# DIABETES CARE 2018: WHAT'S NEW

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ENDOCRINOLOGIST

GREENLANE SUMMER GP SYMPOSIUM 2018

Theme: Preventive Medicine

10 February 2018

Novotel Ellerslie,
72-112 Green Lane East, Ellerslie,
Auckland

8am-4.30pm

The Cardiology Institute and the Greenlane Medical Specialists are hosting the Greenlane Summer GP Symposium. It is a primary care focused, multi-specialty, interactive symposium.

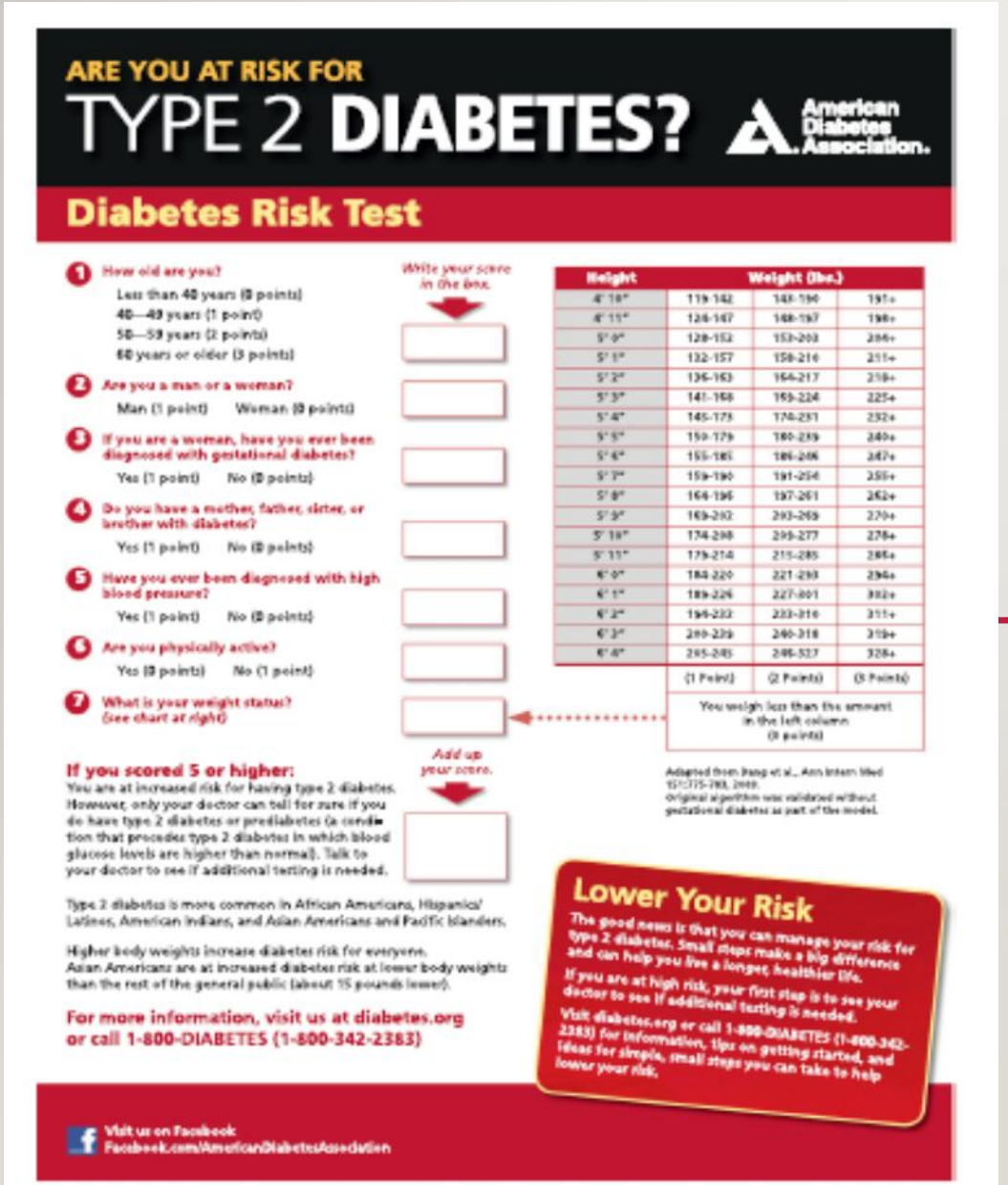
To register, please
- email: symposium@cardiologist.co.nz
- visit: cardiologyinstitute.co.nz
- call: 09-980-6363

Please RVSP by 3rd February 2018

Cardiology Institute

Greenlane Medical Specialists

# PREVENTION AND DELAY OF TYPE 2 DIABETES



ARE YOU AT RISK FOR

# TYPE 2 DIABETES?

American Diabetes Association.

## Diabetes Risk Test

1. How old are you?
   - Less than 40 years (0 points)
   - 40–49 years (1 point)
   - 50–59 years (2 points)
   - 60 years or older (3 points)

2. Are you a man or a woman?
   - Man (1 point)
   - Woman (0 points)

3. If you are a woman, have you ever been diagnosed with gestational diabetes?
   - Yes (1 point)
   - No (0 points)

4. Do you have a mother, father, sister, or brother with diabetes?
   - Yes (1 point)
   - No (0 points)

5. Have you ever been diagnosed with high blood pressure?
   - Yes (1 point)
   - No (0 points)

6. Are you physically active?
   - Yes (0 points)
   - No (1 point)

7. What is your weight status? (see chart at right)

Write your score in the box.

Add up your score.

| Height | Weight (lbs.) | | |
|---|---|---|---|
| 4' 10" | 119-142 | 143-190 | 191+ |
| 4' 11" | 124-147 | 148-197 | 198+ |
| 5' 0" | 128-152 | 153-203 | 204+ |
| 5' 1" | 132-157 | 158-210 | 211+ |
| 5' 2" | 136-163 | 164-217 | 218+ |
| 5' 3" | 141-168 | 169-224 | 225+ |
| 5' 4" | 145-173 | 174-231 | 232+ |
| 5' 5" | 150-179 | 180-239 | 240+ |
| 5' 6" | 155-185 | 186-246 | 247+ |
| 5' 7" | 159-190 | 191-254 | 255+ |
| 5' 8" | 164-196 | 197-261 | 262+ |
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| 5' 10" | 174-208 | 209-277 | 278+ |
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| 6' 0" | 184-220 | 221-293 | 294+ |
| 6' 1" | 189-226 | 227-301 | 302+ |
| 6' 2" | 194-232 | 233-310 | 311+ |
| 6' 3" | 200-239 | 240-318 | 319+ |
| 6' 4" | 205-245 | 246-327 | 328+ |
| | (1 Point) | (2 Points) | (3 Points) |
| | You weigh less than the amount in the left column (0 points) | | |

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009. Original algorithm was validated without gestational diabetes as part of the model.

**If you scored 5 or higher:**
You are at increased risk for having type 2 diabetes. However, only your doctor can tell for sure if you do have type 2 diabetes or prediabetes (a condition that precedes type 2 diabetes in which blood glucose levels are higher than normal). Talk to your doctor to see if additional testing is needed.

Type 2 diabetes is more common in African Americans, Hispanics/Latinos, American Indians, and Asian Americans and Pacific Islanders.

Higher body weights increase diabetes risk for everyone. Asian Americans are at increased diabetes risk at lower body weights than the rest of the general public (about 15 pounds lower).

**For more information, visit us at diabetes.org or call 1-800-DIABETES (1-800-342-2383)**

### Lower Your Risk

The good news is that you can manage your risk for type 2 diabetes. Small steps make a big difference and can help you live a longer, healthier life.

If you are at high risk, your first step is to see your doctor to see if additional testing is needed.

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Visit us on Facebook
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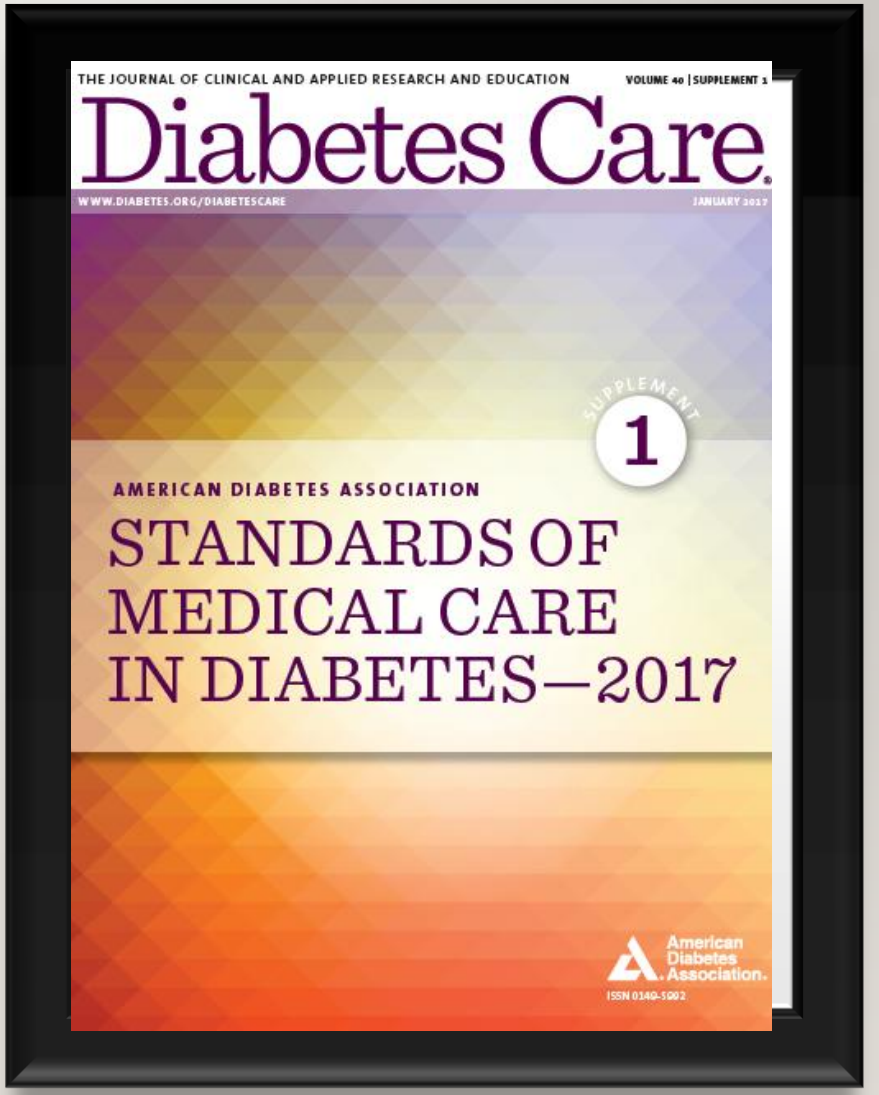
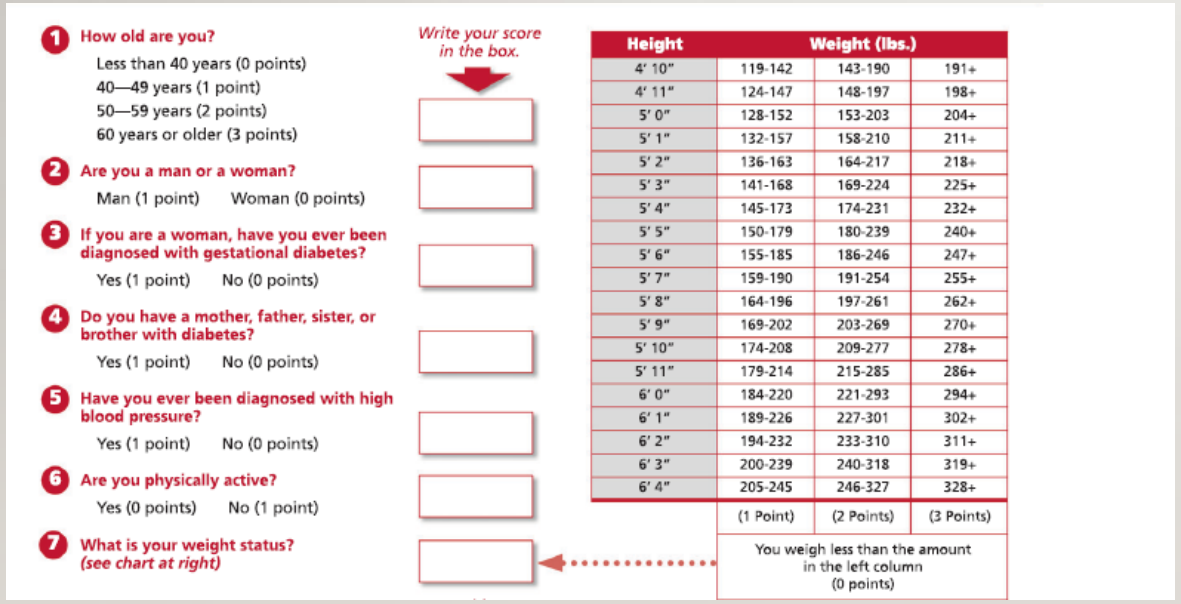



142 pages document

# ADA RISK TEST



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# NEW ZEALAND MOH GUIDELINE

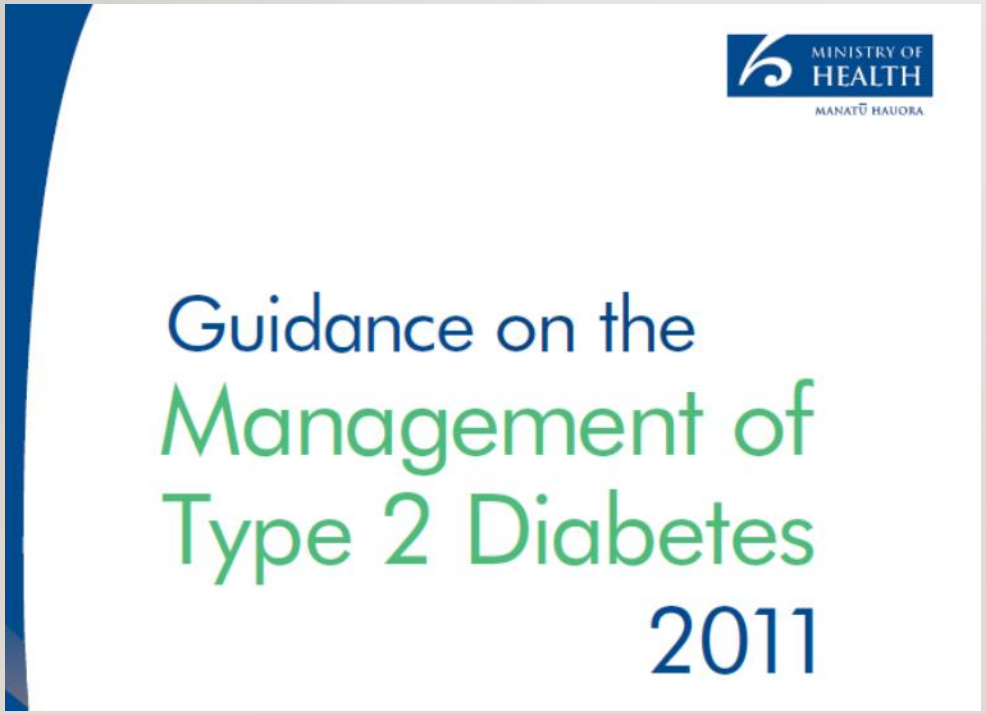



**Table 1** Who should be screened for type 2 diabetes?

| | |
|---|---|
| People undergoing cardiovascular risk assessment | Table 2 specifies people requiring risk assessment and the age at which risk assessment should start |
| Other selected adults over 25 years | NZSSD recommends opportunistic screening for a person:<br>• with ischaemic heart disease (angina or myocardial infarction), cerebrovascular disease or peripheral vascular disease<br>• on long-term steroid or antipsychotic treatment |
| Obese children and young adults (BMI ≥30 kg/m² or BMI ≥27 kg/m² for Indo-Asian* peoples) | NZSSD recommends screening if:<br>• there is a family history of early onset type 2 diabetes; or<br>• they are of Māori, Pacific or Indo-Asian* ethnicity |

* **Indo-Asian** Indian, including Fijian Indian, Sri Lankan, Afghani, Bangladeshi, Nepalese, Pakistani, Tibetan.

**Table 2.3—Criteria for testing for diabetes or prediabetes in asymptomatic adults**

1. Testing should be considered in overweight or obese (BMI ≥25 kg/m$^2$ or ≥23 kg/m$^2$ in Asian Americans) adults who have one or more of the following risk factors:
   - A1C ≥5.7% (39 mmol/mol), IGT, or IFG on previous testing
   - first-degree relative with diabetes
   - high-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
   - women who were diagnosed with GDM
   - history of CVD
   - hypertension (≥140/90 mmHg or on therapy for hypertension)
   - HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)
   - women with polycystic ovary syndrome
   - physical inactivity
   - other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans).
2. For all patients, testing should begin at age 45 years.
3. If results are normal, testing should be repeated at a minimum of 3-year intervals, with consideration of more frequent testing depending on initial results (e.g., those with prediabetes should be tested yearly) and risk status.

**Table 2.5—Testing for type 2 diabetes or prediabetes in asymptomatic children* (46)**

Criteria

- Overweight (BMI >85th percentile for age and sex, weight for height >85th percentile, or weight >120% of ideal for height)

Plus any two of the following risk factors:

- Family history of type 2 diabetes in first- or second-degree relative
- Race/ethnicity (Native American, African American, Latino, Asian American, Pacific Islander)
- Signs of insulin resistance or conditions associated with insulin resistance (acanthosis nigricans, hypertension, dyslipidemia, polycystic ovary syndrome, or small-for-gestational-age birth weight)
- Maternal history of diabetes or GDM during the child's gestation

Age of initiation: age 10 years or at onset of puberty, if puberty occurs at a younger age

Frequency: every 3 years

*Persons aged ≤18 years.

# ATYPICAL DIABETES

## MODY

- GCK; HNF1A(MODY3); HNF4A (MODY1) – commonest
- All children diagnosed in first 6 months of life
- Early adulthood, successive generations, not typical for T2D or T1D

## ATYPICAL TYPE 1

- Negative antibodies (idiopathic)

[*Autoimmne/LADA (positive antibodies)]*

- Consider referring relatives of those with T1D for antibody testing

# DIABETES PREVENTION

- High risk group are ideal candidates…
- HbA1c 39-47 mmol/mol (5.7-6.4%);
- IFG (5.6-6.9mmol/L);
- IGT (7.8-11.0mmol/L)

| **Table 2.4—Categories of increased risk for diabetes (prediabetes)*** |
|---|
| FPG 100 mg/dL (5.6 mmol/L) to 125 mg/dL (6.9 mmol/L) (IFG) |
| OR |
| 2-h PG in the 75-g OGTT 140 mg/dL (7.8 mmol/L) to 199 mg/dL (11.0 mmol/L) (IGT) |
| OR |
| A1C 5.7–6.4% (39–47 mmol/mol) |

*For all three tests, risk is continuous, extending below the lower limit of the range and becoming disproportionately greater at the higher end of the range.

# DIABETES PREVENTION PROGRAM (DPP)

***Strongest evidence of diabetes prevention***

- 1996-2001
- RCT;
- N=3234; age >25 or older
- High risk of diabetes (IGT, IFG 5.3-6.9; BMI>24 or 22 in Asian)
- Placebo (n=1082); metformin (n=1073) 850mg bd; intensive lifestyle intervention (ILS) (n=1079) aiming for 7% weight loss (low energy, low fat diet & >150min/week of moderate intensity exercise)
- Stopped a year ahead of schedule – demonstrated efficacy of metformin & ILS

# DIABETES PREVENTION PROGRAM (DPP)

- Primary findings (published 2002): ILS and metformin group had a respective 58% and 31% lower incidence of diabetes than placebo group over 3 years
- At the end of DPP, all participants were offered lifestyle education. 88% of surviving DPP cohort continued FU in the DPP Outcomes Study (DPPOS) – metformin reduced incidence of diabetes by 31% compared to placebo (greater effects in obese, higher FBS or history of GDM) – risk reduction of 18% over 10 & 15 years post randomisation
- Also a/w 28% lower risk of microvascular complications across treatment arms
- Recent findings suggest metformin may reduce atherosclerosis development in men

# INTENSIVE LIFESTYLE INTERVENTION *(VS PLACEBO)*
## *RISK REDUCTION IN DIABETES INCIDENCE*

- DPP (USA 2002, n=3234) : 58% over 3 years
- DPPOS : 34% at 10 years

- Da Qing Study (China 1997, n=522) : 43% at 20 years
- Finnish Diabetes Prevention Study (Finland 2001, n=522) : 43% at 7 years

# WHY CHOOSE 7% WEIGHT LOSS GOAL

- Feasible to achieve and maintain
- Likely to lessen risk to develop diabetes
- Pace: to lose 1-2 lb/week (over 6 months)
- Subtracting 500-1000 calories/day

# NUTRITION / CALORIC RESTRICTION

- Caloric reduction is of paramount importance!
- Quality of fat is more important than quantity
- Mediterranean diet may help to prevent T2D
- Encourage: whole grain, nuts, berries, yoghurt, (tea & coffee)
- Discourage: red meat, sugar-sweetened beverages
- Individualized plan

# PHYSICAL ACTIVITY

- At least 150 min/week of moderate intensity exercise (similar to intensity of brisk walking)
- Include both aerobic and resistance training
- Breaking up sedentary time
- Could lower postprandial BG
- Prevent GDM

# NEW TECHNOLOGY PLATFORM

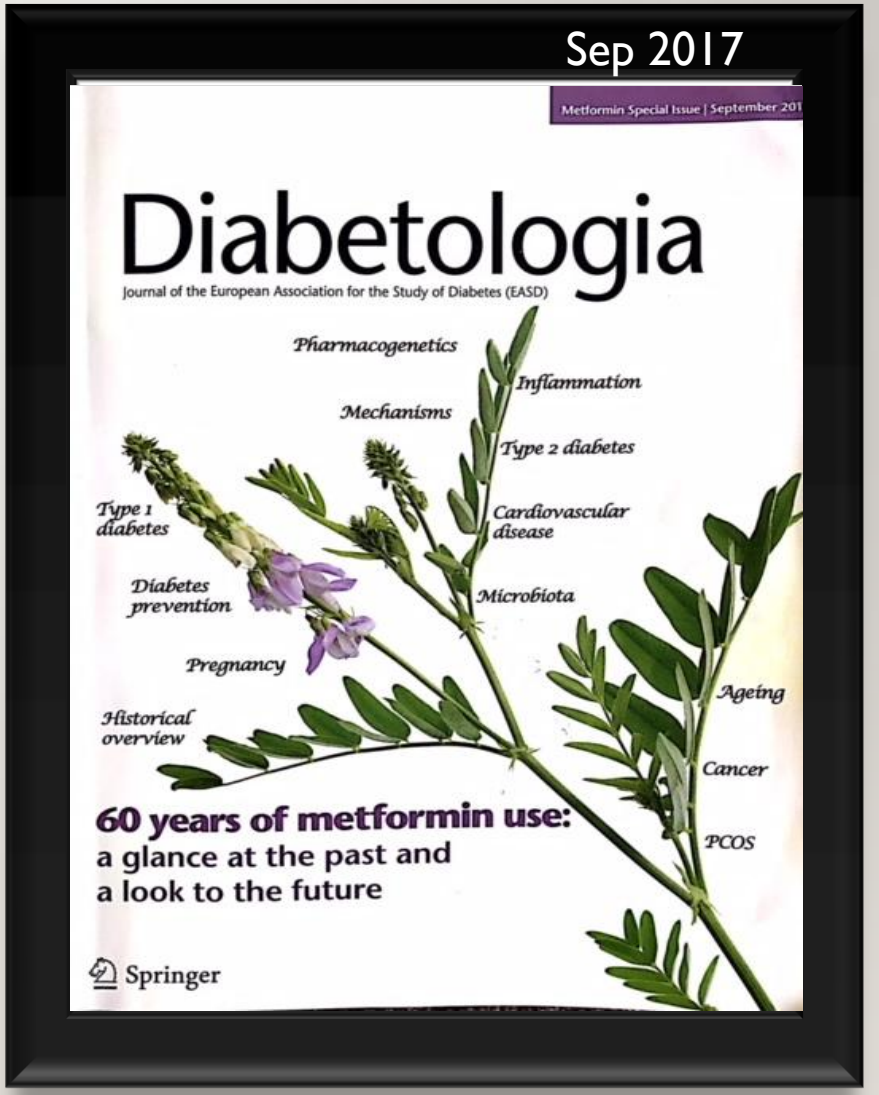
- DVD-based
- Virtual small groups
- Internet driven social network
- Mobile Apps

PHARMACOLOGIC INTERVENTION
FOR DIABETES PREVENTION

# Metformin

***Undisputed queen among T2D drugs***

(Acarbose, Orlistat, GLP-1 receptor agonist, TZD)



# LANDMARK EVENTS IN HISTORY OF METFORMIN FOR MANAGEMENT OF T2D

- 1772 *Galega officinalis* (goat's rue, French lilac, Italian fitch, Spanish sainfoin, professor weed) used to treat symptoms of diabetes
- 1878 Synthesis of biguanide
- 1928 Use of metformin in animal
- 1930 Insulin available
- ***1957*** ***Jean Sterne published use of metformin to treat diabetes***
- 1958 Metformin introduced in UK & Europe
- 1972 Approved in Canada
- 1994 Metformin approved in USA
- 1998 UKPDS – long term metabolic effects & reduced CVD risk with use
- 2002 Metformin reduced progression of prediabetes
- 2005 IDF recommended metformin as first line therapy for T2D
- 2008 UKPDS follow up: continued reduction of CV risk with metformin
- 2011 Metformin included in WHO's essential medicine list

# METFORMIN

- Strongest evidence based
- Demonstrated long term safety data
- Less effective than lifestyle in diabetes prevention in DPP and DPPOS, but maybe cost-saving over 10-year period
- As effective as lifestyle in those with BMI >35
- In DPP, women with GDM, metformin& lifestyle cause 50% risk reduction
- Recommended option for high risk individuals
- Monitor B12 deficiency

# MORE BENEFITS OF METFORMIN

- Use in T1D reduces atherosclerosis progression, weight and LDL (REMOVAL study)
- GDM – good safety profile for mother, less severe hypo, reduced pregnancy weight gain, similar effects on newborn heath vs insulin
- Might inhibit the ageing process (reduces inflammation, ameliorates DNA and cellular damage).
- Human observational studies showed metformin decrease risk of CVD, cancer, depression & frailty. [*Upcoming clinical trials (VA-IMPACT;TAME; ePREDICE*)]
- Attractive candidate for drug repurposing for cancer prevention (interfere with cancer promoting signalling pathway)
- PCOS - ↓testosterone;↑pregnancy rate; ↑insulin sensitivity & glucose tolerance
- Changes in gut microbiota

# NEWER AGENTS (AVAILABLE IN NZ)

- **GLP-1 receptor agonist**
  1. Exenatide (Byetta®, Bydureon®)
  2. Liraglutide (Victoza) – coming soon

- **Dipeptidylpeptidase IV (DPP-IV) inhibitor**
  1. Sitagliptin (Januvia)
  2. Vildagliptin (Galvus)
  3. Saxagliptin (Onglyza)

- **Sodium-glucose co-transporter 2 (SGLT2) inhibitors**
  1. Dapaglifozin (Forxiga)

## Start with Monotherapy unless:

A1C is greater than or equal to 9%, **consider Dual Therapy.**

A1C is greater than or equal to 10%, blood glucose is greater than or equal to 300 mg/dL, or patient is markedly symptomatic, **consider Combination Injectable Therapy** (See Figure 8.2).

## Monotherapy — Metformin — Lifestyle Management

| | |
|---|---|
| **EFFICACY*** | high |
| **HYPO RISK** | low risk |
| **WEIGHT** | neutral/loss |
| **SIDE EFFECTS** | GI/lactic acidosis |
| **COSTS*** | low |

If A1C target not achieved after approximately 3 months of monotherapy, proceed to 2-drug combination (order not meant to denote any specific preference — choice dependent on a variety of patient- & disease-specific factors):

## Dual Therapy — Metformin + — Lifestyle Management

| | Sulfonylurea | Thiazolidinedione | DPP-4 inhibitor | SGLT2 inhibitor | GLP-1 receptor agonist | Insulin (basal) |
|---|---|---|---|---|---|---|
| **EFFICACY*** | high | high | intermediate | intermediate | high | highest |
| **HYPO RISK** | moderate risk | low risk | low risk | low risk | low risk | high risk |
| **WEIGHT** | gain | gain | neutral | loss | loss | gain |
| **SIDE EFFECTS** | hypoglycemia | edema, HF, fxs | rare | GU, dehydration, fxs | GI | hypoglycemia |
| **COSTS*** | low | low | high | high | high | high |

If A1C target not achieved after approximately 3 months of dual therapy, proceed to 3-drug combination (order not meant to denote any specific preference — choice dependent on a variety of patient- & disease-specific factors):

## Triple Therapy — Metformin + — Lifestyle Management

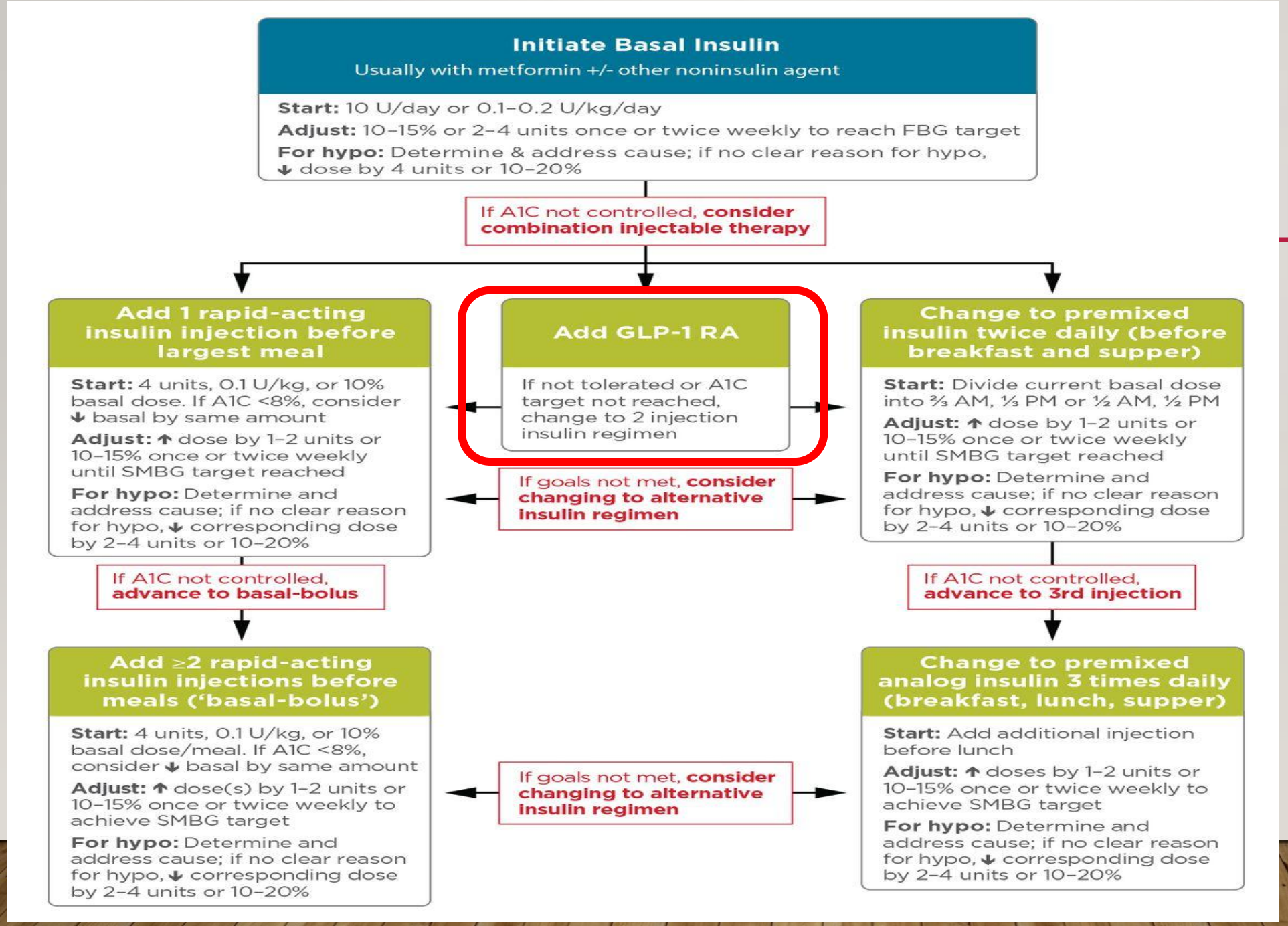
| Sulfonylurea + | Thiazolidinedione + | DPP-4 inhibitor + | SGLT2 inhibitor + | GLP-1 receptor agonist + | Insulin (basal) + |
|---|---|---|---|---|---|
| TZD | SU | SU | SU | SU | TZD |
| or DPP-4-i | or DPP-4-i | or TZD | or TZD | or TZD | or DPP-4-i |
| or SGLT2-i | or SGLT2-i | or SGLT2-i | or DPP-4-i | or SGLT2-i | or SGLT2-i |
| or GLP-1-RA | or GLP-1-RA | or Insulin[§] | or GLP-1-RA | or Insulin[§] | or GLP-1-RA |
| or Insulin[§] | or Insulin[§] | | or Insulin[§] | | |

If A1C target not achieved after approximately 3 months of triple therapy and patient (1) on oral combination, move to basal insulin or GLP-1 RA, (2) on GLP-1 RA, add basal insulin, or (3) on optimally titrated basal insulin, add GLP-1 RA or mealtime insulin. Metformin therapy should be maintained, while other oral agents may be discontinued on an individual basis to avoid unnecessarily complex or costly regimens (i.e., adding a fourth antihyperglycemic agent).

## Combination Injectable Therapy (See Figure 8.2)

AMERICAN DIABETES ASSOCIATION

STANDARDS OF MEDICAL CARE IN DIABETES—2017

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