

# The Women's Health Research Program

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## What is insulin resistance and pre-diabetes?

Globally the number of people being diagnosed with type 2 diabetes is increasing exponentially. Being diagnosed with diabetes significantly increases a person's risk of developing cardiovascular disease, kidney impairment, diabetic eye disease and other circulatory problems.

**Insulin resistance** can be the first warning of developing diabetes.

Insulin resistance most commonly occurs in people who are overweight. An increase in fat tissue, particularly abdominal fat, results in higher levels of free fatty acids in the blood. The increase in free fatty acids interferes with insulin action so that muscle, fat, and liver cells do not respond properly to insulin. As a result the pancreas has to produce more insulin to control blood glucose levels.

High free fatty acids also increase triglycerides in the blood and lower HDL cholesterol. These changes increase the risk of cardiovascular disease. Independently, having excessive fat tissue also increases the risk of high blood pressure.

**Pre-diabetes** (impaired glucose tolerance) follows on from insulin resistance and occurs when the pancreas fails to keep up with the body demands for increased insulin.



Pre-diabetes is the elevation of blood glucose above what is considered normal, but below the level that would fulfil the diagnosis of frank diabetes. People with pre-diabetes may have a normal fasting blood glucose level. However, they have an abnormally high increase in their blood glucose level after eating ie the blood glucose level increases above what is considered normal after eating, but below the threshold for the diagnosis of diabetes.

Pre-diabetes is the leading risk factor for the development of type 2 diabetes. Most people with pre-diabetes will develop type 2 diabetes within 10 years, unless they lose five to seven per cent of their body weight by changing their diet and becoming more physically active.

In addition, people with pre-diabetes also have a higher risk of heart disease.

### Major risk factors for insulin resistance and pre-diabetes

- being overweight or obese;
- having a parent, brother, or sister with diabetes;
- being Indigenous Australian, Asian, Indian, Pacific Islander;
- having a prior history of gestational diabetes or birth of at least one baby weighing more than nine pounds;
- having high blood pressure measuring 140/90 or higher;
- having abnormal cholesterol with low HDL ("good") cholesterol and high triglyceride level; and
- being physically inactive.

### Preventing and managing insulin resistance and pre-diabetes

Progression to diabetes from pre-diabetes is not inevitable. Research



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indicates that weight loss and increased physical activity among people with insulin resistance and pre-diabetes can return blood glucose levels to normal and prevent diabetes. Even a small amount of weight loss can make a big difference to a person's metabolism.

Be active:

- walk when you can instead of driving or taking public transport;
- use the stairs not the elevator; and
- seek out an activity you enjoy.

Review what you eat and eat less:

- cut down on saturated fats (fat in animal products like meat and dairy);
- avoid fast food;
- avoid processed food;
- avoid soft drink;
- reduce alcohol; and
- increase vegetables and fruit in your diet.

#### Medication to prevent diabetes

Metformin is a medication that is commonly used to treat diabetes. It is also used to manage insulin resistance in women with a condition called polycystic ovarian syndrome. It is the only medicine shown to be effective in the treatment of insulin resistance/pre-diabetes for diabetes prevention.

The Diabetes Prevention Program Outcomes Study (DPPOS) has shown that use of metformin (850 mg twice daily) encourages stable weight loss and will prevent/ delay the development of

diabetes. In this study the weight loss associated with metformin use was loss of fat tissue, not muscle. This is a pattern that is different to that seen with calorie restriction as cutting down calories can lead to loss of lean mass as well as fat. Importantly the long term use of metformin is safe and it is generally well tolerated.

#### Recent research findings from the Women's Health Research Program

We recently reported on the Vitamin D status of 2368 Australian women aged 70 years and over. We found that 88 per cent of the women not taking Vitamin D had a Vitamin D level below what is recommended for older women.

We also found that:

- less than 50 per cent of women aged 70 years and over had had their Vitamin D level measured by their GP;
- only 13 per cent of the women aged 70 years and over were on Vitamin D supplements despite a high rate of vitamin D deficiency; and
- older women who are overweight are more likely to have Vitamin D deficiency.

We concluded that the Vitamin D status of community dwelling older Australian women is inadequate, yet the use of supplements is low.

*Robinson PJ, Bell RJ, Lanzafame A, Kirby C, Weekes A, Piterman L, Davis SR The prevalence of Vitamin D deficiency and relationship with fracture risk in older women presenting in Australian general practice. Aust J Ageing 2011.*

## Get involved in research

### Antidepressants ruining your sex drive?

Are you a woman aged between 35 – 55 years, have been taking a stable dose of one of SSRIs (sertraline, citalopram, paroxetine, fluoxetine or fluvoxamine) or SNRIs (venlafaxine) for the past three months and are experiencing sexual difficulties and for which you would like to be treated.

If you would like more information, regarding this and other studies please visit our website: [womenshealth.med.monash.edu](http://womenshealth.med.monash.edu) or contact the Women's Health Research Program on 03 9903 0820 or by email on [womens.health@monash.edu](mailto:womens.health@monash.edu)