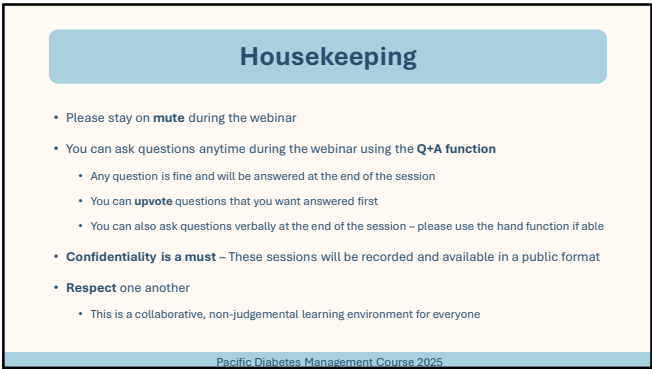
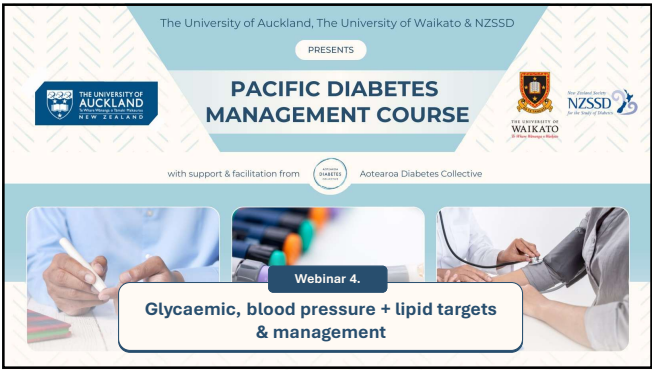




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What glycaemic target should I use?

- HbA1c
- Blood + interstitial glucose levels
- Time in range
- Fructosamine

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HbA1c

- Most practical target as reflects average glucose levels over the previous 3 months
- The 'target' HbA1c should be individualised + reviewed at least annually
- HbA1c should be measured 3 monthly until target + then 6 monthly once at target
- Measurement of HbA1c may be an unreliable target in the following scenarios:
 - Acute deterioration in glucose levels
 - Any haemoglobinopathy e.g. thalassaemia, sickle cell anaemia
 - Altered red cell turnover e.g. pregnancy, bleeding, iron deficiency, haemolysis etc.
 - Post blood transfusion

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HbA1c

- Most practical target as reflects average glucose levels over the previous 3 months

**If HbA1c is unreliable then either blood glucose levels or CGM are the best glycaemic targets.
Fructosamine is now rarely used but can be useful alternative to HbA1c**

- Measurement of HbA1c may be an unreliable target in the following scenarios:
 - Acute deterioration in glucose levels
 - Any haemoglobinopathy e.g. thalassaemia, sickle cell anaemia
 - Altered red cell turnover e.g. pregnancy, bleeding, iron deficiency, haemolysis etc.
 - Post blood transfusion

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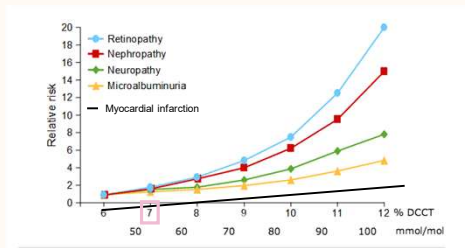
What should the target HbA1c be?

- The target HbA1c in most patients with diabetes is $< 53 \text{ mmol/mol}$ (7%)
- Target HbA1c $< 48 \text{ mmol/mol}$ (6.5%) is appropriate when the risk of hypoglycaemia is low AND if:
 - Young AND/OR
 - Considering pregnancy or pregnant AND/OR
 - Have diabetic microvascular complications – particularly retinopathy + nephropathy
- A higher target HbA1c e.g. $54 - 70 \text{ mmol/mol}$ (7 – 8.5%) is likely more appropriate if:
 - Risk of hypoglycaemia > benefits of tight glycaemic control
 - Life expectancy is limited by non-diabetes related comorbidities
 - Frail and/or elderly and/or cognitive impairment and/or functionally dependent

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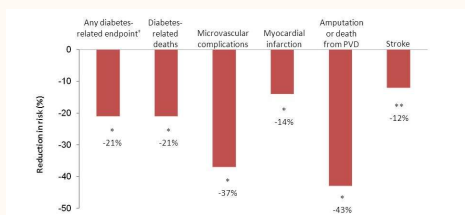
Risk of diabetic complications by HbA1c



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Remember a 11 mmol/mol (1%) reduction in HbA1c significantly reduces complications of diabetes

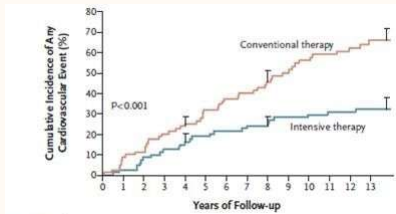


UKPDS, BMJ 2000; 321:405-412

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There is a legacy effect to improved glycaemia

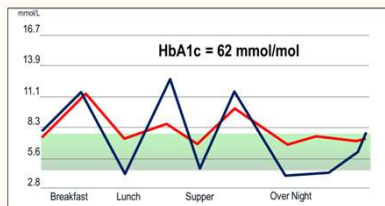


DOCT/EDIC, NEJM 2008; 358:580-91

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Not all HbA1cs are created equally



Glucose levels will always provide the best information but HbA1c useful guide for undetected dysglycaemia

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When should people monitor their glucose levels?

- Minimal recommended monitoring includes:
 - Whenever symptomatic of hypoglycaemia or hyperglycaemia → including if discrepancy from CGM
 - At least 3 – 4 times per day when unwell
 - Before they drive if on insulin and/or sulfonylureas
 - Fasting glucose levels whilst titrating basal insulin at night
 - Pre + 3-4 hours post meals whilst titrating sulfonylurea or bolus/premixed insulin at that meal (before meals + before bed typically suffices)
 - Pre + 1 or 2 hours post all meals in pregnancy
- People should also be encouraged to check glucose levels at other times as powerful educational tool
 - Checking levels before meals + bed on 1-2 days per week often preferable to sporadic checks

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When should people monitor their glucose levels?

Minimal recommended monitoring includes:

- Whenever symptomatic of hypoglycaemia or hyperglycaemia → including if discrepancy from CGM

CGM overcomes many of the limitations/difficulties of blood glucose monitoring

- Pre + 3-4 hours post meals whilst titrating sulphonylurea or sulphonylurea + basal premixed insulin at that meal (before meals + before bed typically suffices)
- Pre + 1 or 2 hours post all meals in pregnancy

- People should also be encouraged to check glucose levels at other times as powerful educational tool

- Checking levels before meals + bed on 1-2 days per week often preferable to sporadic checks

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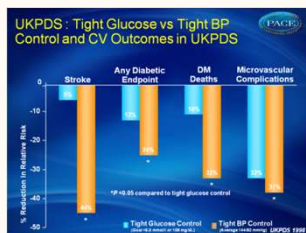
13

Blood pressure targets + management

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Importance of blood pressure control



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Importance of blood pressure control

UKPDS: Tight Glucose vs Tight BP Control and CV Outcomes in UKPDS

NB – there is no legacy effect of tight blood pressure control



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Blood pressure targets

- Measure blood pressure at every visit or at the least annually if to target + 3 monthly if not to target

- Lying/standing or sitting/standing BPs important
- Ambulatory or home BP monitoring useful if white coat hypertension is suspected
 - Heart Foundation NZ have a helpful resource + video
 - Healthify also have helpful resources and explanations



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Blood pressure targets

- Blood pressure targets should be individualised & dependent on presence of complications + CV risk

- If no microvascular or macrovascular complications AND 5 year CVD risk < 5%
 - target BP < 140/90 mmHg
- If microvascular OR macrovascular complications OR 5 year CVD risk > 10%
 - target systolic BP 120 – 129 mmHg
 - Low threshold for treating BP 130 – 139/80 – 89 mmHg if 5 year CV risk 5 – 9.9% in absence of complications
 - A systolic BP < 120 mmHg is not concerning if well tolerated + likely preferable if young or heart failure
 - Target should be relaxed to lowest reasonable and safely achievable if:
 - Frail and/or limited life expectancy
 - Age ≥ 85 years
 - Postural hypotension e.g. diabetic autonomic neuropathy
 - Diastolic BP is no longer a primary target

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Management of high blood pressure

- **Healthy living interventions important at all time → may reduce BP by ~ 10 mmHg**
 - Smoking, vaping + alcohol cessation
 - Low salt intake - < 2 g of sodium or < 5 g of salt per day
 - Leafy green vegetables + fruit per day to ensure adequate potassium intake
 - Mediterranean diet + Dietary Approaches to Stop Hypertension (DASH) are eating patterns with best long-term evidence
 - Avoiding medication that increase blood pressure e.g. NSAIDs
 - Increased physical activity + movement
 - Interventions for weight loss if overweight
 - 5% total body weight loss will improve blood pressure
 - ~10-15% total body weight loss often required for remission of hypertension

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Management of high blood pressure

- **Pharmacological management of hypertension is required if BP remains above target**
- **Choice of BP lowering agent dependent on presence of renal disease → particularly albuminuria (UACR > 3 mg/mmol):**
 - **If renal disease → start ACEi OR ARB + increase to maximal tolerated dose**
 - Add calcium channel blocker or thiazide diuretic if BP remains above target
 - Do not use ACEi + ARB in combination + ensure effective contraception in women of child bearing age
 - **If no renal disease → low dose calcium channel blocker AND ACEi OR ARB in combination**
 - Increase doses and then add thiazide diuretic if BP remains above target
 - ACEi/ARB do not prevent renal disease

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Management of high blood pressure

- **Benefits of each family of medications are 'class effects'**
- **Likely best medications available in each class:**
 - ACEi OR ARB candesartan → likely preferable to enalapril
 - CCB → felodipine likely preferable
 - Thiazide chlorthalidone likely preferable but bendroflumazide good alternative
- **Review patients at least 3 monthly until blood pressure to target → use opportunity to optimise other management**
 - Consider secondary causes of hypertension particularly if treatment resistant or patient is < 35 years of age

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Lipid targets + management

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Management of dyslipidaemia

- Healthy living interventions for dyslipidaemia important at all times
 - Avoid trans fats and reduce saturated fats + oils (e.g. coconut, lard, butter)
 - Limit processed + deep-fried foods
 - Unsaturated fats + oils (e.g. canola, rice, bran, avocado, olive oil etc.) may be useful alternatives
 - Increase intake of fruits, vegetables + wholegrain foods that bind excess cholesterol e.g. oats, barley, quinoa etc.
 - Reduced carbohydrate, saturated fat + alcohol intake important if hypertriglyceridaemia
 - Physical activity + movement will lower LDLc + TG & increase HDLc
 - Weight loss important if overweight
 - 10-15% weight loss may be required for remission but often strong genetic component of dyslipidaemia

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Management of dyslipidaemia

- Statins are recommended if any microvascular or macrovascular complications OR if 5 year CVD risk $\geq$ 10%
 - **Target LDLc is < 1.4 mmol/L**
 - Secondary targets include triglycerides < 1.8 mmol/L if CV disease + < 5.7 mmol/L if no CV disease
 - Statins also strongly recommended if 5 year CVD risk $> 5\%$ with target LDLc < 1.8 mmol/L
- Simvastatin is often ineffective in people with diabetes due to short half-life
- Consider rosuvastatin or ezetimibe if targets not reached on maximal tolerated doses of atorvastatin
 - Many people with diabetes will qualify for SA for rosuvastatin due to ethnicity and/or CV risk
 - Consider fibrates if TG + LDLc remain above target
 - PCSK9 inhibitors very effective but very expensive!

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LDLc lowering efficacy of different statins

Statin	27%	34%	41%	48%	55%	60%
Pravastatin	20 mg	40 mg				
Simvastatin	10 mg	20 mg	40 mg			
Atorvastatin		10 mg	20 mg	40 mg	80 mg	
Rosuvastatin			5 mg	10 mg	20 mg	40 mg

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Management of dyslipidaemia

- Ideally monitor non-fasting lipid studies 3 monthly + titrate therapy until LDLc < 1.4 mmol/L
- Definitive adverse effects of statins still relatively rare + ensure adequate contraception but teratogenicity low
- Atorvastatin + rosuvastatin can be taken at any time of the day & have similar safety profiles to other statins
 - Consider pravastatin if intolerant of other statins

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Take home messages

- HbA1c is best pragmatic glycaemic target in most with T2D but has limitations
 - Target HbA1c < 53 mmol/mol in most
 - Regular glucose levels will always provide the best information
- Effective control of blood pressure critical in prevention, delaying + slowing diabetic complications
 - Target systolic BP 120 – 129 mmHg in most if complications or high risk
 - If renal disease then start ACEi/ARB + increase to maximal tolerated dose
- Effective control of dyslipidaemia also important in prevention, delaying + slowing diabetic complications
 - Target LDLc < 1.4 mmol/L in most if complications or high risk
 - Atorvastatin or rosuvastatin +/- ezetimibe often required to reach targets in diabetes

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Take home messages

- HbA1c is best pragmatic glycaemic target in most with T2D but has limitations
 - Target HbA1c < 53 mmol/mol in most
 - Regular glucose levels will always provide the best information
- Healthy living interventions are always important in addition to pharmacological management
- Effective control of dyslipidaemia also important in prevention, delaying + slowing diabetic complications
 - Target LDLc < 1.4 mmol/L in most if complications or high risk
 - Atorvastatin or rosuvastatin +/- ezetimibe often required to reach targets in diabetes

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Upcoming webinars

- Lifestyle management, Metformin & Vitamin D**
Host: Monday September 27 at 8pm
Cook Islands: Monday September 27 at 8pm
Aotearoa NZ: Tuesday September 27 at 8pm
[Join this link](#)
- Sublingual & Insulin Management of Hyperglycaemia**
Host: Monday September 27 at 8pm
Cook Islands: Monday September 27 at 8pm
Aotearoa NZ: Tuesday September 27 at 8pm
[Join this link](#)
- New Diabetes Medication, Technology & Management algorithms**
Host: Monday September 27 at 8pm
Cook Islands: Monday September 27 at 8pm
Aotearoa NZ: Tuesday September 27 at 8pm
[Join this link](#)
- Optimising Blood Pressure & Lipid Targets + Management**
Host: Monday September 27 at 8pm
Cook Islands: Monday September 27 at 8pm
Aotearoa NZ: Tuesday September 27 at 8pm
[Join this link](#)
- Diabetes and Risk Management, Driving & Pregnancy**
Host: Monday September 27 at 8pm
Cook Islands: Monday September 27 at 8pm
Aotearoa NZ: Tuesday September 27 at 8pm
[Join this link](#)
- Management of Complications Related to Diabetes**
Host: Monday September 27 at 8pm
Cook Islands: Monday September 27 at 8pm
Aotearoa NZ: Tuesday September 27 at 8pm
[Join this link](#)
- Important Management of Diabetes**
Host: Monday September 27 at 8pm
Cook Islands: Monday September 27 at 8pm
Aotearoa NZ: Tuesday September 27 at 8pm
[Join this link](#)

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Case for discussion – Mr W

- 33 year old man with 10 year history of type 2 diabetes with HbA1c currently 52 mmol/mol on metformin alone
 - Known retinopathy
 - BP 138/82 mmHg & LDLc 3.2 mmol/L + TG 6.7 mmol/L
 - BMI 38 kg/m²
- What non-pharmacological + pharmacological management would you suggest?
- Would you add another glucose-lowering therapy?
- How often will you follow him up?

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Discussion

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