

## Type 2 Diabetes: An issue that starts in the womb

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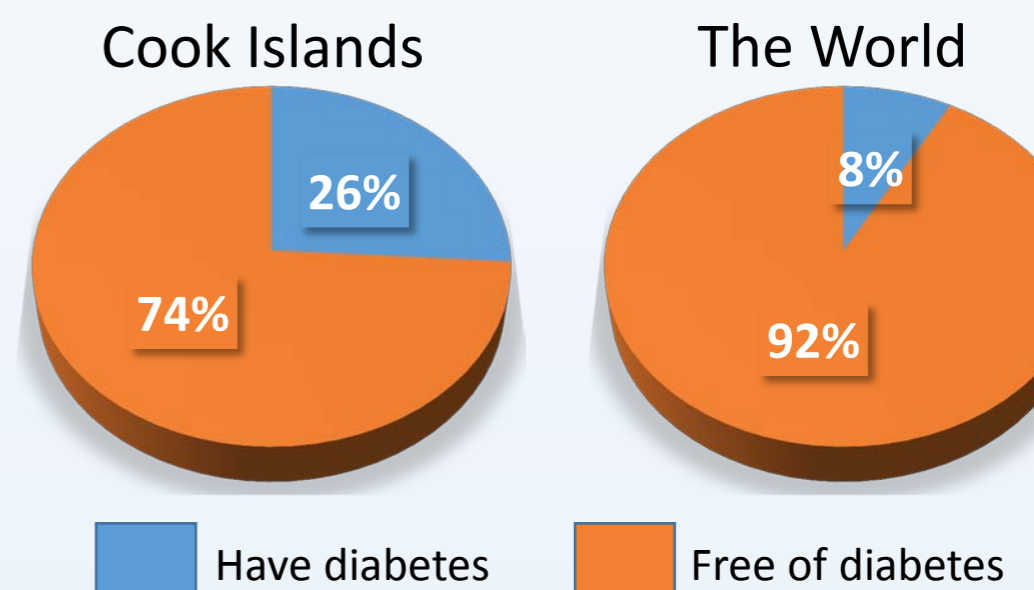
### Research Question

How does the environment in the womb contribute to the risk of developing type 2 diabetes?

### Why is type 2 diabetes an issue for the Cook Islands?

- As obesity rates increase, the risk of developing type 2 diabetes increases.
- Type 2 diabetes used to be a disease more often seen in older people, but now it is becoming more common in younger adults.
- 82% of Cook Island adults do not get the recommended 3 servings of vegetables and 2 servings of fruit every day.
- 75% of Cook Island adults are not achieving the recommended 150 minutes of physical activity every week.
- High levels of carbohydrates are common in the diets of Cook Islanders.

### Adults with Diabetes (%)



### What is type 2 diabetes?

- Type 2 diabetes is a disease where there is too much sugar in the blood.
- This can be because the pancreas is not making enough insulin or the body has become resistant to insulin (when the insulin is made but the body cannot use it).

#### Symptoms:

- Tired, thirsty, frequent toilet visits, frequent infections, eyesight problems, feeling hungry

#### Impact:

- Type 2 diabetes can lead to heart attacks, stroke, eye damage and blindness, kidney damage and amputations.

### My recommended actions

#### Get information!

Mums and soon-to-be mums should find out what is best for a healthy pregnancy. They should talk to doctors, midwives and health specialists to find out what a good diet for them and their baby looks like.

#### Take action!

Eat a varied diet, including:

- 6 to 11 servings of bread and grains,
- 2 to 4 servings of fruit,
- 4+ servings of vegetables,
- 4 servings of dairy products,
- 3 servings of protein,
- 3+ servings of iron-rich foods,
- vitamins C and A[1].

A mother with diabetes should eat around one-third of her usual amount of carbohydrates, lean meat, 5+ fruit or vegetables, and no fat[2].



### The environment in the womb and type 2 diabetes.

#### What's the connection?

- The Developmental Origins of Health and Disease theory is the idea that the nutritional environment we experience in the womb not only shapes our health at birth and in infancy, but through the rest of our adult lives.
- This theory was first suggested in the 1980s by Professor David Barker to clarify an apparent paradox: as British wealth grew, so did heart disease.
- Researchers are beginning to believe that the nine months of pregnancy are the most important part of our development, permanently affecting how our brain operates and the utility of organs. The environment we experience in the womb forms everything, from our vulnerability to disease to appetite and metabolism[3].

**David Barker,**  
University of  
Southampton

- Rather than lifestyle, people's weight at birth would predict whether that person would develop heart disease or not.
- As a result of poor nutrition in the womb during development, the fetus would grow slowly, thus prompting the infant to have heart disease, type 2 diabetes and hypertension later on in adult life.

**Robert Lane,**  
University of  
Utah[4]

- Rat fetuses receiving poor nutrition in the womb become genetically primed to be born into an environment lacking proper nutrition.
- The genetic code of the fetus is programmed to adapt to the environment it would be born in, so the code would assume a lack of nutrition/food after birth.
- As a result, these rats would be born smaller than normal rats, thus opening up a door for risks of future health problems.

**Jane Cleal,**  
University of  
Southampton

- In studies with ewes, the developing fetuses prepare for the world outside by using the health of their mother to tell what they will experience, and they adapt to that environment.
- If the lambs are undernourished in the womb and are well fed after birth, this is an incompatibility because the lamb was prepared for hardship and therefore will not do well in this different and unexpected environment.
- When the nutrition before and after birth don't match up, the lamb is poorly adapted to the world and may have health problems later in life.

#### References:

1. Web MC – Eating right while pregnant (<http://www.webmd.com/baby/guide/eating-right-when-pregnant>)
2. Conversation with Dr Yin Yin May Aung, Head of OBGYN Department, Rarotonga Hospital, PO Box 292, Rarotonga, Cook Islands
3. <http://chriskresser.com/health-begins-in-the-womb-and-even-before/>
4. <http://www.sciencedaily.com/releases/2009/04/090413150743.htm>