ant poison) and cadmium (used in car batteries).
- Pesticides such as Methoprene (found in flea powder).
- Benzene (found in petrol) and Naphthalene (found in mothballs).
- Carbon monoxide, a poisonous gas that bonds with red blood cells and reduces the amount of oxygen taken up by the red blood cells (see diagram below). This can lead to cardiovascular disease.
How does smoking cause cardiovascular disease?

Smoking increases the risk of developing cardiovascular diseases (CVD), which includes coronary heart disease and stroke. There are many ways that smoking can cause or increase the risk of developing CVD. Breathing tobacco smoke increases heart rate and blood pressure. High blood pressure is a risk factor for CVD.

Smoking increases the stickiness of special blood cells called platelets, further increasing the risk of blood clots forming; blood clots can block blood flow to your heart, brain or legs and this can cause cardiovascular disease.

Smoking increases LDL (bad) cholesterol and reduces HDL (good) cholesterol. High levels of LDL cholesterol are a risk for cardiovascular disease.

Smoking also damages the lining of a person’s arteries, leading to a build-up of fatty deposits (atheroma) which narrows the artery. This can cause angina, a heart attack or a stroke.

Buildup of fatty deposits (plaque) narrowing a blood vessel and reducing blood flow.
Cardiovascular disease includes:

**Coronary artery disease** - This is the most common type of heart disease. This is when the coronary arteries (those arteries supplying the heart with oxygenated blood) become narrowed and the heart cannot pump blood like it should. This can lead to heart attack.

**Heart attack** - This is when the flow of blood to the heart muscle suddenly becomes blocked and the heart can’t get oxygen. If blood flow isn’t restored quickly, the section of heart muscle begins to die.

**Thrombosis** - Clogging of the blood in a part of the circulatory system.

**Stroke** - There are two kinds of stroke, both kinds stop blood getting to the brain (see page 7).

**Aortic aneurysm** - Abnormal swelling of the main aorta.

**Atherosclerosis** - Narrowing of the arteries that supply blood to the heart, brain and vital organs.

**Congestive heart failure** - Occurs when the heart becomes too weak to pump blood through the body.

**Peripheral vascular disease** - Reduced blood flow to a body part, (other than the heart or brain) related to a narrowed or blocked blood vessel.

**Hypertension** - Also known as high blood pressure. It is the pressure of the blood as it pumps through arteries. This leads to cardiovascular disease.
Smoking and the risk of Stroke

- Smoking greatly increases a person’s chances of developing serious health conditions like stroke.
- In fact, smokers are three times more likely to have a stroke than someone who doesn’t smoke. Stopping smoking can significantly reduce those risks.
- Smoking is particularly dangerous for people who have high blood pressure. They are five times more likely to have a stroke than smokers with normal blood pressure, and 20 times more than non-smokers with normal blood pressure.

What is a stroke?
Stroke is a type of cardiovascular disease. There are two kinds of stroke. Both kinds of stroke stop blood getting to parts of the brain.

- In the first kind, an artery in the brain gets blocked.
- In the second kind, a blood vessel in the brain bursts, causing bleeding.

Blocked artery
A stroke caused by a blockage is called an ischaemic stroke.

The blockage can be caused by a blood clot getting stuck in a blood vessel in the neck or the brain. It can also be caused when blood vessels become blocked with plaque.

Bleeding in the brain
A stroke caused by a blood vessel bursting in the brain is called a haemorrhagic stroke.

The burst vessel stops oxygen getting to parts of the brain. This kind of stroke can be caused by high blood pressure.

It can also be caused by a weak spot in a blood vessel. This is called an aneurysm.

TIA
Sometimes signs of a stroke only last a short time. This is called a transient ischaemic attack (TIA). It is sometimes called a mini-stroke.

A TIA is a warning sign a stroke may occur in the future. A person should talk to their doctor about lowering their risk of stroke after TIA.
How does smoking cause stroke?

Smoking is a major risk factor for stroke.

As outlined in the cardiovascular disease section of this booklet, smoking increases the risk of stroke in a number of ways:

- Smoking increases the stickiness of blood, further increasing the risk of blood clots forming. These clots can block an artery in the brain, causing a stroke.
- Nicotine is a highly addictive drug. It causes blood vessels to narrow, increases heart rate and raises blood pressure. Elevated blood pressure is a major contributory factor to stroke.
- Smoking increases LDL (bad) cholesterol and reduces HDL (good) cholesterol. High levels of LDL cholesterol contributes to the build-up of plaque in the arteries and is a risk factor for stroke.
- The carbon monoxide in tobacco smoke is the same type of poisonous gas found in car exhausts; it takes the place of oxygen in the blood and starves the brain of the oxygen it needs to function properly.
How do you know if someone is having a stroke? **Think F.A.S.T.**

**FACE**
Check their FACE. Has their mouth drooped?

**ARMS**
Can they lift both ARMS?

**SPEECH**
Is their SPEECH slurred? Do they understand you?

**TIME**
TIME is critical. If you see any of these signs, call 000 now!

*Think F.A.S.T.* **Act FAST!**

**CALL 000**

*Courtesy of Stroke Foundation*
Type 2 diabetes is a condition where a person’s body doesn’t make enough of an important hormone called insulin, or the insulin doesn’t work as well as it should. Insulin is used in the body to turn the glucose in foods that people eat into energy. If there isn’t enough insulin, or the insulin isn’t working as it should, glucose (sugar) builds up in the blood.

**Smoking increases the risk of developing type 2 diabetes.**

Aboriginal people are already at higher risk of developing type 2 diabetes.

Smokers are 30-40% more likely to develop type 2 diabetes than non-smokers.

Smokers are at risk of developing diabetes because the chemicals in smokes make it harder for their body to use insulin to turn the glucose in the foods they eat into energy.

Smoking can also cause high blood pressure and high cholesterol, which are also risk factors for diabetes.

If someone already has type 1 or type 2 diabetes, smoking makes it harder for them to manage their blood glucose levels. This is because glucose is a sticky substance and when combined with nicotine the blood becomes thicker and stickier which leads to it lining and damaging the walls of blood vessels. Over time if the glucose levels stay high, damage will become worse and the person is more likely to develop complications of diabetes such as:

- Heart attack and stroke
- Kidney disease
- Problems with feet, which may lead to ulcers and amputation
- Eye problems, including blindness
- Erectile dysfunction

Diabetic retinopathy, also known as diabetic eye disease, is when damage occurs to the retina due to complication of type 2 diabetes.
What is gestational diabetes?
Gestational diabetes is a type of diabetes that may occur when a woman is pregnant and usually goes away when the baby is born. In pregnancy, hormones are produced that help the baby to grow and develop.
These hormones also block the action of the mother’s insulin, the hormone used to help move glucose from the blood stream into muscles and cells. This is called insulin resistance. Because of this insulin resistance, the body needs to produce 2 to 3 times more insulin than normal. If the body is unable to produce this extra insulin, a woman’s blood sugar level will rise and gestational diabetes develops. Woman with gestational diabetes may need oral medication or insulin injections to manage it, along with a healthy diet and regular gentle activity.

Smoking and gestational diabetes
As smoking also causes insulin resistance, this adds to the insulin resistance caused by the pregnancy hormones, putting a woman at higher risk of developing gestational diabetes. If she continues to smoke after being diagnosed with gestational diabetes, this will make it much more difficult for her to manage her blood glucose levels and may result in complications.

Who is at risk of developing gestational diabetes?
All pregnant women can get gestational diabetes. Women may be at greater risk of getting gestational diabetes if they:
- had gestational diabetes in a past pregnancy
- are over 30 years old
- have a family history of diabetes
- are an Aboriginal or Torres Strait Islander woman
- are overweight
- smoke cigarettes

Complications of gestational diabetes
If gestational diabetes is not well managed, and blood glucose levels remain high, it may result in complications such as a large baby, premature delivery, miscarriage, and stillbirth. A large baby can create the risk of injury at delivery, and some women may need to have a caesarean delivery or instrument assisted delivery. When the baby is born they may have low glucose levels and need to be looked after in special care until the glucose level stabilises.

After the baby is born
After the baby is born, gestational diabetes usually goes away. An oral glucose tolerance test (OGTT) should be performed six weeks after delivery to ensure that blood glucose levels have returned to normal. However, women who have had gestational diabetes have an increased risk of developing type 2 diabetes later in life and should be tested for diabetes at least every 1 – 2 years. Eating a healthy diet, maintaining a healthy weight, exercising regularly and not smoking will help reduce the risk of developing type 2 diabetes later in life.
Smoking causes chronic obstructive pulmonary disease (COPD), this is the term used for a number of lung diseases that make it difficult to breathe. COPD is the fourth largest killer of Australians. Two of the most common forms of COPD are emphysema and chronic bronchitis. Smoking is a cause of chronic disease, including both emphysema and chronic bronchitis.

**Emphysema and smoking**

Tobacco smoke damages the air sacs in the lungs. Over time this leads to progressive loss of lung function and the development of emphysema. As emphysema worsens breathing becomes a struggle and supplementary oxygen may be required. Damage from emphysema is not reversible; however quitting smoking will slow the rate of loss of lung function.

**Chronic bronchitis and smoking**

Smoking inflames the airways and allows less air to flow in and out, resulting in difficulty breathing. This leads to chronic bronchitis. With smoking cessation and vigorous treatment early on, chronic bronchitis can be reversible. If a patient gives up smoking, this can slow down the progress of the condition and may allow some parts of the lung to heal.

Compared to a non-smoker, a person who has smoked is more than five times as likely to develop emphysema/chronic bronchitis, and a current smoker is more than six times as likely to suffer from emphysema/ chronic bronchitis.

The most important thing a person can do to prevent emphysema or chronic bronchitis is to quit smoking.

References
The effects of second-hand smoke

What is second-hand smoke?
Second-hand smoke is the smoke which people breathe out or smoke that comes off the end of a burning cigarette or rollie. It is also called passive smoke, environmental smoke, or side-stream smoke. Second-hand smoke contains thousands of chemicals, including over 250 toxic or carcinogenic chemicals. These can affect the central nervous system, the immune system, the heart and the liver, and cause eye, skin or respiratory problems. Individuals with underlying diabetes, vascular disease or hypertension are at greater risk of harm from second-hand smoke.

Cardiovascular disease and second-hand smoke
Exposure to second-hand smoke is a cause of coronary heart disease in non-smokers, increases the risk of an acute heart disease event, and can make existing cardiovascular disease worse. The cardiovascular system is very sensitive so even low or brief exposures to second-hand smoke can cause a disproportionately high amount of damage. For non-smokers, exposure to second-hand smoke increases the risk of an acute heart disease event and even in cases of brief exposure (ranging from minutes to hours) may have 80–90% of the effect of active smoking on some cardiovascular mechanisms. Second-hand smoke may contribute to an increased risk of stroke, through encouraging atherosclerosis and damage in the carotid and large arteries of the brain.

Second-hand smoke and type 2 diabetes
Individuals with existing diabetes are at greater risk of developing coronary heart disease if exposed to second-hand smoke. Chronic exposure to second-hand smoke may be linked with increasing the risk of developing type 2 diabetes in young adults and older populations.

Health effects of exposure to second-hand smoke for infants and children
Exposure to smoking in the womb and following birth is associated with several causes of death during infancy, including low birth weight, preterm delivery, and sudden infant death syndrome. It is also associated with the following health effects:

- **Sudden unexpected death in infants (SUDI), including SIDS** - SIDS is the sudden, unexpected death of an infant under one year. Postnatal exposure to second-hand smoke doubles the risk of SIDS. Babies exposed to second-hand smoke are more likely to have thickening and inflammation of the airways, and are more susceptible to lung infections. Second-hand smoke may also impair the body’s control over respiration and heart rate, and the automatic response to start breathing again after an episode of apnoea.

- **Asthma** - exposure increases the risk of developments of asthma, and increases severity of symptoms.

- **Middle ear disease** - exposure can cause acute and chronic infections and middle ear disease, leading to temporary loss of hearing and possible permanent damage.

- **Respiratory illness** - exposure increases the risk of bronchitis, croup, bronchiolitis and pneumonia.

- **Poor lung development** - the carbon monoxide in second-hand smoke impacts the development of children’s lungs. This can make allergy symptoms worse or increase the risk of respiratory illness.

- **Behavioural problems** – exposure to smoking has been linked to risk of Attention Deficit Hyperactivity Disorder (ADHD) and other intellectual and behavioural problems.

- **Becoming an adult smoker** – children who live with smokers are more likely to become smokers themselves.

References
Benefits of quitting smoking

Health benefits

- Less than 20 minutes after their last cigarette, heart rate will already start to drop back towards a normal level.
- After 2 hours without a cigarette, heart rate and blood pressure will have decreased to near normal levels and circulation will start to improve.
- 12 – 24 hours after quitting, the carbon monoxide in the body decreases to lower levels, and blood oxygen levels increase to normal levels (carbon monoxide, released from burning tobacco, bonds with blood cells and makes it hard for oxygen to bond with the blood cells – this can lead to cardiovascular problems, see page 4).
- 24 hours after quitting the heart will start to repair. In just one full day after quitting, the risk of heart attack will begin to drop.
- Just 12 months after quitting the risk of cardiovascular disease is halved compared to when smoking.
- 5 years after quitting, the risk of stroke has decreased dramatically.
- 10 years after quitting the risk of dying from lung cancer is halved.
- 15 years after quitting the risk of heart disease is the same as a non-smoker.

Benefits of quitting smoking and diabetes

If a smoker does not have diabetes, quitting will reduce their risk of developing diabetes.

If a smoker already has diabetes, quitting will improve their blood glucose levels because the body will be able to use insulin more effectively. This will reduce the risk of complications for diabetes, such as heart attack, stroke, blindness, kidney damage and nerve and vessel damage which can result in limb amputation.

Other benefits of quitting

- Sense of taste and smell will improve.
- More energy.
- Don’t smell of cigarette smoke.
- Look younger - less wrinkles, yellow teeth or discoloured fingers.
- Save money.
- Make the family proud.
- Good role model for kids and community.
- Live longer to watch family grow.
- Kids stay safe and healthy.
- Feel proud for beating the smokes.
- Be there to pass on culture and knowledge.

References

National Heart, Lung and Blood Institute http://www.nhlbi.nih.gov/health/health-topics/topics/smo
National Heart Foundation (WA Division) and Derbal Yerrigan Health Services. Heart Health Manual: Aboriginal Health Workers. Perth; Western Australia.
Health line (USA). http://www.healthline.com/health-slideshow/quit-smoking-timeline#7
Support for reducing or quitting the cigarettes:

Quitting can be hard for some people. This is because the nicotine in cigarettes is a very addictive substance, and a person’s smoking may be a strong addiction.

There are lots of other reasons why people smoke, including smoking to help cope, help relax, get an energy lift, get a break, or be part of a group.

- If a person is thinking about quitting or cutting down there are a lot of people who can help them with this: Doctor or GP, Nurse, Chemist, AMS Health worker, Tobacco Cessation worker, other people who have quit, family and friends, Quitline Counsellor.

- Quitline is a confidential telephone counselling service. Quitline counsellors are very experienced in helping people to stop or reduce their smoking. They understand quitting can be tough, and it may take a few attempts to find the right way to quit.

- Quitline can offer an individualised quitting plan and ongoing support.

**Quitline 13 7848**

Withdrawal

When a person quits smoking they may have some withdrawal symptoms as the body begins to repair and return to normal.

Withdrawal symptoms include: coughing, irritability and mood swings, difficulty concentrating, tingles in hands and feet, restlessness, anxiousness, upset sleep, upset stomach, headaches or hunger. These symptoms will disappear. It may take 10-30 days.

Managing cravings

Cravings only last a few minutes, and reduce over time. The 5 Ds can be a useful way to manage a craving.

**The deadly Ds**

1. Delay
2. Deep breathe
3. Drink water
4. Do something else
5. Dial Quitline 13 7848
Plan a quitting method

Going Cold Turkey
This means giving up the cigarettes suddenly. This works for many people. Quit medication can still be used to help them get through, and Quitline can help them to make a plan to quit.

Gradual Approach
This means cutting down the number of cigarettes smoked each day, or delaying the time of the first cigarette, making it later and later until no longer smoking. If this approach is taken it helps to aim to be smoke-free within two weeks.

Quit Medications
Medications are available which can reduce withdrawal symptoms. These are nicotine replacement products (NRT) and some prescription medications. A person should ask their doctor or health care worker if these would be OK for them.

Quitting tips for your clients

- Make a plan and stick to it.
- See if anyone in your family wants to quit with you.
- Find people to support you.
- Change old habits.
- Ask people who have quit how they did it.
- Join a group – it can make things easier.
- Know what triggers you to smoke.
- Keep track of how much money you are saving.
- Don’t be hard on yourself – it is a change to do things differently.
- Remember it can take several attempts to quit.
- Phone a friend or call Quitline 13 7848.
Smoke-free pregnancy

Smoking during pregnancy is linked to complications for both mothers and babies; smoking reduces the amount of oxygen in the mother’s blood-stream. This also means that the baby’s oxygen supply is decreased. The baby is also exposed to all the harmful gases and chemicals contained in cigarettes.

This can lead to complications like still births, babies born early, lower birth weight, increased risk of Sudden Infant Death Syndrome, miscarriages, and undeveloped organs including the lungs, heart, and brain.

Stopping smoking and avoiding second-hand smoke will benefit both mother and baby immediately. Harmful gases and chemicals will clear from her body and more oxygen will be available for her and her baby.

Smoke-free partners

Ensuring a smoke-free environment is the best thing for mother and baby.

If a pregnant woman is trying to give up smoking it is important that their partner offers support and encouragement, and keeps in mind she is doing this for the whole family.

Partners can help by asking other people to not smoke near her.

If the partner is a smoker it is crucial that they do not smoke near her, as the second-hand smoke she would breathe can be dangerous for both her and the baby.

If they both smoke the best thing would be for them to quit together.
Smoke-free home and family

When families work together they can greatly reduce the harms of smoking and second-hand smoke. Families can:

- Talk about the harms of smoking and how it impacts the whole family.
- Make a plan and set some family rules about smoking.
- Put up some signs so that everybody knows not to smoke in the house.
- Make a designated smoking area outside away from doors, windows, and air conditioners. Tell the children to stay away from people who are smoking and don’t let them hang around the smoking area.
- If people choose to smoke ask them to respect the family and smoke in the smoking area.
- If people choose to smoke suggest when they are visiting that they ask where to smoke in case the family are too ashamed to tell them.

Smoke-free car

- Exposure to second-hand smoke is very harmful for children. In Western Australia smoking is prohibited in a vehicle if a child under 17 years of age is present.
- It is not only unborn babies who are affected by cigarette smoke but newborns and children too.
- Babies and children’s lungs are very sensitive and they breathe at much faster rates than adults. This means that if they are exposed to cigarette smoke they are breathing in more chemicals, more often.
- Second-hand smoke can cause various health issues in babies and children.
- People should try to keep their children in a smoke-free environment as much as possible.
**Eat healthy**

_Sense of taste and smell is dulled by tobacco; after quitting, food tastes so much better. It is important to remind your clients to:_

- Eat fresh food from the bush and shop.
- Eat a variety of fruit and vegetables everyday.
- Eat wholegrain and wholemeal breads, cereals, rice and pasta.
- Eat less salt - don’t add extra salt to food.
- Drink plenty of water - carry a bottle with them and aim for 2L a day.
- Avoid fatty and fried foods.
- Keep away from too much sugar – choose water instead of soft drink, add less sugar to tea or coffee, choose fruit juice with no added sugar, choose low sugar breakfast cereals, eat less biscuits, cakes, chocolate, lollies and ice cream.
- Avoid too much alcohol.

**Become more active**

_When a person quits the smokes they will have more energy, feel fitter and be able to move more. It is important to remind your clients:_

- It is never too late to start regular physical activity.
- If they have not been active for a while, start slowly and build up over time.
- Physical activity doesn’t mean they have to go to a class or go for a jog, it means walking more – taking the stairs instead of the lift or escalator, getting up to change the TV channel, catching up with friends for a walk and talk, rather than using the car.
- Try physical activity as a family. They can go bush walking, take bike rides or picnics out in the bush.
- The more active they are the more natural it will feel for them and their family.
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More Information

HealthInfoNet:  www.healthinfonet.ecu.edu.au/
Heart Foundation:  www.heartfoundation.org.au/

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