

Type 2 Diabetes and the Adolescent and Young Adult

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Disclosures

- ▶ I have received travel grants and speaking fees from Sanofi, Lilly and NovoNordisk
- ▶ No input from outside sources in my talk today

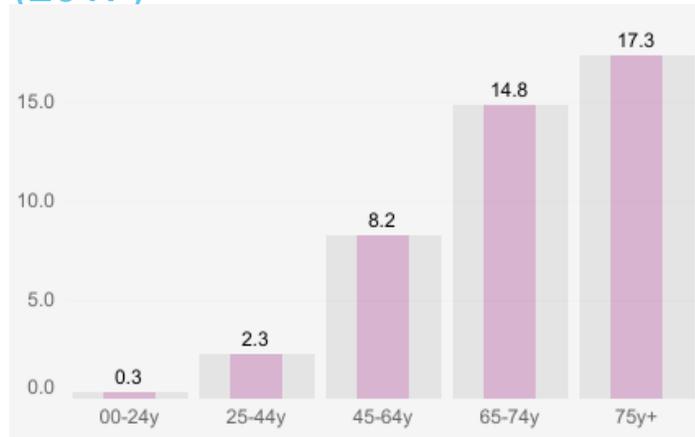
WHO classification

- ▶ Onset of Type 2 Diabetes Mellitus before the age of 40 (but excluding secondary diabetes).

Hypothesis

- ▶ Type 2 diabetes in young people is a distinct pathological entity characterized by a more aggressive phenotype than when the disease occurs later in life

Prevalence of Diabetes by age in New Zealand (2017)



Virtual Diabetes Registry (MOH)

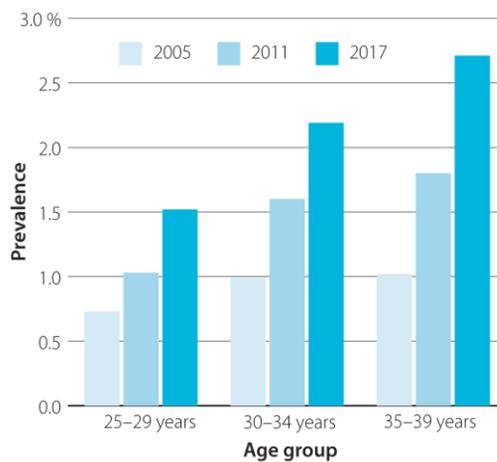


Figure 1: Changes in the prevalence of diabetes from 2005-2017 in adults aged 25-39 years in New Zealand. Source: Virtual Diabetes Register and Statistics New Zealand

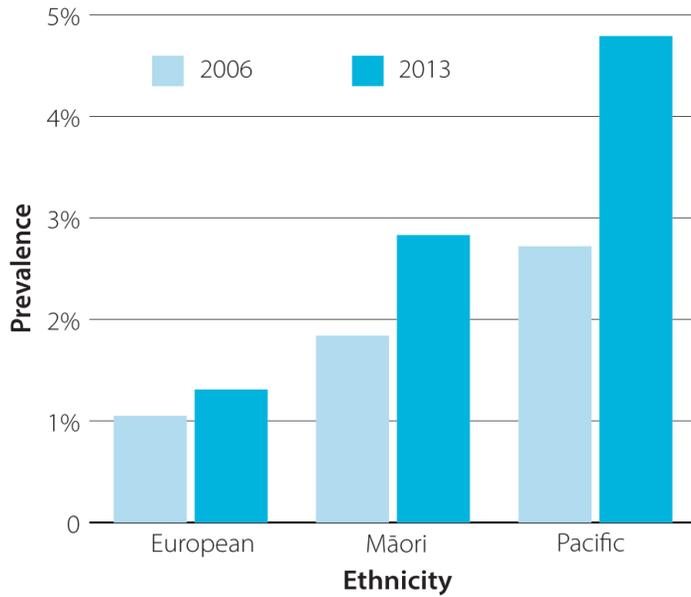


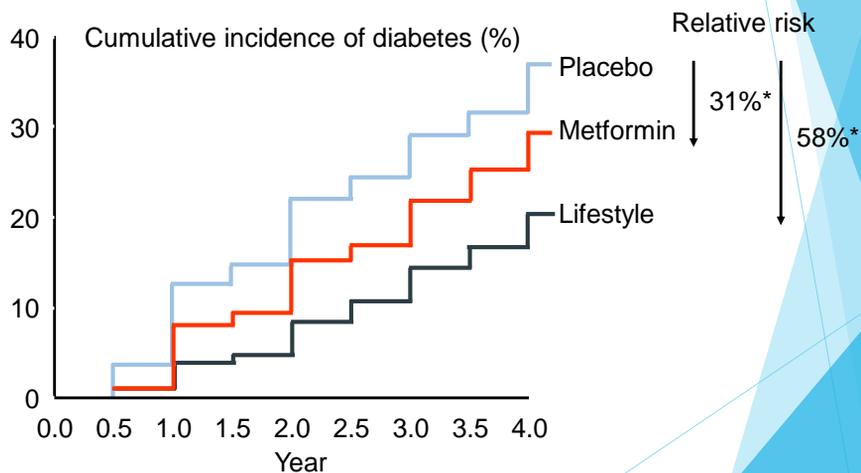
Figure 2: The prevalence of diabetes in adults aged 25–39 years by ethnicity, calculated from entries in the Virtual Diabetes Register compared to the population of the same age and ethnicity at the 2006 and 2013 censuses. Source: Virtual Diabetes Register and Statistics New Zealand

- ▶ For Type 2 DM age less than 40 there is a 2:1 ratio of female to male

Many young people have an increased risk of developing type 2 diabetes

- ▶ Prediabetes (Hba1c 41-49)
 - ▶ Increased progression to type 2 diabetes
 - ▶ Increased cardiovascular risk
- ▶ 16% of New Zealand population <45 have prediabetes
- ▶ In Auckland 40% of Maori/Pacific/Indian age 35-39 have prediabetes

Diabetes Prevention Program



DPP-N Engl J Med. 2002; 346: 393-403

▶ Same risk factors that increase risk in older people with T2DM also influence risk in younger people

- ▶ Age
- ▶ Family history
- ▶ Weight
- ▶ History of gestational diabetes
- ▶ Poor diet
- ▶ Lack of exercise

▶ Those that have T2DM earlier tend to have more risk factors

Pathophysiology

▶ Obesity induced mechanisms

- ▶ 80% of young vs 56% in older onset
- ▶ 2015 study at Auckland Diabetes Centre showed BMI of those under 40 with T2DM medium BMI 38
- ▶ Weight alone however not an absolute predictor

Pathophysiology

- ▶ Decline in beta cell function
 - ▶ Loss accelerated in young onset type 2 diabetes
 - ▶ One study showed 20-35% annual decline in function (average in late onset is about 7%)

Who to test for Type 2 Diabetes

- ▶ Screening Guidelines
- ▶ Opportunistic testing

Ministry of Health Website

- ▶ You should get a heart and diabetes check if you are in one of these groups:
 - ▶ Māori, Pacific and South-Asian men over 30 and women over 40
 - ▶ European men over 45 and European women over 55
 - ▶ you have a family history of heart problems
 - ▶ for people with a severe mental illness, a CVD assessment is recommended from age 25.



New Zealand **Primary Care Handbook 2012**

Cardiovascular risk assessment and diabetes screening
Cardiovascular risk factor management
Management of type 2 diabetes

Age at which to start cardiovascular disease risk assessment in adults (NZGG 2009)

1. Asymptomatic people without known risk factors: Men at age 45; women at age 55	
2. Māori, Pacific and Indo-Asian peoples*: Men at age 35; women at age 45 years	
3. Screening is recommended 10 years earlier in the presence of other known cardiovascular risk factors or in those at high risk of developing diabetes	
Family history risk factors	<ul style="list-style-type: none"> • Diabetes in first-degree relative (parent, brother or sister) • Premature coronary heart disease or ischaemic stroke in a first-degree relative (father or brother <55 years, mother or sister <65 years)
Personal history risk factors	<ul style="list-style-type: none"> • People who smoke (or who have quit only in the last 12 months) • Gestational diabetes • Polycystic ovary syndrome • Prior blood pressure $\geq 160/95$ mm Hg • Prior TC:HDL ratio ≥ 7 • Known borderline HbA1c (41-49 mmol/mol) or fasting glucose 6.1-6.9 mmol/l • BMI ≥ 30 kg/m² or truncal obesity (waist circumference ≥ 94 cm in men or ≥ 80 cm in women) • Estimated glomerular filtration rate (eGFR) < 60 ml/min/1.73m²
4. People with diabetes (annually from the time of diagnosis)	

Additional recommendations

- ▶ Opportunistic screening for type 2 diabetes in adults >25 with:
 - ▶ IHD/PVD/CVA
 - ▶ On long term steroids or antipsychotic treatment
 - ▶ Obese -BMI > 30 (or >27 in Indo-Asian population)
 - ▶ Family history of early age of onset type 2 diabetes in more than one first degree relative
 - ▶ Past history of gestational diabetes

Additional recommendations

- ▶ Obese children or young adults (BMI >30 or >27 in Indo-Asian) should be screened if
 - ▶ Family history of early onset type 2 diabetes
 - ▶ Maori, Pacific or Indo-Asian ethnicity

Be aware of other possible diagnosis

- ▶ T1DM
- ▶ Monogenic
- ▶ Acromegaly
- ▶ Cushing's Syndrome

Why important

- ▶ This is the group who develop the most complications
- ▶ Increased morbidity and mortality (compared to older type 2 and to same age type 1)

Complications

- ▶ If diagnosed between 20-40 years of age life expectancy reduced by 14 years in men and 16 years in women compared to those without diabetes

Complications

- ▶ Associated with
 - ▶ Hypertension
 - ▶ Hyperlipidaemia
 - ▶ Fatty liver

Complications

- ▶ Microvascular complications
 - ▶ 4x increased risk of renal failure compared to same age T1DM
 - ▶ 3x higher chance of peripheral neuropathy compared to same age T1DM
 - ▶ Increased retinopathy x2
 - ▶ Increased neuropathy x2

Complications

- ▶ Macrovascular complications
 - ▶ 2x higher risk compared to late onset T2DM
 - ▶ 14X higher risk of Myocardial infarction compared to those without diabetes (age matched)

Complications

- ▶ Reduced fertility
- ▶ Reduced hearing
- ▶ Cognitive function decline
- ▶ Mood disorders

Treatment

- ▶ Little evidence in this age group
- ▶ Most of big T2DM trials are of older people
- ▶ Treatment is extrapolated from this data

Treatment

- ▶ The same as anyone with type 2 diabetes
- ▶ But you need to be (and can be) more aggressive with treatment

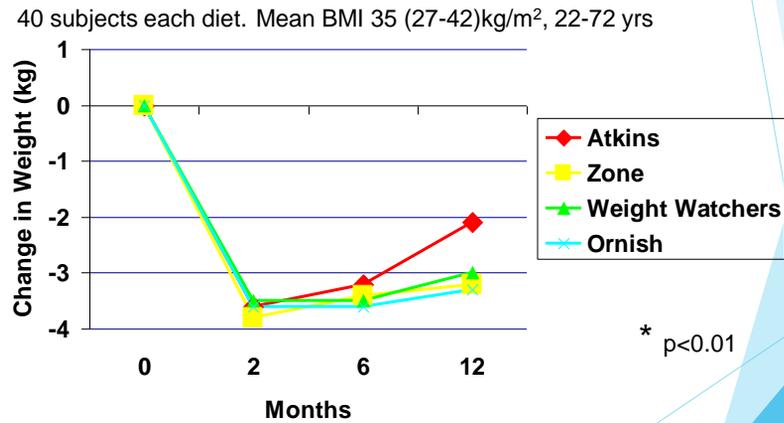
Lifestyle

- ▶ Still the cornerstone of treatment
- ▶ Weight loss has the ability to improve and reverse diabetes
- ▶ Also important to be aggressive in those young with prediabetes
- ▶ Consider bariatric surgery

Dietary advice

- ▶ A healthy balanced diet
- ▶ No particular diet is better than any other
 - ▶ The secret is sticking to it
 - ▶ Need to be able to incorporate into own lifestyle
 - ▶ Need to be able to afford

Comparison of Atkins, Ornish, Weight Watchers and Zone



Dansinger *et al.* JAMA 2005;293:43

Medication



Medication

- ▶ Metformin still first choice
- ▶ Sulphonylureas do not work very well
- ▶ Early use of insulin often necessary

What about the newer classes of medication?

- ▶ DPP4 inhibitors
 - ▶ Vildagliptan
- ▶ GLP agonists
- ▶ SGLT2 inhibitors

What about the newer classes of medication?

- ▶ The answer is we just don't know
 - ▶ Most Type 2 studies are in older people
 - ▶ No specific studies in younger people

These are not an easy group

- ▶ Frequent non attenders to diabetes clinics
- ▶ Infrequent visitors to general practice
- ▶ Often not good at taking their medications
- ▶ Often lower socioeconomic group
- ▶ Sometimes the amount of effort needed is taxing for all involved
- ▶ Need to get whole family/whanau involved

- ▶ Trying to keep young people engaged
- ▶ Not to “tell them off”
- ▶ Accept periods of poorer control
 - ▶ It is in the past anyway and you can’t change it
- ▶ Be aware that “life gets in the way”
 - ▶ Work
 - ▶ Money issues
 - ▶ Transport issues
 - ▶ School
 - ▶ Children

Celebrate your successes

- ▶ Any improvement is an improvement

