


# A healthy heart



**UNDERSTANDING  
CARDIOVASCULAR  
DISEASE**







*“Cardiovascular disease kills  
one Australian every 12 minutes.”<sup>1</sup>*

## THE PROBLEM

According to the World Health Organisation, cardiovascular disease (CVD) is the world's leading cause of death.<sup>2</sup> Over 3 million Australians suffer from cardiovascular disease, and despite significant advances in the treatment of CVD it remains the cause of more deaths than any other disease in Australia. It is also the most expensive disease in Australia—costing billions of dollars each year.<sup>3</sup>

## WHAT IS CARDIOVASCULAR DISEASE?

CVD describes a range of illnesses that involve the heart (cardiac) and blood vessels (vascular).

## SOME COMMON CARDIOVASCULAR DISEASES<sup>4,5</sup>

### CORONARY HEART DISEASE

When the arteries that supply the heart become clogged, this is known as coronary heart disease (CHD)—the most common cause of death in the developed world. It is also a major cause of disability, with many people unable to easily manage daily activities. CHD can result in angina or heart attack. Angina is commonly presented as chest pain or discomfort resulting from inadequate blood flow and oxygen to the heart muscle.

### HEART FAILURE AND CARDIOMYOPATHY

Heart failure results from a variety of conditions that impairs the heart making it incapable of maintaining a reasonable blood flow. When there is a prolonged deprivation of fresh blood and oxygen to the heart muscle, the section of the heart muscle begins to die and heart attack occurs. Cardiomyopathy occurs when the heart muscle thickens, stiffens or enlarges causing the heart to pump ineffectively, which eventually leads to heart failure.

### STROKE

A stroke is caused by reduced, blocked or interrupted blood supply to the brain. This results in rapid loss of brain function, leading to varying degrees of brain cell death and loss of associated mental or physical function.



# WHAT CAUSES CARDIOVASCULAR DISEASE?

## ATHEROSCLEROSIS

The main cause of CVD is atherosclerosis—the build up of plaque inside the blood vessel walls. Plaque consists of cholesterol, fat, macrophages (a type of white blood cell). Other substances like calcium may also be present. The vessels become narrow or even completely blocked up, so little or no blood can travel through to the brain, heart and other organs.

The narrower the artery, the greater the risk of them being blocked by a rupture in the plaque-lined artery wall or a blood clot. About 10% of heart attacks result from blockages directly related to the accumulated hard plaques. The greater risks—and those leading to as many as 90% of heart attacks—are those of softer plaques, deposits of which are linked to higher cholesterol and are more unstable so more likely to rupture and block blood flow to the heart muscle or brain.<sup>6</sup> These dangerous soft plaques often go unnoticed, even in angiograms.

We're born with clean and flexible arteries that have the capacity to stay that way over time. However a very early study observed that most of the young people studied, who were around 20 years old, had plaque deposits taking up 20% of the internal space in their blood vessels (the arterial lumen).<sup>7</sup> Typically, by the time many of us are 45 years of age, plaque can have grown to the point that it narrows our arterial lumen by 50% or more in many people. And by 70 years of age, many live with up to 90% narrowing of some of their arteries, leaving only 10% opening for blood to flow through.<sup>7</sup>

But how does atherosclerosis happen? It's a process with many contributing factors.



## INFLAMMATION

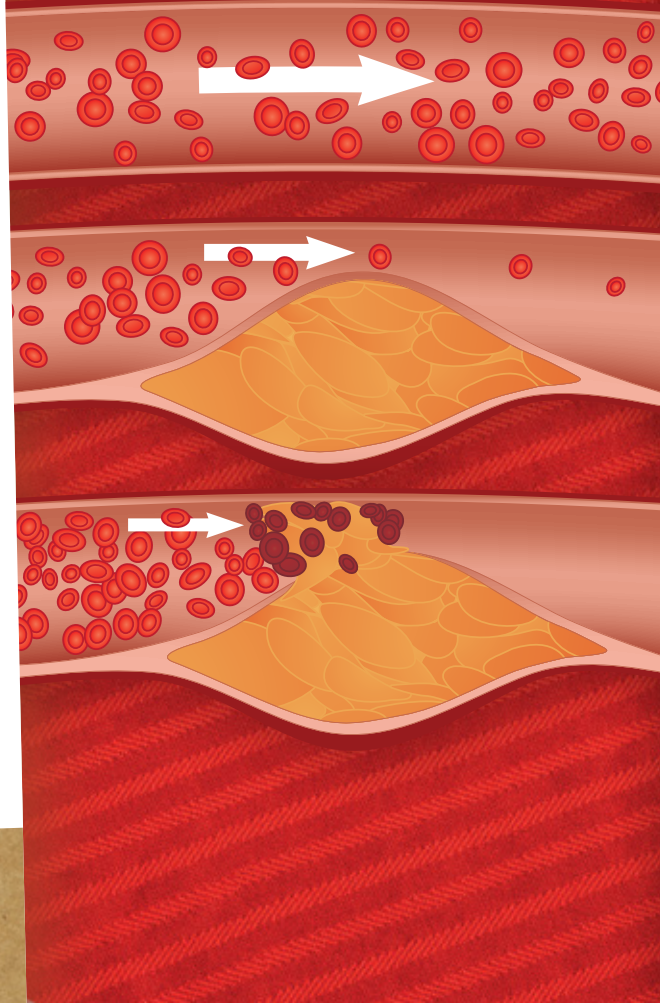
We've all experienced the inflammation that results when we get a splinter, cut or graze. It's our immune system's way of fighting off potential infection or trouble. Likewise, poor lifestyle choices can lead to an ongoing, low-level inflammation throughout our body.

Lifestyle factors such as smoking, a lack of activity, stress, obesity and what we eat can all drive this chronic low-level inflammation. This in turn, affects the lining of our blood vessels throughout the body and also our normal metabolic functioning. Instead of a relatively short-term inflammation and consequent healing, we end up with inflamed blood vessels, increasing oxidative stress and eventually leading to heart and arterial diseases,<sup>8</sup> and many other chronic diseases as well.

## OXIDATIVE STRESS

Oxidative stress is a closely related contributing factor, which can be both a cause and consequence of inflammation.<sup>9</sup> Oxidative stress occurs when harmful substances called free radicals damage molecules within our body cells. Too much free radical damage causes the

*Atherosclerosis is the build up of plaque inside the blood vessel walls.*



immune system to respond, leading to inflammation. Oxidative stress is generated by a number of factors including excess of substances and behaviours that produce free radicals—such as alcohol, cigarette smoke, and high levels of unhealthy fats and sugars in our diets.<sup>10</sup>

## CHOLESTEROL

Cholesterol is a waxy, fat-like substance in our blood that is produced in the liver. It is a part of all animal cells and is essential for many of the body's metabolic processes, including hormone and bile production, and to help the body use vitamin D. Excess blood cholesterol can play a key role in cardiovascular disease.<sup>11</sup>

Cholesterol levels in our blood are dictated largely by our food choices, which can work to both raise and lower our blood cholesterol. Of particular interest is the level of LDL (*bad*) cholesterol, which in its oxidised form (i.e. its free radical damaged form), plays a crucial role in the formation of atherosclerotic plaques.<sup>12</sup> High fat (and/or sugar) diet and lack of physical activity can raise the levels of LDL cholesterol in our blood, while many plant foods (e.g. oats, barley, legumes, fruit) contain soluble fibre that helps reduce cholesterol.<sup>13</sup>

## TRIGLYCERIDES

Triglycerides are another type of fat in the blood. Triglycerides by themselves are not as powerful an indicator of the development of atherosclerosis as blood cholesterol. Combined with high LDL cholesterol levels, however, they can add considerably to the risk. Additionally, high triglycerides can increase blood clot formation,<sup>14</sup> potentially leading to the blockage of arteries that supply blood to the heart, brain, lungs, and limbs.<sup>15</sup>

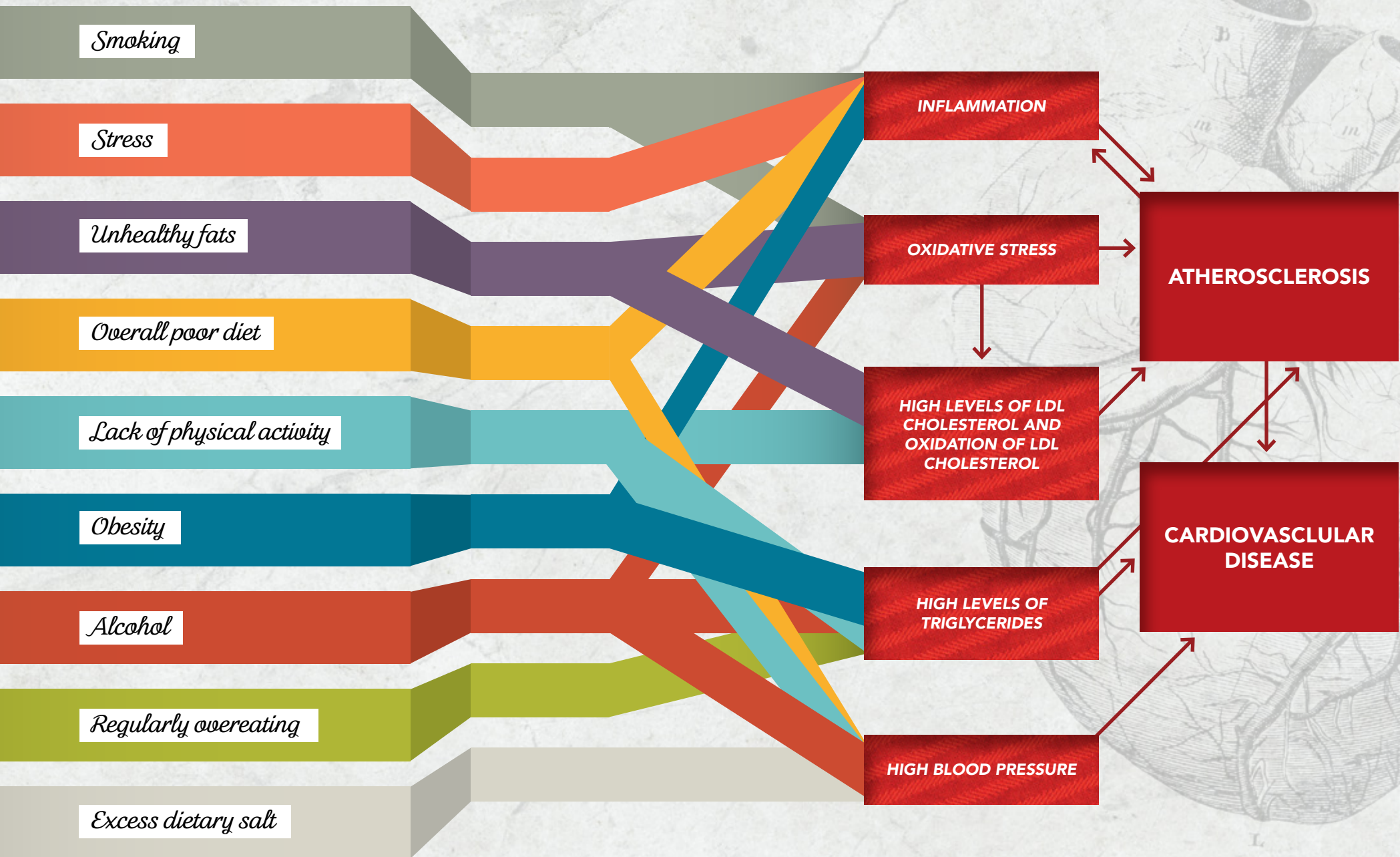
## A COMPOUNDING PROBLEM

The Western diet and lifestyle produce oxidative stress and inflammation, which together damage the innermost lining of our arteries. The damage causing oxidised LDL cholesterol is removed from the blood circulation by being taken up into the arterial wall where it is removed by the immune systems white blood cell macrophages. Unfortunately if oxidised cholesterol is deposited at a faster rate than the white blood cells can remove it plaque layers begin to form. This in turn results in further inflammation, allowing a cycle of damage and plaque formation to spiral.<sup>16</sup>

## HIGH BLOOD PRESSURE

In addition to the processes causing atherosclerosis, high blood pressure (or hypertension) is a well-recognised, major risk factor for cardiovascular disease, contributing to half of all heart disease and strokes.<sup>17</sup>









# REDUCING your RISK

Most of the contributing factors to CVD are lifestyle elements, over which we can have control. Many of these behaviours contribute in multiple ways to the development of CVD, as you can see from the tangled web of arrows in the diagram on pages 8 and 9.

To reduce the risk of CVD, individuals and populations need to deal with the contributing lifestyle factors.

## **SMOKING**

Smoking is a major contributor to both inflammation and oxidative stress—two of the key elements of the atherosclerosis process. According to the Heart Foundation of Australia, there is overwhelming medical and scientific evidence that smoking promotes coronary heart disease<sup>18,19</sup> and is a major cause of stroke<sup>20,21</sup>. The more you smoke the greater your risk. But even smoking just one to four cigarettes a day can double or triple coronary risk.<sup>22</sup> Further, scientific evidence has established that exposure to second-hand smoke increases the risk of coronary heart disease by 25-30% in non-smokers.<sup>23,24</sup> Quitting smoking, or never starting in the first place, is a huge step in reducing cardiovascular risk both for yourself and for those around you.<sup>13</sup>

## **UNHEALTHY FATS**

The third key element in the atherosclerosis process is the oxidation of high levels of LDL cholesterol in our blood stream. Reducing LDL levels has a major impact on cardiovascular risk, and may be achieved by limiting saturated and trans fats in our diet.<sup>25</sup> Processed foods and foods of animal origin are the major sources of trans and saturated fats. In contrast, a whole food, plant-based diet contains little of

these *bad* fats, but moderate to low amounts of *good* fats—found in foods like nuts, seeds, and avocados. Additionally, reducing these bad fats in our diets will also reduce the chance that the LDL cholesterol in our blood will be oxidised.

### OVERALL POOR DIET

Nutritious whole food plant-based diets contain high levels of grains, fruits, and vegetables. These foods provide our bodies with fibre, vitamins and minerals, anti-oxidants, and polyphenols—all of which act in a variety of ways to protect against inflammation, oxidation and atherosclerosis.<sup>26,27</sup> A diet low in these nutritious foods and high in fats, salt and sugars, contributes to the atherosclerosis pathways while providing little or no protection against them.

### LACK OF PHYSICAL ACTIVITY

Research has shown that exercise protects against CVD in a number of ways. Firstly, it can be effective in raising HDL (good) cholesterol levels while reducing LDL (bad) cholesterol levels.<sup>28</sup> It can also increase our anti-oxidant capacity, thereby reducing the risk of LDL (bad) cholesterol being oxidised.<sup>29</sup> Exercise can reduce high blood pressure—a major CVD risk factor—and strengthen your heart and cardiovascular system, resulting in improved circulation. Importantly, exercise can reduce body fat and help you maintain a healthy body weight.<sup>30,31</sup>

### OBESITY

Research has shown that unnecessary weight gain worsens all elements of your cardiovascular risk profile, including unhealthy levels of blood fats (such as LDL cholesterol and triglycerides) and hypertension, with obese individuals five times more likely to suffer from hypertension.<sup>32,33</sup> The greater a person's *fatness*, the worse their cardiovascular risk factors become.<sup>34,35</sup> Body fat around the abdomen has the greatest impact on cardiovascular risk, and repeated weight fluctuations—from frequently losing weight then regaining it—cause plaque formation to accelerate.<sup>36,37</sup>

Maintaining a healthy body weight throughout adult life, or taking steps to achieve successful long term weight loss, represent a significant way of reducing a person's risk of cardiovascular disease.<sup>38</sup>

### ALCOHOL

Research appears to give a slightly confusing picture when it comes to the impact of alcohol on cardiovascular disease, but the information becomes clearer when it is carefully assessed.

What is known is that regular consumption of alcohol increases blood pressure, and that around 15% of hypertension—a major risk factor for cardiovascular disease—is due to drinking alcohol.<sup>39</sup>

What is also known is that the current state of research does not allow us to say unequivocally that alcohol protects against heart disease. It might do this in some people, but it definitely doesn't in many groups. According to the Heart Foundation of Australia alcohol can damage your heart, and at-risk individuals should not drink alcohol at all.<sup>40</sup> Further, any protective effect that does exist has quite likely been exaggerated due to other diet and lifestyle factors not being taken into account. Any presumed cardiovascular benefits from drinking alcohol need to be carefully weighed against the tendency of alcohol to elevate blood pressure, not to mention the many other adverse health consequences.<sup>39</sup>

According to the American Heart Association, most of the professed cardiovascular benefits of drinking alcohol can be achieved through diet and exercise, and people who do not already drink alcohol should not start drinking.<sup>41,42</sup>

### EXCESS DIETARY SALT

Many aspects of good nutrition are as much about *ratio* as *amount*, and salt is one example of this. Excess dietary salt (sodium chloride) is a significant contributor to hypertension, especially in the presence of low potassium intake.<sup>43,44</sup>

A study of over 2,000 participants, who were followed for 10-15 years, found that those with higher ratios of sodium to potassium had significantly increased risk of cardiovascular disease. The ratio of the two nutrients was a stronger indicator of risk than just the amounts of sodium or potassium alone.<sup>45</sup>

For most people, the most significant contributor to excess dietary sodium is processed foods. Almost all processed foods have high levels of added salt, even if the food doesn't taste salty. So while it may be important to watch how much salt you add in cooking and at the table, reducing processed foods and choosing low-salt options is foundational to avoiding excess dietary salt.

To increase potassium intake and restore a better sodium-potassium ratio, individuals need to increase their intake of fresh fruits and vegetables, whole grains and legumes—all of which will give many other benefits as well!





# Good salt, bad salt?

You may have heard the suggestion that some salt is bad and some salt is good. The argument proposes that table salt purchased in supermarkets has been stripped of its true nutrient content, bleached, and polluted with toxic chemicals and anti-caking agents. The argument then points to pure rock salt from the sea or the mountains that has been hand-harvested and washed. It is available to purchase in its pure, nutritious state, ready to provide us with a healthy version of sodium—a nutrient essential to human health.

Although this viewpoint approaches the topic a little differently, the conclusions its proponents draw are largely the same—eat less processed food with its high salt levels, and eat more unprocessed whole foods to obtain the right amounts of both sodium and potassium.





# THE BOTTOM LINE

Extensive scientific research has been conducted in an effort to curtail the western world's biggest killer—cardiovascular disease. And while some of the finer details are sometimes disputed (a healthy and necessary part of good science), there is overwhelming evidence of the benefits of key behaviours:

- ✓ **DON'T SMOKE**
- ✓ **REDUCE UNHEALTHY DIETARY FATS**
- ✓ **EAT LESS PROCESSED FOODS HIGH IN SALT LEVELS**
- ✓ **EAT MORE FRESH FRUIT AND VEGETABLES**
- ✓ **BE ACTIVE**
- ✓ **ACHIEVE AND MAINTAIN A HEALTHY WEIGHT**
- ✓ **LIMIT ALCOHOL**



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WELCOME TO THE START OF GREAT HEALTH

**2 GOOD EATING**  
ESSENTIALS OF CHOOSING HEALTHY FOOD



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