DIABETES

For Tairāwhiti general practice

A guide for clinical management in type 2 diabetes

HAURAKI PHO HAURAKI PRIMARY HEALTH ORGANISATION NETWORK

Pinnacle Midlands Health Network

Our aim is that a person with type 2 diabetes can go to any general practice in the Tairāwhiti DHB region and receive excellent care for their diabetes.

This folder is to give all nurses a resource for type 2 diabetes. It is filled with information from a variety of sources that are intended to support beginning nurses through to proficient nurses develop knowledge and clinical reasoning in diabetes care.

We have focused on clinical management and while we acknowledge there is much more to working with people who live with any long-term condition than simply clinical knowledge, that will have to be another folder!

We know that this will be a work in progress and will continue to evolve over the years, partially as information changes, but also as the needs of general practice changes.

We hope you find it useful. We always welcome feedback.

Suzanne and Anne

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Front cover: For Māori, the Harakeke plant is symbolic of whānau. The outer leaves tūpuna, inner leaves mātua, and the very inner leaf is the rito or pepe. Diabetes does not impact on just one person, the whole whānau is affected, the influences rippling across generations. It takes a whole whānau, and a whole healthcare system to support the person who lives with diabetes.
The harakeke or flax plant has many uses—the mostly widely known use is weaving, but did you know that the harakeke flowers pro- duce large amounts of nectar. This was traditionally used to sweeten food and drinks.

CONTENTS

CLINICAL MANAGEMENT IN TYPE 2 DIABETES

SCREENING FOR DIABETES

New Zealand Society for the Study of Diabetes (NZSSD) has recommended that HbA1c should be the first-line test for screening and diagnosis of type 2 diabetes.

Screening for Diabetes should be offered to:

- Patients presenting with signs and symptoms suggestive of diabetes
- As part of cardiovascular risk assessment (CVA). Note that the CVA criteria for screening changed in early 2018. Essentially the changes are to start testing earlier—particularly in high risk groups, and to discuss treatment options with people helping them to balance risk outcomes with treatment choices. A useful summary statement can be found on the best practice website site here: https://bpac.org.nz/2018/cvd.aspx
- Those who are at high risk of developing diabetes

  Identified risk factors for diabetes:

  1. Family history of Diabetes
  2. Pre-Diabetes (HbA1c 41-49mmol/L)
  3. History of Gestational Diabetes or large-for-dates babies
  4. On long term steroids or antipsychotics
  5. Polycystic Ovarian Syndrome
  6. Increased BMI: Adults and Children with a BMI>30kg/m2 (or >27kg/m2 in Indo-Asian children)
  7. Increased Waist Circumference: >94cm (Men) and >80cm (Women) (or >90cm (Men) and >80cm (Women) if Indo-Asian)

Note for woman with previous gestational diabetes:

Hba1c is checked by general practice 3 months post-delivery and at least annually thereafter depending on result. (sooner if HbA1c closer to 49).

Interpretation of Screening results - BPJ 2011:

HbA1c Result	Glucose	Diagnosis	Comment s
>50mmol/mol, with symptoms	>7.0mmol/L, with symptoms	**Diabetes**	
>50mmol/mol, no symptoms	>7.0mmol/L, no symptoms	**Diabetes**	A second HbA1c test >50mmol/mol us required to confirm diagnosis (After 3 months)
41-49mmol/mol	6.1-6.9mmol/L	**Pre-Diabetes**	Offer lifestyle advice. Perform CVD risk assessment and follow guidelines for treatment of risk. Repeat testing of HbA1c every 6-12 months
<40mmol/mol	<6.0mmol/L	**Diabetes Unlikely**	Normal range. Repeat HbA1c at next CVD assessment or when clinically indicated.

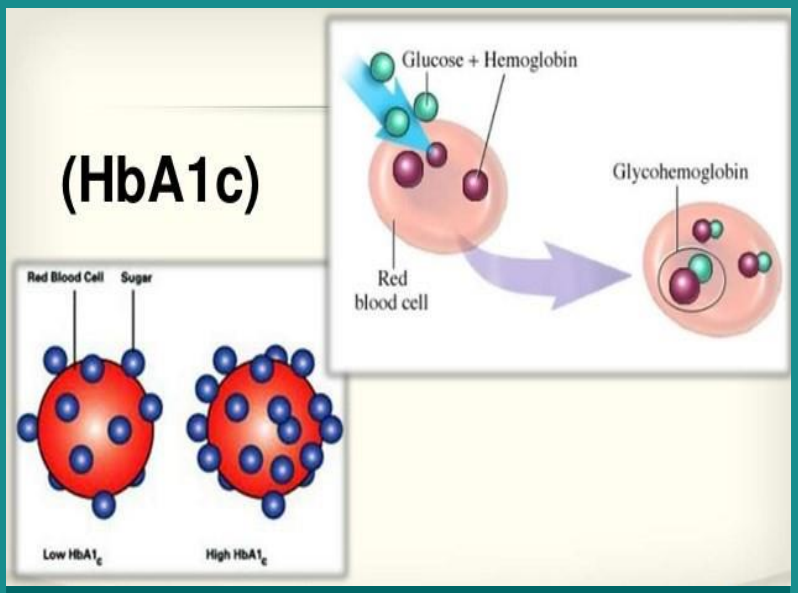
- Use of fasting plasma glucose is recommended when HbA1c results are borderline or further investigation of the result is necessary, such as when a patient has two differing HbA1c results.
- Fasting plasma glucose remains a valid test for diagnosing people with Type 2 Diabetes, including when HbA1c is not appropriate or cannot be used or may be inaccurate in patients with haemoglobinopathies with the direction of change depending on the specific diagnosis.

<u>Factors which can increase HbA1c:</u>

Alcohol intake
Iron or vitamin B_{12} deficiency
Hyperbilirubinaemia
Renal failure
Opiate use
Splenectomy

<u>Factors which can decrease HbA1c:</u>

Erythropoietin, iron or vitamin B_{12} administration
Ingestion of antioxidants such as vitamin C or E
Very high triglyceride levels
Chronic aspirin use
Splenomegaly
Rheumatoid arthritis
Use of antiretrovirals

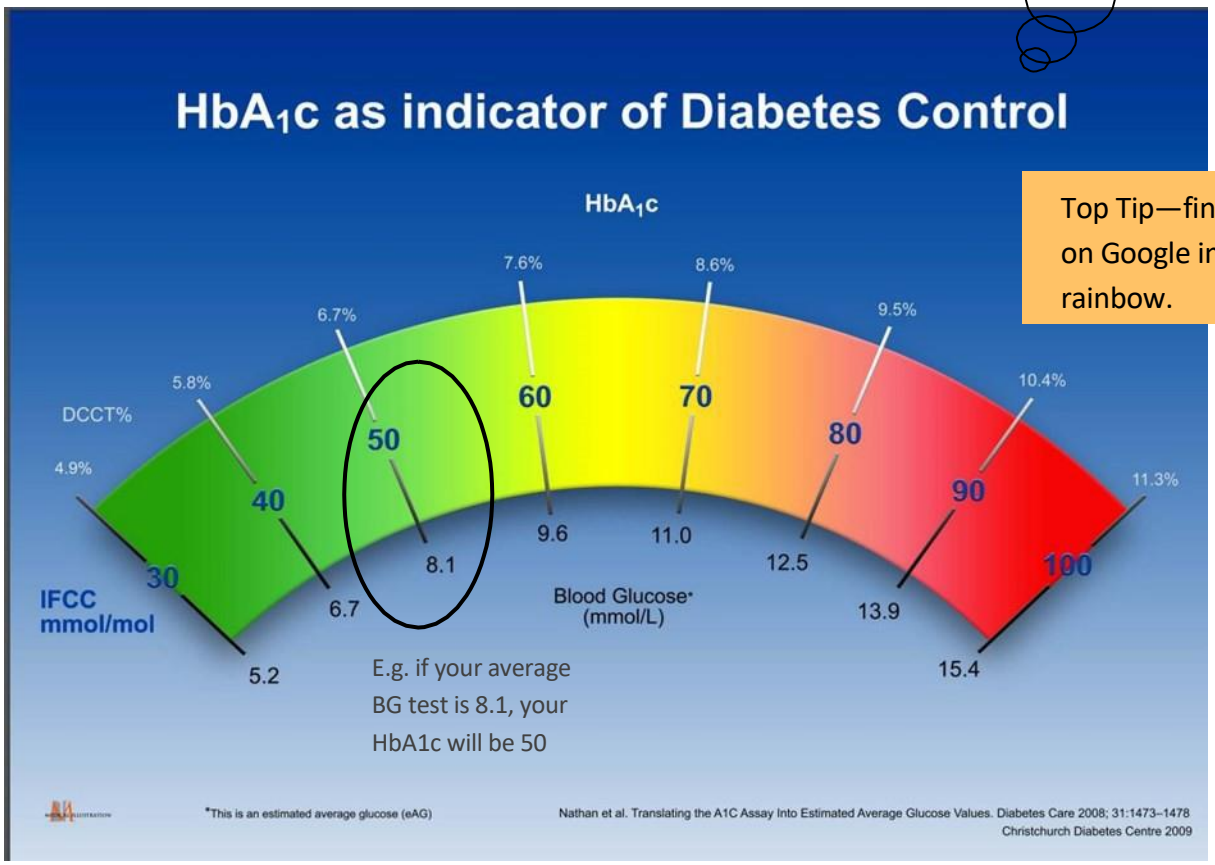


The preferred test for diagnosing diabetes, and for on-going monitoring of control.

HBA1C TEST

HbA1c measures how much glucose has become stuck to haemoglobin molecules on red blood cells. By looking at the oldest red blood cells (remember red blood cells only live for around 12 weeks) it gives an average of how much glucose has been circulating in the blood for the past 3 months.

These charts are great to use. Self-monitoring values are at the bottom, while corresponding HbA1c targets are made clear by the traffic light colours.



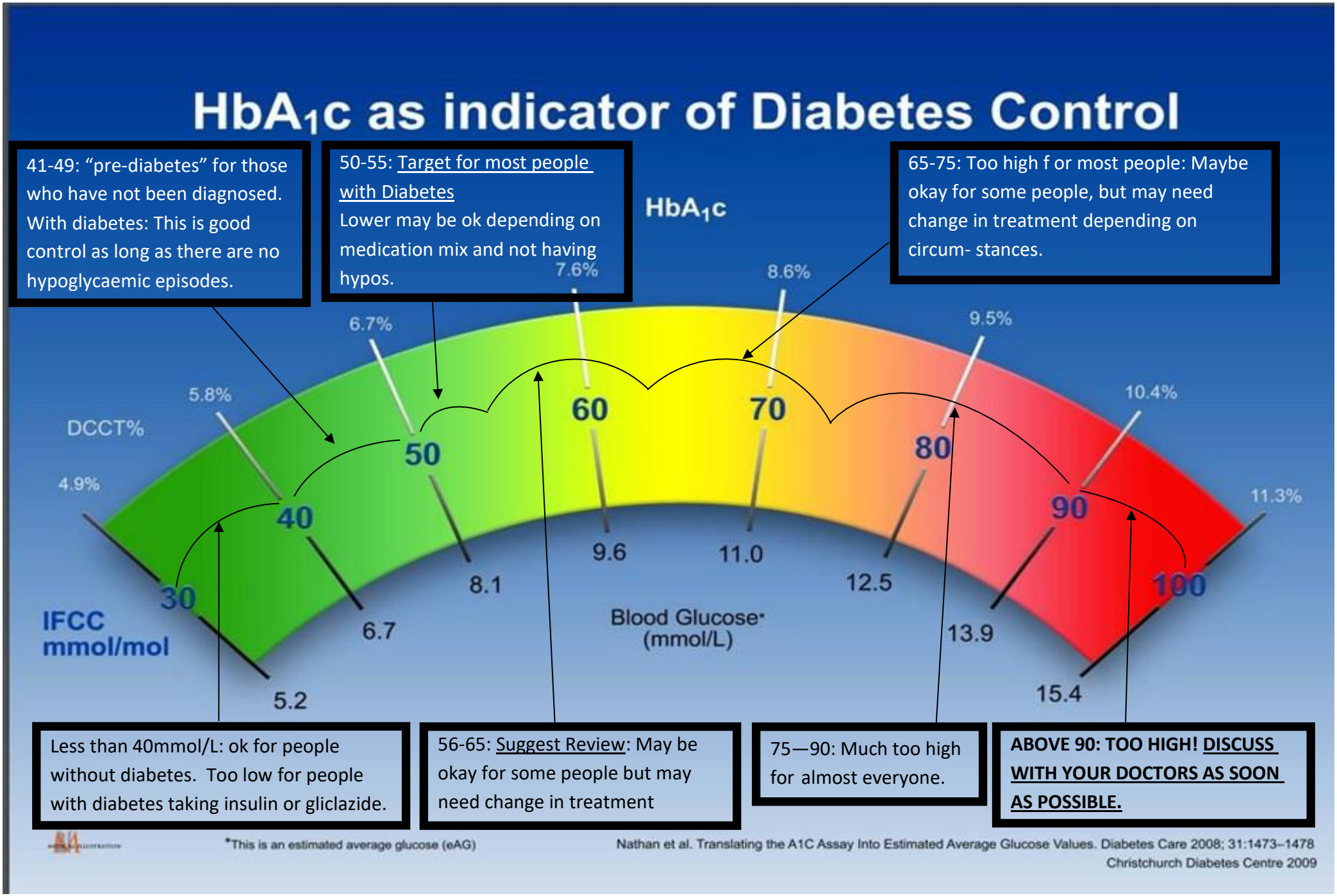
Top Tip—find these charts on Google images—HbA1c rainbow.

HbA_1c as indicator of Diabetes Control

41-49: "pre-diabetes" for those who have not been diagnosed. With diabetes: This is good control as long as there are no hypoglycaemic episodes.

50-55: <u>Target for most people with Diabetes</u>
Lower may be ok depending on medication mix and not having hypos.

65-75: Too high f or most people: Maybe okay for some people, but may need change in treatment depending on circum- stances.



Less than 40mmol/L: ok for people without diabetes. Too low for people with diabetes taking insulin or gliclazide.

56-65: <u>Suggest Review</u>: May be okay for some people but may need change in treatment

75—90: Much too high for almost everyone.

ABOVE 90: TOO HIGH! <u>DISCUSS WITH YOUR DOCTORS AS SOON AS POSSIBLE.</u>

*This is an estimated average glucose (eAG)

Nathan et al. Translating the A1C Assay Into Estimated Average Glucose Values. Diabetes Care 2008; 31:1473–1478

Christchurch Diabetes Centre 2009

Clarification of diagnosing and coding

Advice for those people who have an HbA1c that has returned to within normal range.

Once a person is diagnosed with diabetes, **HbA1c** is an indication of control only - not an indicator for change in diagnosis. This is why diagnosis in the first instance needs to be clear and well documented.

- There are a few patients who fulfil the criteria for a diagnosis of diabetes, and having been coded as such, may achieve long-term normalisation of glycaemic control without medication, through lifestyle measures or bariatric surgery.
- In the UK, GPs are advised not to remove such patients from relevant screening registers (including retinal screening) as current evidence shows that all people with diabetes should be screened for diabetic retinopathy for life once there has been a definite diagnosis, excluding gestational diabetes.
- Studies show up to 40% of people who go into remission (using ADA criteria) following bariatric surgery will have relapsed within 5 years.

As of yet, there is no criteria for remission of diabetes agreed on in New Zealand.

If you do consider removing the diagnosis of diabetes:

- Clear documentation in the notes by the patients GP as to why the diagnosis was changed
- How the patient is informed of the changes and a record of this occurring
- Consideration of medico-legal issues relating to removing a diagnosis of diabetes if the patient fulfilled criteria for that diagnosis at one time, particularly as it relates to past medical history for the purpose of medical insurance or life insurance.

Type 1 or Type 2 Diabetes

IA2 and GAD antibodies can help diagnosis.

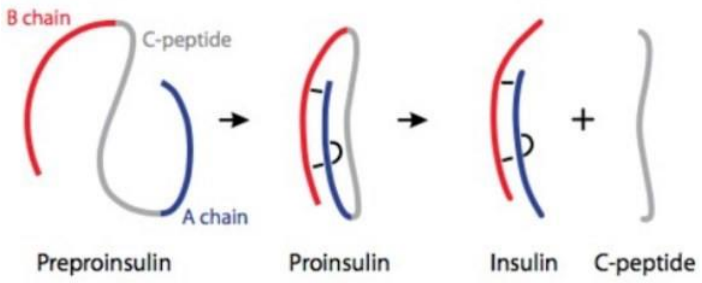
C peptide must always be done with a corresponding glucose result (Note: this is expensive).

If initially managed on diet and oral medications— but are now on insulin,

they have Type 2 diabetes on insulin.

Some background information

C peptide is a part of proinsulin. When the insulin splits off, C peptide is left. It is more stable in the blood stream and therefore a more useful measure that insulin.



In a pancreas that is functioning normally the C peptide level will correspond with the amount of glucose in the blood stream. The more glucose that is present the more c peptide is present.

In type 1 diabetes C peptide can be very low despite a high glucose level.

With type 2 diabetes there are a number of options. If the glucose level is low, and a high C peptide indicates insulin resistance. If the glucose is high, and the insulin is lower than expected, this indicates insulin deficiency. This is why it is critical to do both tests, C peptide and glucose at the same time – preferably fasting.

Note that there are other indicators for c peptide testing including insulinoma (may be indicated by a high C peptide and low blood glucose).

GAD stands for Glutamic acid decarboxylase. While this usually acts to make neurotransmitters, it can at times work as an autoantigen. It triggers the autoimmune system to produce autoantibodies to destroy its own beta cells. GAD antibodies can be found in 70 - 80% of people diagnosed with Type 1 diabetes. If at the same time there are autoantibodies to Islet cells (tyrosine phosphatase–related islet antigen 2 = (IA2), it strengthens the diagnosis. Type 1 diabetes is an autoimmune condition.

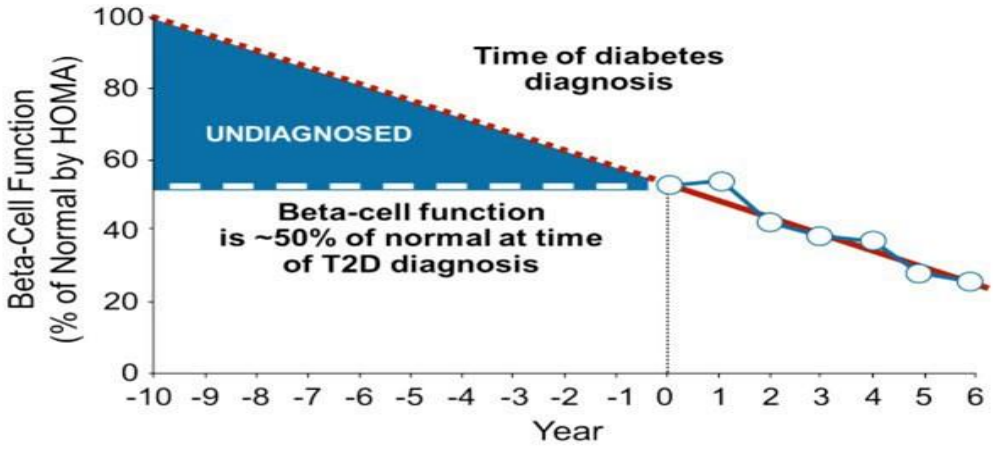
There are more than simply the 2 types of diabetes—MODY, GDM and LADA are a few of the more common ones. If you need more information on these conditions, try this article: CMAJ 2014 Approach to the patient with atypical diabetes; Jun 10; 186(9): 678–684.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4049991/

PRE-DIABETES

ALSO KNOWN AS INTERMEDIATE HYPERGLYCEMIA

- Diabetes is one of New Zealand's fastest growing long-term conditions
- Annually, 5-10% of individuals with pre-diabetes will progress to T2DM
- Prevalence has been increasing approximately 7% per year for the past 8 years
- The appropriate term to classify patients with HbA1c 41-49 is debated. In 2006, the WHO recommended use of the term "*Intermediate Hyperglycaemia"* as opposed to *"pre-diabetes"*, as not all individuals with an HbA1c between 41-49 would proceed to Type 2 Diabetes. (From MOH pre-diabetes and self-management 2016).

Beta cell function can be less than 50% of normal by the time diabetes is diagnosed



- Treatment: lifestyle measures are the key treatment
- Consider: The initiation of Metformin for prevention of diabetes.

ADA consensus 2017 states, 'Metformin therapy prevention of type 2 diabetes should be considered in those with pre-diabetes, especially those with BMI >35kg/m2, those aged >60years, women with prior gestational diabetes mellitus, and/or those with rising A1c despite lifestyle intervention. Long term Metformin may be associated with biochemical vitamin B12 deficiency, and periodic measurements of vitamin B12 levels should be considered in metformin-treated patients, especially in those with anaemia or peripheral neuropathy.

SOME QUESTIONS FOR YOUR PRACTICE:

- Does your practice have a routine protocol for pre-diabetes diagnosis, education, and follow up?
- There are seven possible pre-diabetes classification read codes—encouraging the whole practice to maintain one or two of these options simplifies systematic review and prompts intervention.
- Recall will depend on results of HbA1c and patient history. If HbA1c close to 49—consider recalling at 3-6 months rather than annually.
- Provide a combination of written and verbal advice.

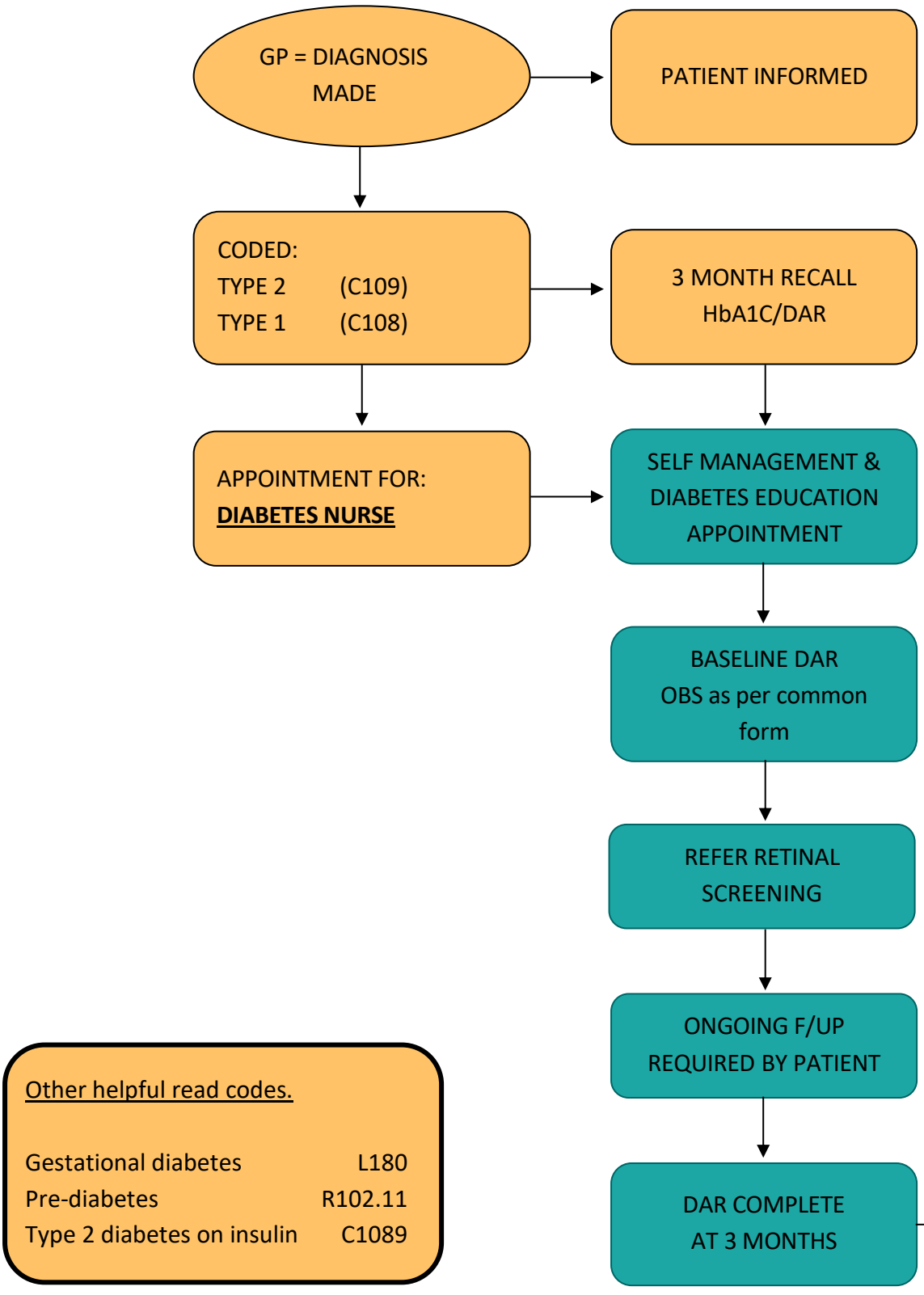
Some background reading:

Diabetes Prevention Program (DPP) and the ongoing DPP Outcomes Study (DPPOS) are major studies that changed the way people approach type 2 diabetes prevention world-wide. The DPP showed that people who are at high risk for type 2 diabetes can prevent or delay the disease by losing a modest amount of weight through lifestyle changes (dietary changes and increased physical activity). Taking metformin, a safe and effective generic medicine to treat diabetes, was also found to prevent the disease, though to a lesser degree.

The DPPOS has continued to follow most DPP participants since 2002. To date, the DPPOS has shown that participants who took part in the DPP Lifestyle Change Program or are taking metformin continue to prevent or delay type 2 diabetes for at least 15 years. The DPPOS has also shown that the DPP Lifestyle Change Program is cost effective (costs are justified by the benefits of diabetes prevention, improved health, and fewer health care costs) and metformin is cost-saving (leads to a small savings in health care costs) after 10-years.

- Pre-diabetes is not a clinical condition in its own right but is a high-risk factor that can contribute to both diabetes and cardiovascular disease.
- Prevalence of pre-diabetes is particularly high in some population groups for example: Over 40% of people living in the Auckland metro region who are Māori, Pacific, or Indian ethnicity have been identified with pre- diabetes at 35-39 years, and over 50% at 45-49 years (Chan 2015).

INITIAL EDUCATION AND DAR



Other helpful read codes.

Gestational diabetes	L180
Pre-diabetes	R102.11
Type 2 diabetes on insulin	C1089

Patient Initial Education

HOW WE EDUCATE PEOPLE IS AS IMPORTANT AS WHAT WE TEACH

1.

Assessment: What do they already know?

Establish what the person/whānau already know about Diabetes, build on this when answering questions they may have.

2.

Make it personal for the person with diabetes

Make information relevant to **their** diabetes, so it makes sense to them—consider their health beliefs and their previous experience/knowledge of diabetes

3.

Consider questions that the person/whānau may not voice

- What caused their Diabetes?
- What is actually wrong?
- How will Diabetes affect me now and in the future?
- How long will it last?
- How good is my treatment at controlling my Diabetes?
- What can I do to look after myself?

These are just some of the questions that a person can have but be too shy to ask.

4.

Documentation

Document what information you have covered, and any gaps that you believe will need to be discussed at a later time.

Use a keyword to make documentation easier and more consistent. E.g. diabetes education:

- Food
- Testing
- Activity

Goal setting

SMALL ACHIEVABLE GOALS ARE THE KEY TO LIFESTYLE CHANGE

S

SPECIFIC

- Define the goal with clear, understandable language
- WHO is involved? WHAT do I want to accomplish? WHERE

M

MEASURABLE

- Can you track the process and measure outcomes?
- How much, how many, how will I know when at my goal?

A

ATTAINABLE/ACHIEVABLE

- Is the goal reasonable enough to be accomplished? How so?
- Is the goal out of reach or below standard performance?

R

RELEVANT

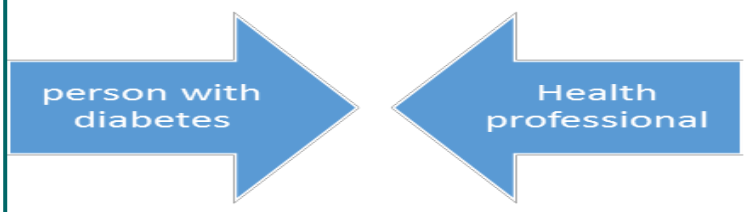
- Is the goal worthwhile and will it meet your needs?
- Is each goal consistent with other goals you have established?

T

TIMELY

- Your objective should include a time limit. E.g. I will complete this step by month/day/year

Work together to ensure best results.



People are capable partners in their health care

Diabetes Annual Review

- Type 2 diabetes is a progressive condition
- Often treatments are layered in over the years; this means that on-going control is reviewed regularly.
- An annual review is standard care for all people with diabetes.
- An annual review is the Assessment phase. Then consider triage—who needs to be seen again urgently, soon, next year?
- Treatment is individualized

- DAR bloods can be preset on MedTech request form, and the pathlab e-request form
- Minimum: HbA1c, Full (non-fasting) lipid profile, Renal function, full blood count urine microalbuminuria, MSU and consider B12 if on long term Metformin.

Annual reviews are about the person who has diabetes. It is their opportunity once a year to check in and make sure their diabetes management and education is up to date. If we are prepared prior to them arriving, it means that we can focus on what is most important to the person.

On the next page is a suggested format for preparing yourself for an annual review. Fill in everything you can prior to the person arriving, and then you will have identified the clinical issues and are free to focus on them. It is most helpful to create a plan forward together.

Example of Diabetes Annual Review on next page:

Diabetes Annual Review Preparation Sheet

Patient Name/NHI:	**Today's Date:**
Type of diabetes:	**Duration:**

On-going plan:

Date most recent results:	**Comment declining/stable /improving**	**Relevant medications.**
Hba1c		Metformin Sulphonylurea/DPP4 Insulin/type/device/amount
Cholesterol Total: Ratio:		
LDL: HDL: Trig:		
Kidneys EFGR:		
Microalbuminuria		
Last result Todays result		
BP:		
Weight:		
Height:		
WC:		
CVRA:		
Smoking:		
Exercise: Type duration frequency		
Food – any changes and goals:		
Assessment of feet complete and able to self-care:		
Testing when, recording, changes required:		
Hypos: YES/NO What used to treat hypos?		

Flu vaccine due:	Drivers licence type if relevant:	Retinal screening due:	Mood:	Medical Alert:

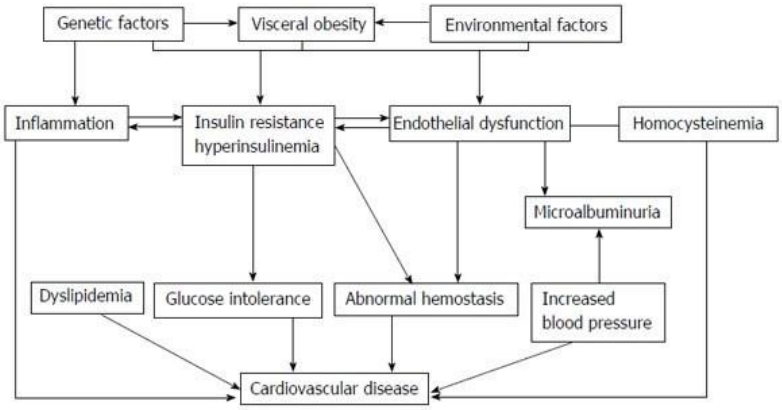
If on insulin – ☐ Storage ☐ Sharp disposal ☐ Check sites ☐ Travel ☐ Sick day
☐ Insulin dose corect ☐ Insulin technique ☐ Correct pen and insulin ☐ Changing needles

If female <40 years—pre pregnancy advice.

If male—Erectile Dysfunction? —discuss

Cardiovascular risk

- All people with type 2 diabetes are at higher risk of cardiac disease. The reason for this is multifaceted and not completely understood.



From: World J Diabetes. 2014 Aug 15; 5(4): 444–470.

- CVD risk assessment is now based on New Zealand PREDICT study data beginning assessments 10—15 years earlier in some at risk groups.

- The aim is to facilitate informed choices, so patient considers early and lifelong healthy lifestyle choices, and when appropriate other treatments.

- Non-fasting blood lipids are now recommended for all treatment decisions and monitoring as long as the triglyceride levels are normal. Fasting bloods are only required if triglycerides are elevated

Full details can be found here: https://www.health.govt.nz/publication/cardiovascular-disease-risk-assessment-and-management-primary-care

- CVD risk assessment and management is a recommended component of the annual diabetes review, in people with type 2 diabetes.

- The new risk prediction equations for people with type 2 diabetes include: duration of diabetes, BMI, eGFR, ACR, HbA1c and hypoglycaemic medications; in addition to the risk factors in equations for people without diabetes.

- No specific risk equations are available for people with type 1 diabetes, although the same main disease variables (diabetes duration, renal disease, glycaemic control) apply as for type 2 diabetes. CVD risks for this group are substantially higher than for people with type 2 diabetes (50% higher in men and up to 90% higher in women).

- Encourage a healthy lifestyle (smoking cessation, healthy diet, regular physical activity, optimal weight) in everyone.

- Optimise glycaemic control to an appropriate level in consultation with the individual patient. The target range agreed will generally be more stringent in younger and fitter patients (e.g. 50–55 mmol/mol or lower) than older, co-morbid or frail patients and those prone to hypoglycaemia (e.g., 55–64 mmol/mol or higher).

Hypertension

A word from the experts!

Between 70 and 80 % of people with diabetes have hypertension.

The coexistence of diabetes and hypertension worsens clinical outcomes with respect to both microvascular and macrovascular disease. Diabetes management should therefore be comprised of a multifaceted approach that targets optimal blood pressure and lipid management in addition to glycaemic control. The pathophysiology of hypertension in diabetes involves maladaptive changes and complex interactions between the autonomic nervous system, mechanical forces, renin-angiotensin-aldosterone system as well as individual and environmental factors. Multiple high-quality randomized controlled trials have shown reduced morbidity with reduction of elevated blood pressure in people with diabetes.

What this means in practice is — Please treat hypertension.

Treatment needs to be individualised but generally 130/80 is the recommendation

Causes of hypertension

Sedentary lifestyle, increased calories and insulin resistance

- Increased adiposity = increased insulin resistance = oxidative stress and inflammation = vascular stiffness = hypertension

Increased intra vascular volume

- Mismatch between sodium intake and sodium loss = increased sodium concentration = increased venous return = elevated arterial pressure

Premature vascular aging

- Structural changes to the lumen of small vessels = vascular remodelling, inflammation, peripheral vascular resistance, decreased elasticity = hypertension

Autonomic nervous system deregulation

- Increased sympathetic activity = increased heart rate, ventricular contraction, peripheral resistance and fluid retention.

Role of innate and adaptive immunity

- Involved in angiotensin II and aldosterone induced hypertension. Renin Angiotensin Aldosterone system

- Angiotensin II is a potent vasoconstrictor and has a direct effect on the vascular smooth muscle also promotes sodium and water retention.

Dyslipidaemia

The New Zealand Heart foundation has a great explanation of Cholesterol

Cholesterol (Matu Ngako) is a type of fat that circulates in your blood. Your body needs some cholesterol to work properly, but when you have high cholesterol (hyperlipidaemia) it speeds up the process of atherosclerosis.

This is when plaque builds up in your artery walls, narrowing arteries and restricting blood flow. Eventually the plaque can get so large and hard that it cracks, and a clot forms over the plaque. If this clot blocks an artery it can cause a heart attack or stroke.

There is only one type of cholesterol, but it is carried around the body by different 'carriers' (lipoproteins) that have different tasks. There are two types of carriers: LDL (low density lipoprotein) and HDL (high density lipoprotein).

LDL-cholesterol L-L-L (LDL is Lousy and it needs to be Low)

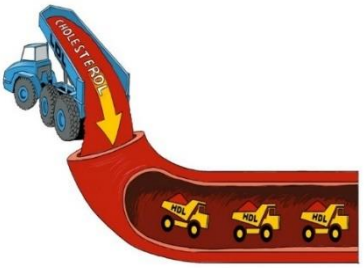
- Known as 'bad' or 'lousy' cholesterol
- The role of LDL in the body is to transport cholesterol to all organs for use in building cells
- LDL is like a large 'dump truck', and dumps cholesterol in the artery walls.

For high-risk individuals an LDL-C target of 1.8mmol/L or lower is recommended.

For intermediate-risk individuals the benefits and harms of lipid-lowering drugs should be presented and discussed to allow an individualised informed decision about whether to start treatment. **A target LDL-C reduction of 40% or greater is recommended if drug treatment is commenced.**

HDL-cholesterol H-H-H (HDL is happy and it needs to be High)

- HDL cholesterol is like a 'pick up' truck that picks up and transports cholesterol from the blood stream to the liver, which gets rid of it
- The role of HDL in the body is to carry extra cholesterol away from the arteries to the liver
- Known as 'good' cholesterol. (or happy)



Triglycerides are the most common form of fat in your body. The role of tri-glycerides is to store and transport fat in the blood. Extra energy from food and alcohol that your body does not need is changed to triglycerides. High tri-glycerides increase your risk of heart attack and stroke.

Total cholesterol is a rough measure of all the cholesterol and triglycerides in your blood.

Total cholesterol/HDL cholesterol ratio is the ratio of your total cholesterol to your HDL cholesterol. This ratio is used to measure your risk of heart attack and stroke.

Diabetes recall process

- What system does your practice have in place?
- Is it one person or multiple people responsible for recalls?
- People with type 1 diabetes may or may not want an annual review at the GP—offer them a choice and aim to have a DAR in primary health 6 months after the specialist review.

More detail on a recall process can be found in Appendix 1

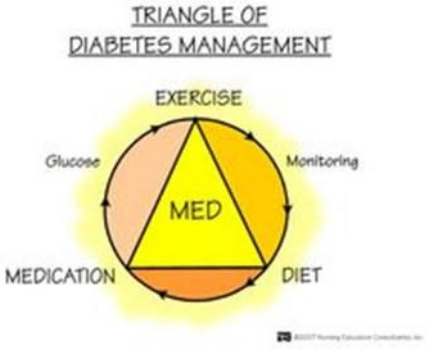
LIFESTYLE

FOOD ACTIVITY SLEEP STRESS

Numerous aspects to lifestyle and wellness affect a person's diabetes. There are real constraints in general practice as to how we can support the patient to live as well as they possibly can.

There are some key concepts that support our understanding of diabetes management. Each of you will find different ways of explaining these concepts to patients. Remember cornerstone of treatment for type 2 diabetes is:

healthy food choices,
physical activity,
medication

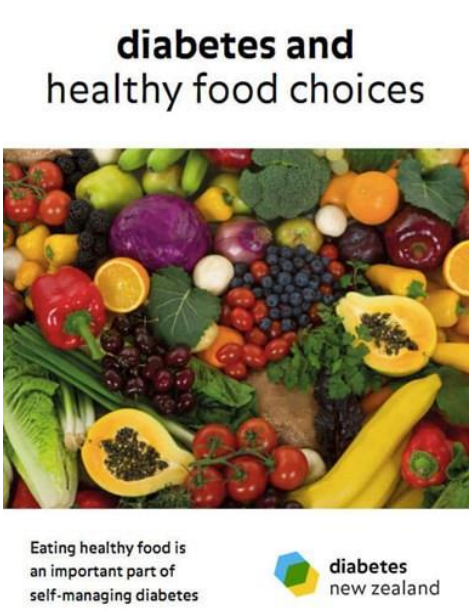


Some recommended sites for lifestyle information

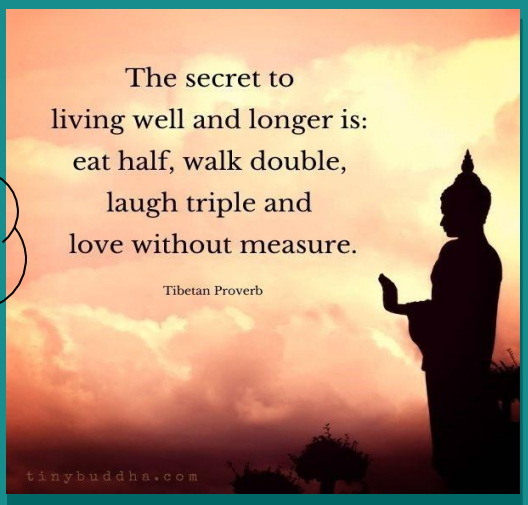
https://www.diabetes.org.nz/

https://www.health.govt.nz/your-health/healthy-living/food-activity-and-sleep

Health navigator (this is useful for self-management strategies as well):
https://www.healthnavigator.org.nz/health-a-z/d/diabetes/

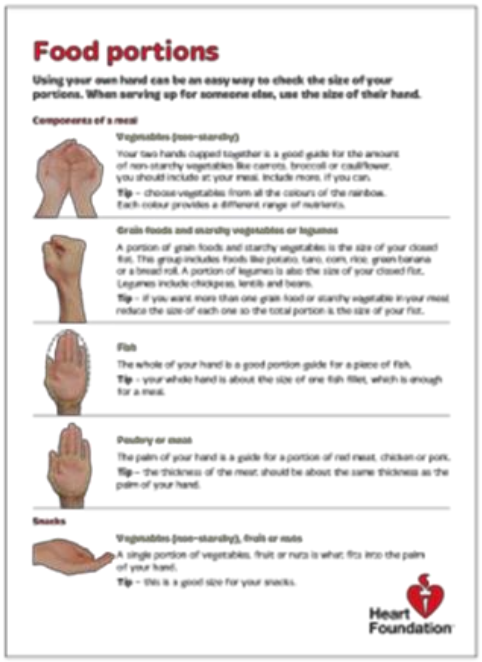


Our favourite booklet about food



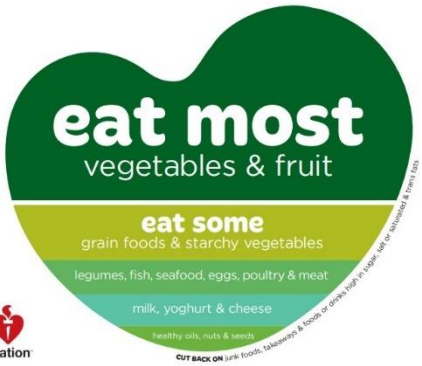
IF ONLY IT WERE
THIS SIMPLE

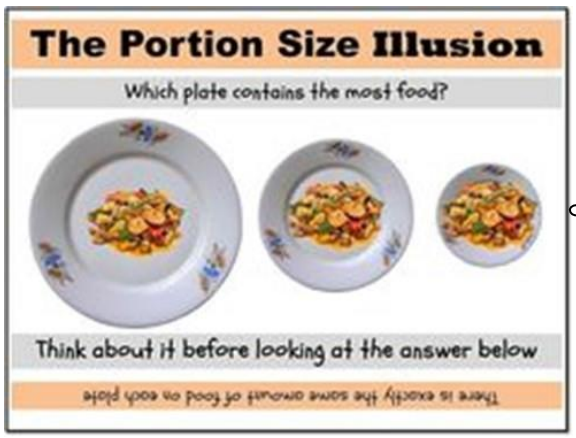
Food resources



There are so many resources to choose from—be selective. Aim for no more than 5 resources you use a lot. Here are a couple more favourites.

Healthy food guide have a portion size poster as well– it has more detail than this one from the heart foundation





Try this at home!

Remember that people get confused if they are told different health messages. Keep to evidence-based health/food messages. Ensure as a team you are all saying the same things about food. Fad diets typically promise quick weight loss, restrict a specific food group, require expensive supplements, and are short lived.

If it sounds too good to be true—it is!

DIETARY INTAKE

All people with diabetes need to know that **carbohydrates** impact on their BGL.

Make an opportunity to assess a person's food intake and prior knowledge level. Discuss some common labelling misconceptions. (No added sugar, organic, fat free)

The DNZ healthy food booklet has an excellent section on what carbohydrates are.

Make sure that patients are aware that increased calorie consumption over their individual requirements will increase their weight.

From the Ministry of Health

Enjoy a variety of nutritious foods every day including:

- plenty of vegetables and fruit grain foods, mostly whole grain and those naturally high in fibre
- some milk and milk products, mostly low and reduced fat
- some legumes, nuts, seeds, fish and other seafood, eggs, poultry (e.g. chicken) and/or red meat with the fat removed
- Choose and/or prepare foods and drinks: with unsaturated fats instead of saturated fats that are low in salt (sodium); and if using salt, choose iodised salt with little or no added sugar that are mostly 'whole' and less processed.
- Make plain water your first choice over other drinks.
- If you drink alcohol, keep your intake low. Stop drinking alcohol if you could be pregnant, are pregnant or are trying to get pregnant.
- Buy or gather, prepare, cook and store food in ways that keep it safe to eat.

Discuss fat intake using the acronym FAT – frequency, amount, type. *There really is nothing that a person with diabetes cannot eat if they consider these principles. This principle applies not only to fat but also carbohydrates*

An Example: *if a person's favourite food is pizza and they eat this 3 times a week, could they eat it once a week, or eat a smaller portion (and add some delicious vegetables), or change the choice they make from Hawaiian stuffed crust x large (1512 KJ) to large slice thin and crispy (626 KJ).*

Basal Bolus insulin does work best with great CHO knowledge. In teaching our patients about carbohydrates we should be focusing on timing, type and amount as this is very relevant to achieving control and balance in their diet.

Some people require more in-depth information e.g. education on Glycaemic Index, an A4 sheet of everyday CHO foods (see below), being able to read nutrition labels, in general how much CHO they consume at each meal.

There is very clear information on this site https://www.carbsandcals.com/diabetes/type-2-diabetes and on the next page is information that will help people understand how much CHO they eat at each meal.

For further support patients can be referred to the Pinnacle MHN Extended Care Team Community Dietitian via e-Referral.

Basic CHO Sheet

Bread	Carbohydrate	Vegetables	Carbohydrate
1 slice – check the label	10 – 20 g	1 small potato (50 gm)	10 g
1 medium slice molenburg	13 g	1 med potato (125 gm)	25 g
1 toast slice molenburg	17 g	1 scoop mashed potato (60 gm)	10 g
1 slice vogel	18 g	1 cup mashed potato	40 g
1 med slice white bread	13 g	1 small piece kumara (50 gm)	10 g
1 toast slice white bread	17 g	1 whole cob corn	30 g
1 slice your usual bread	……g	¼ c creamed corn	15 g
1 bread roll long/hamburger	30 g	1 small tin baked beans (225 g)	50 g
1 bread roll med bakery	20 g	1 cup cooked dried beans	30 g
1 crumpet	20 g	1 parsnip (22 cm long 160 gm)	20 g
1 large pita bread	40 g	1 cup yams	40 g
1 wrap – check the label	22 g	1 cup thick vegetable soup	20 g
1 English muffin	30 g		
Cereals		**Fruit**	
1 Weetbix	10 g	1 piece raw fruit 100 g	10 g
1 cup cooked porridge	30 g	1 med banana	20 g
½ cup rolled oats	25 g	2 raw apricots/plums	10 g
2 dessert spoons muesli/oats	10 g	150 gm berries	10 g
1 cup muesli - check the label	80 g	½ cup stewed fruit in juice	10 g
1/2 cup just right/ light n tasty	25 g	100 g grapes/cherries	15 g
10 Fruitybix	30 g	1 grapefruit	10 g
½ c All bran	20 g	1 persimmon	15 g
1 cup Kornies/rice bubbles	20 g	2 medium feijoa	5 g
1 c Nutragrain	20 g	1 slice fresh pineapple	13 g
Pasta/Rice		**Dried fruit**	
1 c uncooked pasta	30 g	4 dried apricot halves	10 g
1 c cooked rice	50 g	1 c dried fruit	100 g
1 pkt instant noodles	50 g	1 tablespoon raisins/sultanas	10 g
1 small tin spaghetti	35 g	4 dates	20 g
Dairy products		**Crackers biscuits baking**	
1 glass milk 200 ml	10 g	1 med cracker – check the label	5 g
1 pottle diet yoghurt	10 g	1 large cracker	10 g
1 pottle reg. yoghurt	25 g	1 plain biscuit – arrowroot, roundwine	5 g
1 ice-cream slice	10 g	1 large biscuit digestive	10 g
		1 rice wafer	10 g
Extras		1 savoury/low sugar muffin- small size 70g	20 g
1 pie	30 g	1 sweet muffin – small 80 gm	30 g
1 cup macaroni cheese	35 g	1 small scone 50 gm	20 g
1 hamburger – regular	30 g	1 small pikelet 25 gm	10 g
1 slice pizza	20 g	1 c flour	90 g
2 Sushi rolls	20 g	1 small pkt crisps 50 gm	25 g
1 serve hot chips - med	60 g	1 muesli bar	20 – 40

Food/glucose activity record sheet

Record as much as you can over the next 4 days about your diabetes patterns. This will help you; your nurse and doctor understand more about your diabetes.

Bring this to your next appointment on: _____

Date	Breakfast	Morn. tea	Lunch	After-noon tea	Evening meal	Bed
Blood glucose						
Food and fluids						
Insulin 1. 2.						
Other comments						

Bring this to your next appointment on: _____

Date	Breakfast	Morn. tea	Lunch	After-noon tea	Evening meal	Bed
Blood glucose						
Food and fluids						
Insulin 1. 2.						
Other comments						

Physical activity

Physical activity is a key component in diabetes management
It increases insulin sensitivity and increases consumption of glucose by the cells.

The latest NZ MoH guidelines are for ADULTS:

Do at least 2 ½ hours of moderate or 1 ¼ hours of vigorous physical activity spread throughout the week.

Moderate intensity activity causes a slight, but noticeable, increase in breath and heart rate. You can still carry on a conversation.

Vigorous intensity makes you out of breath – you can't do these activities and chat at the same time.

For extra health benefits, aim for 5 hours of moderate or 2 ½ hours of vigorous physical activity spread throughout the week.

Do some muscle-strengthening activities on at least 2 days each week. More information can be found here: https://www.health.govt.nz/our-work/preventative-health-wellness/physical-activity

GREEN PRESCRIPTION – discuss a referral to green prescription (delivered by Sport Gisborne) as a first step.

Exercise may impact on the BGL for up to 24 hours. People need to be aware of the potential of a hypo following moderate or vigorous exercise.

Ideally adults with Type 2 diabetes should do both aerobic and resistance exercise training for optimal glycaemic and health outcomes (ADA,2016).

Pre exercise health check by GP is advisable for people with diabetes if previously sedentary or morbidities present.

There are many opportunities for people to increase their activity.

It can be as simple as parking further away from work, walking upstairs not taking the elevator, sit and be fit activities.

Dancing, walking, swimming, waka alma, in2hula, marathons, TriMāori, hiking… the list is endless. Be aware of what opportunities are in your local area.

It must be affordable, achievable, and often. Doing a small amount of activity regularly is better than a huge effort once in a while.

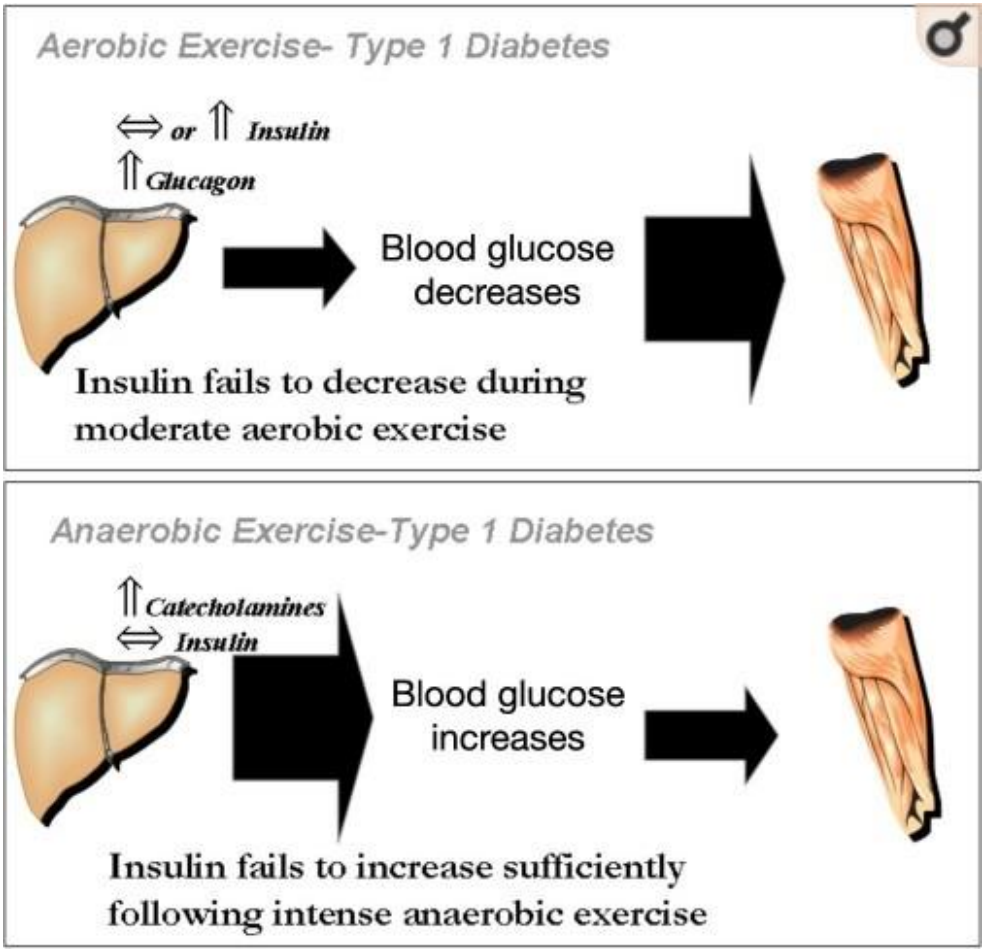
Consider setting a goal, invite a friend, gradually increase the intensity.

Some people are motivated by technology— pedometers are cheap, fitness watches and apps such as my fitness pal or charity miles.

Encourage people to start any new exercise slowly and aim to increase.

The benefits of physical activity for individuals with type 2 diabetes are undisputed. Regular physical activity enhances insulin sensitivity, increases cardiorespiratory fitness, improves glycaemic control, reduces the risk of cardiovascular mortality, and enhances psychosocial well-being.

For those with type 1 diabetes (and potentially those with type 2diabetes and little or no insulin production), it is a little more complex. While the benefits of having an active lifestyle remain the same, the physiological response during intense or prolonged exercise need to be understood.



J Diabetes Sci Technol › v.3(4); 2009 Jul › PMC2769951

Mechanisms for exercise-associated hypoglycaemia and hyperglycaemia in type 1 diabetes. During aerobic exercise, a failure in circulating insulin levels to decrease in people with type 1 diabetes limits glucose production by the liver while facilitating an increase in glucose disposal into skeletal muscle. Because of the mismatch in glucose production and utilization, circulating glucose levels drop and hypoglycaemia can occur (upper panel). Prior exposure to either aerobic exercise or hypoglycaemia also blunts glucose production during subsequent exercise by lowering glucose counter regulatory responses (i.e., glucagon and catecholamines). This makes the active person susceptible to frequent exposure to hypoglycaemia. In contrast, during anaerobic exercise, a rise in catecholamines and a failure in circulating insulin levels to increase at the end of vigorous exercise in people with type 1 diabetes increases glucose production by the liver while limiting glucose disposal into skeletal muscle (lower panel). Because of the mismatch in glucose production and utilization, circulating glucose levels rise and hyperglycaemia can occur.

The key is to test regularly prior to exercise and afterwards.
The impact of exercise can be seen as much as 24 hours afterwards.
Be prepared to treat a hypo.

<u>With all activity —wear appropriate footwear that is comfortable, supportive and well-fitting.</u>

Sleep

Reduced sleep is now widespread, usually as an accommodation to a busy lifestyle and the use of technology intruding into sleep time.

The Sleep Heart Health Study those with a self-reported short sleep duration (<5 hours) had an increased risk of type 2 diabetes compared to those with a sleep duration of 7—8 hours.

Diabetes UK has a summary on sleep affecting BGL:
https://www.diabetes.co.uk/diabetes-and-sleep.html

Sleep hygiene

You can find a hand out on sleep hygiene on the health info page:
https://www.healthinfo.org.nz/index.htm?

- If blood glucose levels are high overnight, nocturia can be an issue and further interrupt sleep patterns. Restless leg syndrome is sometimes experienced by people with diabetes as is cramping and neuropathic pain. All of these issues will improve with improved blood glucose control.

You will find information on these aspects of sleep on the Midland Community health pathway page.

MIDLAND REGION Community HealthPathways

Obstructive **Sleep** Apnoea (OSA) in Adults

Restless Legs Syndrome (RLS) and Periodic Limb Movements of **Sleep** (PLMS)

Sleep Disturbances in Palliative Care

Becoming an Approved Community **Sleep** Assessment Provider

CPAP Therapy

Sleep

Work and Income Funding for CPAP

Consider assessment for sleep apnoea

Obstructive sleep apnoea (OSA) alters glucose metabolism, promotes insulin resistance, β cell dysfunction, and is associated with development of type 2 diabetes. This appears to be independent of obesity. Chronic exposure to intermittent hypoxia and other pathophysiological effects of OSA affect glucose metabolism directly and treatment of OSA using a CPAP machine can improve glucose homeostasis. Lifestyle interventions has a significant impact on Apnoea hypopnoea index (AHI) in people with type 2 diabetes.

If people are struggling with sleeping well: https://www.sleepwellclinic.co.nz/

Stress

KEY POINTS for the person with diabetes

- Stress is a part of our daily lives
- Stress becomes unhealthy when it begins to make us less able to manage our physical or psychological health, or other factors in our lives such as our work and relationships
- Stress can be caused by physical factors (like an injury or illness) or psychological or social factors (unresolved work issues, bereavements, moving house, unresolved relationship problems)
- In many people with diabetes, stress can cause their blood glucose levels to rise. Learning strategies to deal with stress may lessen this effect
- Having diabetes is in itself a major source of stress. People with diabetes have higher rates of anxiety and depression. Learning how to manage stress and treating these skills as a priority, can help a person cope with stress more effectively
- There are practical things that can be done to reduce stress, such as learning relaxation techniques, learning different ways to respond to stress, identifying situations that cause stress and choosing to avoid them, and making changes to your life that increase your enjoyment level
- Developing a positive coping style may help you deal more effectively with stress

From Diabetes NZ website

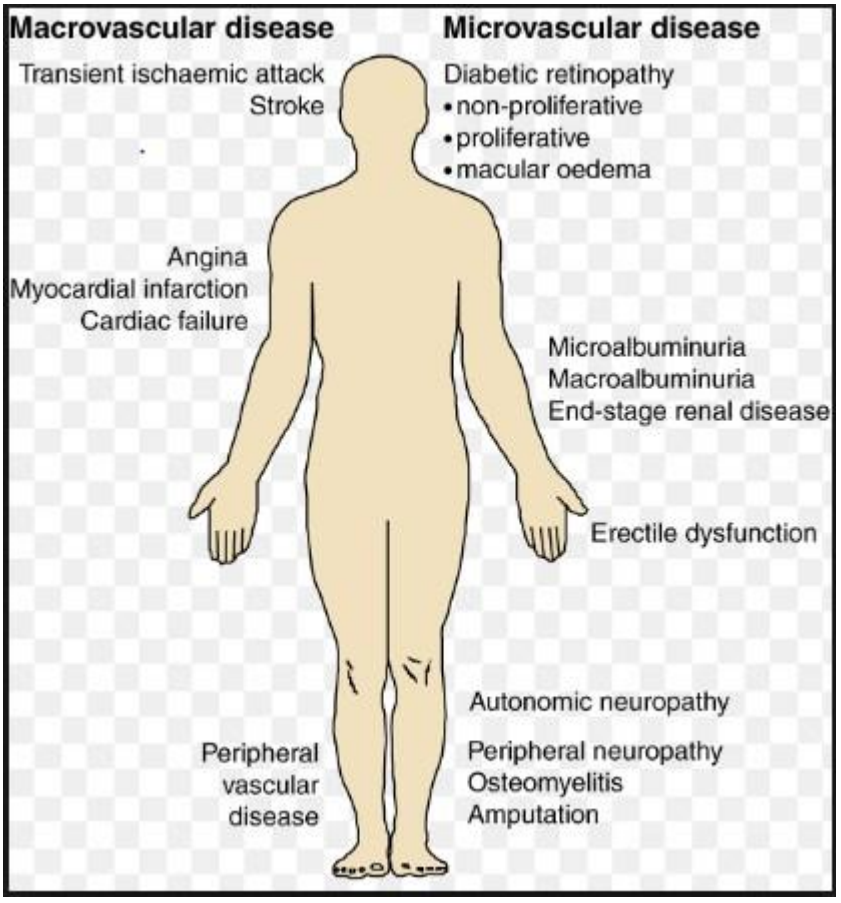
All of the lifestyle topics addressed here are great for the whole population. Be the champion for healthy lifestyle messages.

MICROVASCULAR COMPLICATIONS

It is essential to identify diabetes related complications by early and regular screening and this includes gum disease, foot examination for neuropathy and ulceration, kidney damage and eye disease. Patient education is necessary in all of these areas to avoid impaired quality and length of life and burden of costs to secondary health care services. (MOH, 2015. Living well with Diabetes).

While the UKPDS is an older study in today's terms, it still a landmark for reducing complications. The key messages are:

- retinopathy, nephropathy, and possibly neuropathy are benefited by lowering blood glucose levels in type 2 diabetes with intensive therapy. The overall microvascular complication rate was decreased by 25%.
- Tight control of blood pressure reduced the risk of any non-fatal or fatal diabetic complications and of death related to diabetes



Renal disease

<u>All people with type 2 diabetes should have eGFR and Albumin/Creatinine ratio assessed annually and more often if abnormal (3 -6monthly)</u>

- If the patient has albuminuria then this result should be repeated one or two times over the next 3 months to confirm the result. Exclude causes such as UTI, severe hyperglycaemia, heart failure, vigorous physical activity, contamination with blood, or other kidney disease i.e., concomitant haematuria is present. Confirm with another test.
- The combination of a low eGFR and albuminuria/proteinuria means that the patient is at greater risk of developing end-stage renal failure, compared with patients who have a low eGFR, but no albuminuria or proteinuria.

GFR Categories (mL/min/1.73 m²) Description and Range				Persistent Albuminuria Categories Description and Range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmoL	30–300 mg/g 3–30 mg/mmoL	>300 mg/g >30 mg/mmoL
	G1	Normal or high	≥90			
	G2	Mildly decreased	60–89			
	G3a	Mildly to moderately decreased	45–59			
	G3b	Moderately to severely decreased	30–44			
	G4	Severely decreased	15–29			
	G5	Kidney failure	<15			

Kidney Disease: Improving Global Outcomes (KDIGO) 2017 Clinical Practice Guideline classification chart for albuminuria.

For people with diabetes and renal disease in the Tairāwhiti region there is a renal team at Hauora Tairāwhiti.

Queries can be directed to Tui Te Ora Clinical Nurse specialist on 06 8690500 ext. 8159

Referral is via BPAC e-Referral

PRACTICE POINTS

- People with confirmed microalbuminuria should be treated with an ACE inhibitor or an ARB whether or not hypertension is present.
- Good glycaemic control in patients with CKD and diabetes, is essential to prevent or delay the progression of diabetic nephropathy, and to reduce cardiovascular risk.
- An HbA1c target <53 mmol is generally a target for patients with CKD and diabetes. However, if there is an increased risk of hypoglycaemia, older patients living alone, comorbidities or limited life expectancy, a target HbA1c > 53 mmol may be more appropriate. This should be decided with patients using a shared decision-making approach.
- In patients with advanced stage 4 and stage 5 CKD the risk of hypoglycaemia is also clinically relevant, and less intensive glycaemic control but with close monitoring is often required. The maximum dose of metformin in patients with an eGFR < 60 is metformin 1 gram daily. Metformin should be avoided altogether in patients with an eGFR < 30 except under the close supervision of a nephrologist.

Taken from the NZ Primary Care Handbook 2012

Target BP is <130/80 mm Hg – note 1

Hypertension should be treated aggressivly with lifestyle modification including dietary salt restriction and drug therapy.

Evidence suggests a blood pressure target <120 mm Hg may be harmful. Care should be taken to estimate likely treatment response for patients when BP approaches the target of <130 mm Hg.

Start drug therapy if:

BP >130/80 mm Hg consistently for 3 months despite attempts at lifestyle modification

Maintain lifestyle improvements

Start ACE inhibitor (and titrate dose) or ARB if intolerant – note 2

If above target

Add **one** of: CCB or thiazide type diuretic

If above target

Add **another** of: thiazide type diuretic or CCB

If above target

Add **one** of:
- alpha-blocker
- beta-blocker
- further diuretic therapy (potassium sparing)

If above target

Add **another** of:
- alpha-blocker
- beta-blocker
- further diuretic therapy (potassium sparing)

or refer to a specialist

Approach to management

If hypertensive, intensive monthly follow-up and stepwise protocol adjustments to medication are advised until consistently below target.

BP should be reviewed at least 6 monthly once at target.

Refer to Appendix C for the recommended method of BP measurement.

Renal disease

Microalbuminuria is confirmed if, in the absence of infection or overt proteinuria, two out of three specimens have an elevated ACR.

People with confirmed microalbuminuria should be treated with an ACE inhibitor or an ARB whether or not hypertension is present.

Māori, Pacific Island and South Asian peoples are at a higher risk of renal complications. More frequent monitoring of renal status is indicated.

Any evidence of renal disease based on decreasing eGFR should be treated with urgency.

Loop diuretics may be used instead of or in combination with thiazide diuretics in patients with significant renal impairment (eGFR <45 ml/min/1.73m²).*

Note 1. Consider patient age. In younger people tighter control should be considered given their higher lifetime risk of diabetes-related complications.

Note 2. ACE inhibitor or ARB medication are contraindicated in pregnancy.

* Consensus of NZGG Diabetes Advisory Group

Young people— and particularly Pacific men, Māori and Indian seem to be developing renal disease at quite alarming rates in NZ.

How low can you go?

While treatment is recommended for a persistent systolic above 130mm Hg, A systolic BP <120 increases the risk of hypotension and falls.

Using ACE inhibitors

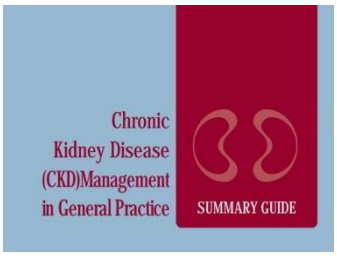
- When an ACE inhibitor is commenced, the GFR and serum potassium should be measured 7—10 days later to ensure there is no further decline in GFR
- If reduction in GFR < 25% and GFR stabilises within 2 months of starting therapy, continue the ACE inhibitor.
- A reduction > 25% after starting ACE inhibitor may indicate renal artery stenosis. Reduce or stop the ACE inhibitor and consider nephrology assessment.
- If potassium > 6 mmol/L, reduce or stop the ACE inhibitor.
- If intolerant of ACE inhibitor, use an angiotensin-II receptor antagonist.

Some extra notes about treatment of renal disease:

- Any evidence of renal disease based on decreasing eGFR should be treated with urgency.
- Loop diuretics may be used instead of or in combination with thiazide diuretics in patients with significant renal impairment (eGFR <45 ml/min/1.73m2).
- People with type 2 diabetes are more prone to nephrogenic anaemia (from no other cause) and eligible for erythropoietin for eGFR<45. Hb <100

Opinions vary as to when metformin should be reduced in the presence of renal impairment, but all agree that metformin is contraindicated when eGFR<30.

A helpful resource:
'Chronic kidney disease (CKD) management in general practice':
https://www.kidneys.co.nz/resources/file/kidneyhealth_complete_pgs-2.pdf



End stage renal disease (ESRD)

Historically has been the domain of the renal unit, but at times general practice will be asked to manage blood glucose levels. This needs to be done on an individual basis. Some general points are:

HbA1c target is moderate. Expert opinion recommends HbA1c between 53-75mmol/mol. Targeting lower HbA1c levels may exacerbate mortality risk in dialysis patients with underlying illness and malnutrition.

Up to 1/3 of people with ESRF experience 'Burn- out diabetes'. There are a number of factors that contribute to a spontaneous resolution of hyperglycaemia—the HbA1c returns to normal without the use of treatment.

Many glucose lowering drugs and their active metabolites are metabolised and excreted through the kidneys and will therefore require dose adjustment in the dialysis patient.

Limitations of HbA1c in dialysis patients: ESRD relate factors can cause falsely high HbA1c values (due to high urea levels and metabolic acidosis) as well as falsely low values (due to anemia, repeated blood transfusions, haemoglobinopathies, use of erythropoietin-stimulating agents and malnutrition). Despite this, renal guidelines from both the UK and US advise use of HbA1c to monitor glycemic control in dialysis patients.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3960718/pdf/nihms558834.pdf

Autonomic neuropathy

This can affect the sympathetic and parasympathetic functions in people with diabetes involving cardiovascular (silent MI), gastrointestinal (gastroparesis), genitourinary (neurogenic bladder/erectile dysfunction), metabolic (hypoglycaemia unawareness), sudomotor (excessive sweating) and ocular changes (small pupil that constricts poorly to light).

PRACTICE POINT

- It is important when screening patients at annual diabetes review you can recognise the symptoms of autonomic neuropathy and refer the patient on for further medical assessment

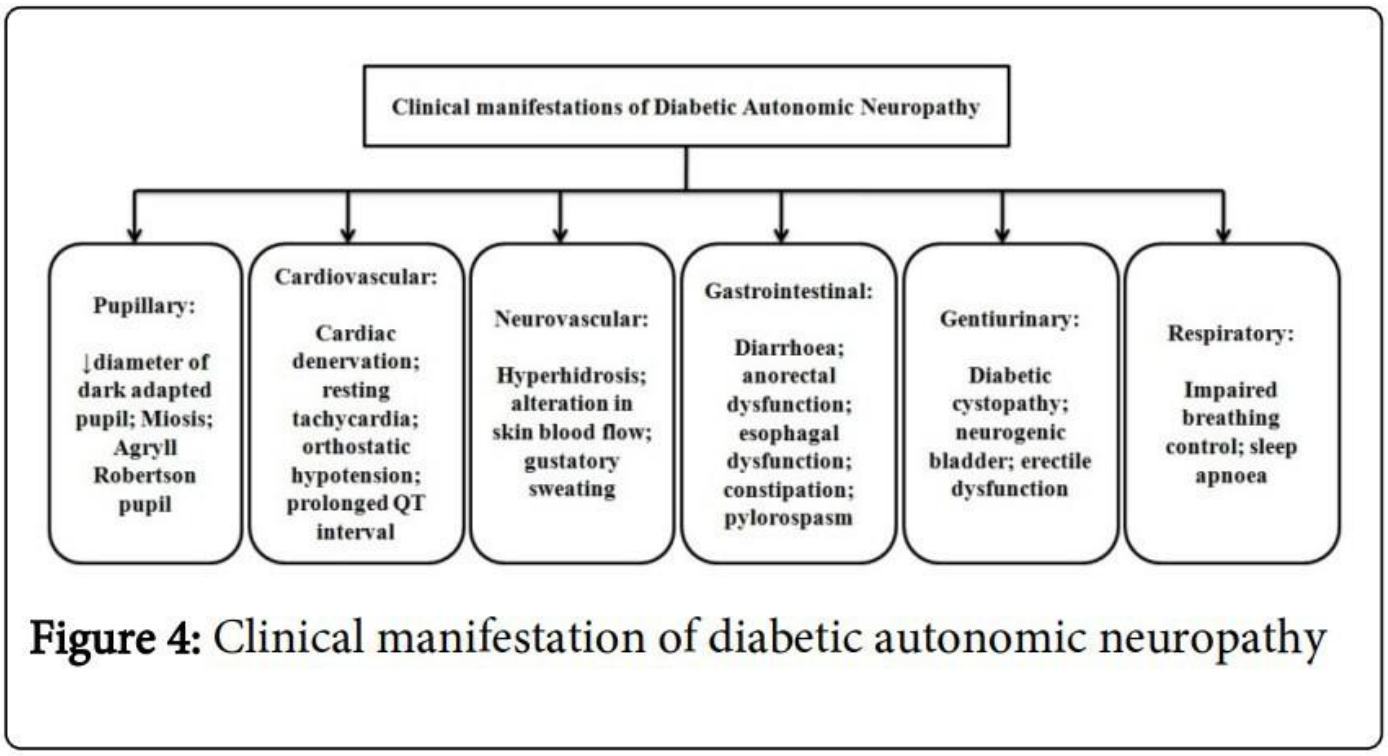


Figure 4: Clinical manifestation of diabetic autonomic neuropathy

Peripheral neuropathy

- Diabetic peripheral neuropathy is one of the most common long-term complications of diabetes.
- It develops in up to half of all people with diabetes and is one of the main risk factors contributing to foot ulceration and eventual amputation.
- Basic foot education at an annual review can prevent some issues developing.
- It is the main cause of non-traumatic lower limb amputation, which is a result of a combination of de- creased sensation and reduced arterial supply.
- Assessing for peripheral neuropathy is a routine part of ongoing care for patients with diabetes.
- Treatment of diabetic neuropathy includes optimal control of hyperglycaemia, appropriate foot care (often involving input from a podiatrist), and symptomatic management of any neuropathic pain.

A very comprehensive article on Peripheral Neuropathy can be found here: https://bpac.org.nz/BPJ/2014/June/diabetic-peripheral-neuropathy.aspx

For a thorough foot check:

- Take off the persons shoes and socks.
- A general inspection of the feet and the patient's footwear
- Musculoskeletal assessment for deformity (including Charcot arthropathy)
- Neurological assessment
- Vascular assessment of the feet, and assessment of the heart rate and blood pressure

General inspection of the feet notes.

Examine both feet and check the condition of the skin, particularly looking for erythematous areas, dryness, flakiness, thickness, cracking, callus formation, infection and ulceration.[18] Dermatological changes, such as dry or scaly skin, may be secondary to a degree of autonomic dysfunction which can begin distally.

There may also be abnormalities of sweating or circulatory instability in the feet, e.g. a hot or cold foot.[13] Heavy callus formation over the pressure points of the foot and signs of localised rubbing or friction, blisters or erythema can also be an indication of inappropriate footwear.[18] Foot ulcers are not caused by neuropathy alone but can occur without injury once hard callus is present over pressure points. If a patient has a loss of sensation in the foot, there will be prolonged and increased forces on the callused areas which then increases the risk of tissue breakdown and ulceration.

Testing for sensation in feet

Monofilament

Monofilament testing uses a 10 g monofilament to assess a patient's ability to feel light pressure at a number of separate sites on the foot. The New Zealand Society for the Study of Diabetes guidelines suggest the examination of 12 sites in total – six on each foot (Figure 1), although some clinicians believe that fewer sites are required, e.g. four sites on each foot.18, 20 If the patient cannot detect the light pressure at more than one of the designated testing sites, then loss of protective sensation is deemed to be present.

To perform the test the patient is placed supine with bare feet (or their feet raised on a stool in front of the clinician). The use of the filament should be demonstrated to the patient on their upper arm. Ask them to close their eyes and say "yes" when they can feel the filament. The filament should then be placed against the foot, avoiding areas of callus if possible, and pressed until the patient indicates they can feel it, or until the filament bows (Figure 1). The filament should be pressed against the foot slowly over three seconds, not tapped. Site selection should be random and not predictable by the patient.

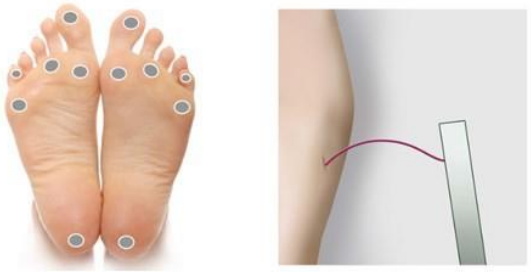


Figure 1: Recommended sites for cutaneous sensory pressure perception testing using a monofilament. Monofilament bent to form a C shape.

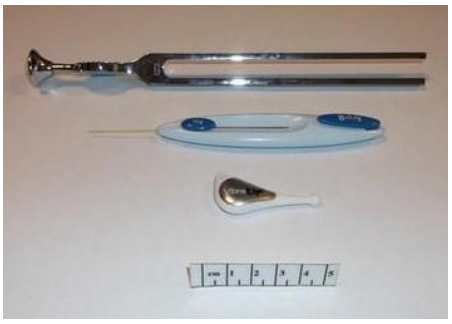
N.B. It is recommended that a monofilament is not used on more than ten patients in 24 hours, as they may buckle. The monofilament should also be replaced on a regular basis to ensure it still has a 10 g pressure. In addition, the monofilament should be cleaned with alcohol after each use.

Available to purchase from:
https://www.mediray.co.nz/diabetes/shop/peripheral-neuropathy/neuropen-monofilaments-10g-box-5-gds-nt0104/

Vibratip

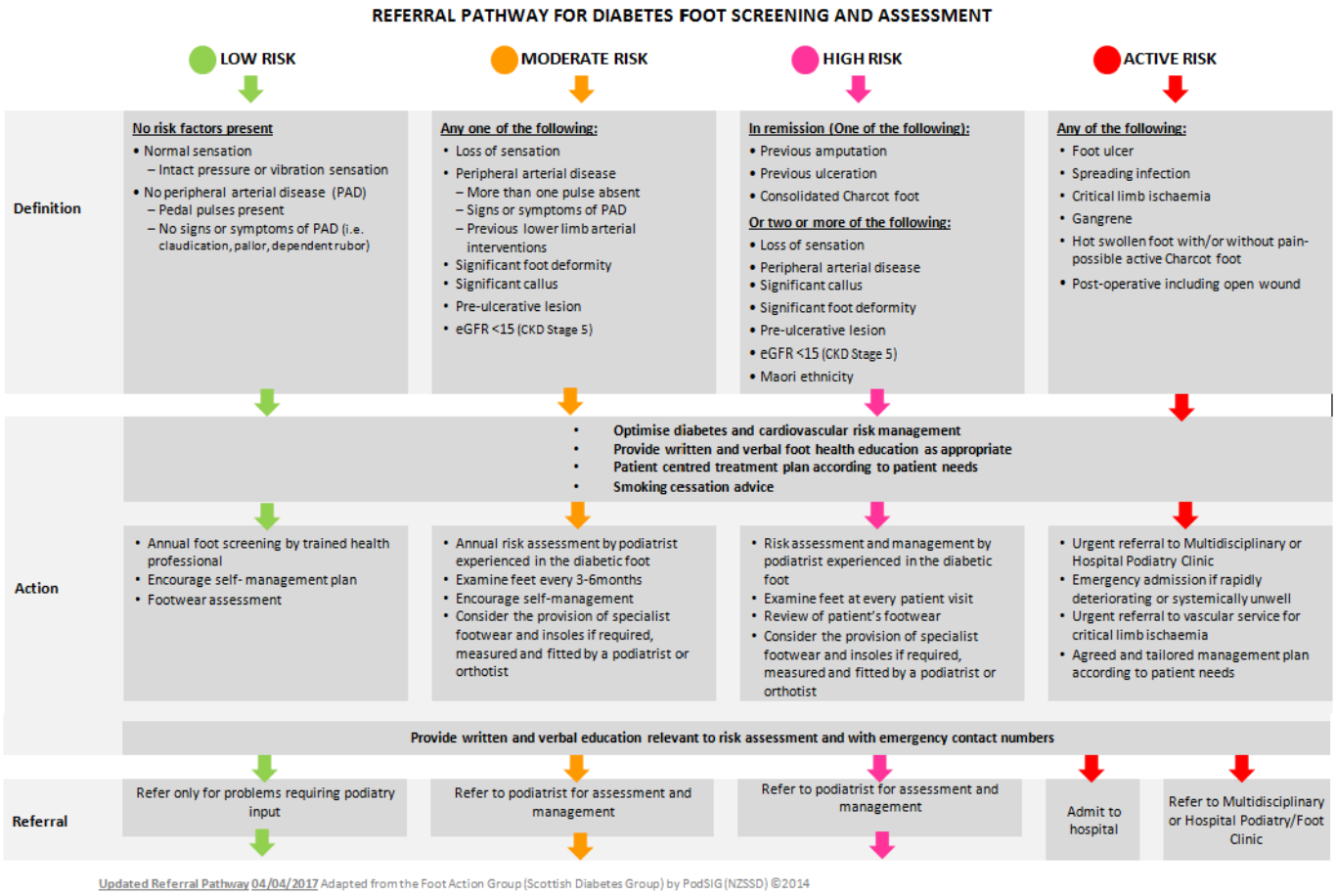
The idea with vibration testing is that sensation is the first sensation to be impacted on by neuropathy rather than pressure—so the changes in the foot could be picked up earlier than with a monofilament. Currently there are no international guidelines to support the use of one technology over the other. The proper use of a vibratip device is essential:

- Hold the vibratip firmly between thumb and index finger
- Gently touch the patient's intact skin twice—for about 1 second with the rounded tip of device. Once activate the vibration—once there is no vibration. (do this in random sequence).
- Ask the patient which of the two touches was associated by vibration
- Clean vibratip with alcohol swab after each use.



VibraTip™ produces a vibratory stimulus similar to that of a 128 Hz tuning fork

Available to purchase from:
https://www.pharmacodiabetes.co.nz/products/vibratip/vibratip---for-health-care-professionals/



A clearer copy of this diagram can be found here:
https://nzssd.org.nz/content/17_12_2_REFERRAL_PATHWAY_FOR_DIA.pdf

Podiatry Services (via e-Referral)

Funding is available for 3 podiatry consults/year for patients with reduced/loss of sensation or reduced pulses or foot ulcers. There is also a limited amount of funding for orthotics hese can be accessed via e-Referral to Foot Mechanics

Active foot clinic at TDH for patients who meet the following criteria

Diabetes – secondary services (DHB) podiatry referral

This service is for diabetic patients with active foot complications and high risk feet.

active ulceration

spreading infection

critical ischaemia

gangrene, or;

unexplained hot, red, swollen foot with or without pain

Include in referral (if available):

last diabetic foot check (screening)

last three months BPs (screening)

last three HbA1c readings

BP / height / weight (automatically included if in screening)

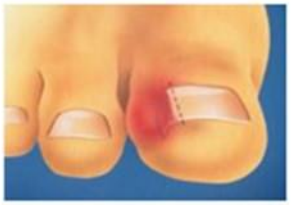
other relevant clinical history, e.g. consultation

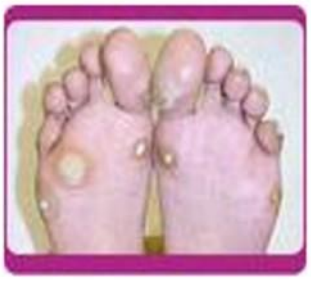
For more information please view the Referral pathway for diabetes foot screening and assessment .

Patient education is essential

Skin / Nails

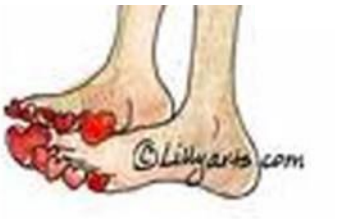
- Callous / Corn
- Pressure / Friction areas
- Blisters
- Fissured/cracked heels (Eulactol cream)
- Interdigitally – in between your toes
- Fungal infection of skin and nail
- Anhydrotic/dry skin (Aqueous cream)
- Ingrown toenails
- Pathological nails – thick/discoloured
- Colour/temperature
- Pain
- Sensation loss for people with diabetes





Footwear

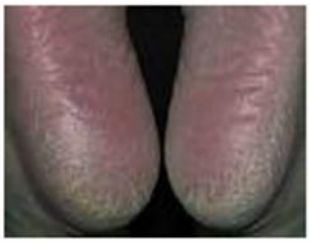
- Wide broad toe box
- Length
- Heel counter
- Laces / Velcroe
- Socks - cotton



Looking after your feet- Claire O'Shea Podiatrist WRDS

When & How

- After a shower or bath
- Putting on your socks & shoes
- At night before you go to bed
- Pull your toes apart
- Get someone else to look at them for you
- Use a mirror
- Compare the good foot with the bad foot



Summary

- Check skin, nails and shoes
- Look at both feet, comparing the 'good' foot with the 'bad' foot.
- If you don't have family or friends to help, a mirror does the job just as well.
- Remember if you are checking your feet daily you will know immediately when something is not right.

diabetes new zealand

You will find some more useful patient resources at the diabetes New Zealand website:

https://www.diabetes.org.nz/

Retinopathy

Eye Disease (adapted from the Midlands clinical pathway)

- Classified into non-proliferative, proliferative, and macular oedema
- Is the leading course of blindness in the developed world countries
- Diabetic retinopathy is a microvascular complication of both type 1 and 2 diabetes
- About 20% of patients with type 2 diabetes have retinopathy at diagnosis.
- the prevalence is strongly related to the duration of diabetes, prolonged hyperglycaemia and the presence of nephropathy, hypertension and dyslipidaemia
- National and international studies show that between 30-40% of people with diabetes have retinopathy.
- Severe retinopathy may be present with normal vision.
- Refractive errors occur as lens changes shape with elevated blood glucose.

This means that when the glucose levels are high, you may experience blurred vision. This is reversible. Retinopathy is not reversible.

Arrange regular retinal photography:

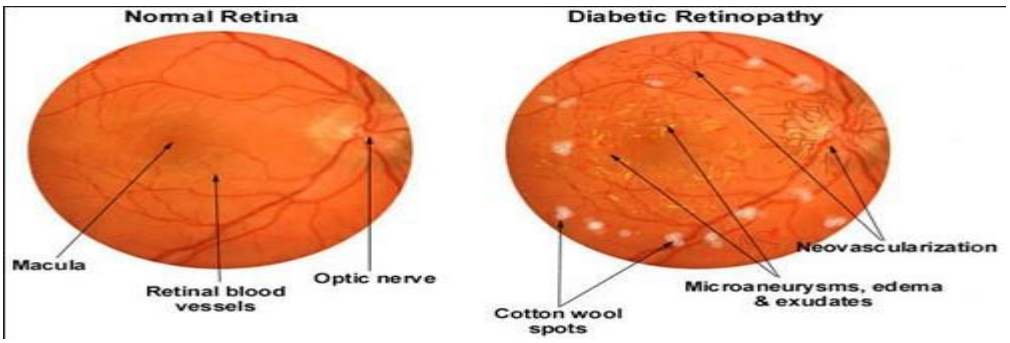
- For type 2 diabetes, start from diagnosis.
- For type 1 diabetes, start 5 years after diagnosis, not if aged < 12 years.
- If no retinopathy, screen every 2 years— 3 years.
- If retinopathy present, screen at least annually for changes
- If you are not sure when they last had an eye photograph—phone the diabetes clinic

- Education about prompt medical assessment if there is any visual deterioration.
- Active management of all diabetes risk factors (e.g., glycaemic control, blood pressure, lipids, renal function) helps prevent the onset and reduce the progression of retinopathy.
- Very rapid improvement of glycaemic control can result in short-term worsening of retinopathy.
- Inform the ophthalmology department if a patient with established retinopathy is being taken from poor control to tight control quickly, in case laser treatment becomes indicated.
- In the longer term, the risk of retinopathy progression is decreased by tight glycaemic control.

ACTIVE MANAGEMENT:

This can be concerning to people; they need good explanations of what is happening and why.

- Very rapid improvement of glycaemic control can result in short-term worsening of retinopathy. Inform the ophthalmology department if a patient with established retinopathy is being taken from poor control to tight control quickly, in case laser treatment becomes indicated.
- In the longer term, the risk of retinopathy progression is decreased by tight glycaemic control.
- Active management of all diabetes risk factors (e.g., glycaemic control, blood pressure, lipids, renal function) helps prevent the onset and reduce the progression of retinopathy.



Retinal Photo Screening

Use e-Referral for retinal screening:

Diabetes – Retinal Photo Screening
Entry criteria: • all individuals with a confirmed clinical diagnosis of diabetes • **Note**: Gestational diabetes lasts the length of pregnancy – these women will not develop diabetic retinopathy within 9 months and do not meet the service entry criteria. **Referral must include:** Most recent labs HbA1c Creatinine/eGFR /ACR Type of diabetes Duration of diagnosis or year of diagnosis History of foot ulcers Include BP / height / weight if available (automatically included if in screening).

Normal visual acuity does not preclude sight-threatening retinopathy.

Cataracts are more common in diabetes, seen at a younger age, and progress more rapidly.

Erectile dysfunction

Erectile dysfunction is defined as the inability to get and maintain an erection

- impacts on 35 – 75 % of men who have diabetes.
- Men are likely to develop the problem 10 – 15 years earlier than men without diabetes. Over the age of 70, there is a 95% likelihood of facing difficulties with erectile function.
- Women also experience sexual dysfunction at higher rates when they have diabetes. Up to 78% of women with diabetes will experience sexual dysfunction in the form of decreased lubrication, desire, and arousal; dyspareunia, orgasmic dysfunction and sexual satisfaction. This rate increases if the woman has diabetes and depression and/or anxiety.

The following website has excellent up to date information about what ED is, the pathophysiology and the treatment options.

https://www.urologywaikato.co.nz/erectile-dysfunction

Often the person will not ask about ED issues, so it is up to health professionals to become comfortable at starting the conversation.

There are a number of treatments for ED:

- Counselling – the basis of ED may be psychological, behavioural, or physical.
- Exercise – this does more than simply boost circulation, it can reduce weight, reduce depression and anxiety, it may increase testosterone, and it simply boosts how we feel about ourselves.
- Oral medications – there are many of these on the market. Some have a shorter half-life than others, they still require stimulation and arousal to achieve a positive result, and they have reduced in price considerably since coming off market. They are available without script from pharmacy, encourage the person to try them more than once before they say it doesn't work – performance anxiety can reduce their effect the first time, and warn people about online herbal options particularly from overseas; the label claims are not always accurate.
- Penile injections are often a useful option.
- Vacuum devices
- Penile implant or prosthesis

MONITORING

- Self-monitoring of blood glucose (SMBG) is the only way the person with diabetes (PWD) and their health care professional know what is happening with their diabetes. The more testing being done the more information they (we) have.
- People can learn more about their own diabetes by looking at how their blood glucose respond to what they eat/do/feel/medication use.
- Short periods of intense testing 3-4 days are achievable by most and gives you the information that is required to make decisions on medication options.

Most people will be somewhere on the following continuum:

<u>Bare minimum/maintenance</u> <u>Intense focus</u>

Pre breakfast, pre bed 1 day a week

Pre and 2-hour post meals (6)
Plus pre bed (7) plus 2 am (8 tests)

- Consider getting people to write their results in a logbook/download results/use an app (mysugr) at home as they are looking for a **pattern**
- Discuss BGL patterns - what can you see and what does this mean? - CHO consumption, exercise and medication
- Use a food/exercise diary with blood glucose test results alongside for a 3-day snapshot.

Paired testing & Overnight hypoglycemia

- If starting a new insulin or concerned about **overnight hypos** (people often sleep through these) ask the person to test at 2am.
  Clues to overnight lows - HbA1c is low, but daytime testing is high. Waking with nightmares or sweaty, elevated results in am (there can be a rebound like effect) or simply that something just does not make sense.

- **Paired testing** is when people test before and then 2 hours after a meal.
  The thinking is that if there is a postprandial rise of more than 3mmols, look at reducing CHO load on the meal, or introduce//increase medications that support insulin secretion (sulphonylurea, rapid acting insulin)

Whichever meter the person uses, the correct technique is important.

Wash hands prior to testing

Keep meter in upright position

Insert the square end of a CareSens N test strip: the meter will turn itself on.

Apply blood to the test strip.

Only 0.5 µL is required (that's a very small amount).

After 5 seconds the result is displayed.

Remove the test strip and the meter will turn itself off.

Easy.

Battery—CR2032 Lithium battery for the CareSens range of meters are free from your local pharmacy.

A guide to the availability of CareSens meters and test strips for newly diagnosed patients.

Patients newly diagnosed with diabetes

TYPE OF MEDICATION

Sulphonylurea and/or insulin	Medications other than sulphonylurea and Insulin

BLOOD GLUCOSE METER

Subsidised by PHARMAC	Not subsidised by PHARMAC

HOW TO GET A METER FOR YOUR PATIENTS

Patients can obtain subsidised CareSens meters by presenting a prescription to their pharmacy Models available: • CareSens N, N POP or N Premier • CareSens Dual (only for patients with type 1 diabetes)	• Give a free meter coupon to your patient to get either a CareSens N or an N POP meter free of charge. Contact your CareSens representative for coupons. OR • Patients can purchase a CareSens meter of their choice from a pharmacy or Pharmaco Diabetes website.

FUNDED TEST STRIPS

Blood glucose test strips are NOT restricted to one pack per prescription. 2 packs of 10 KetoSens (blood ketone test strips) are funded for people with Type 1 diabetes	Blood glucose test strips are restricted to one pack per prescription

METERS AND TEST STRIPS FOR CLINIC USE

Use the PSO form

	Compatible test strips	Tests
Current Meters		
CareSens N meter CareSens N POP meter	CareSens N	Blood glucose
New Meters with Bluetooth Functionality		
CareSens N Premier	CareSens N	Blood glucose
CareSens Dual	CareSens PRO and KetoSens	Blood glucose and blood ketone

Pharmaco Diabetes Training Portal

The Pharmaco Diabetes Training Portal is a convenient online training platform for healthcare professionals. Simply go to the portal, register your interest and start learning at a time and place that works for you. Full of information and videos, the portal will help you become expert in using the CareSens blood glucose monitoring systems.

www.PharmacoDiabetes-training.co.nz

Lancets are not free but please ensure that people are changing them because when they are blunt, they often cause more pain and can lead to resistance to self-monitoring of blood glucose.

Choose a suitable meter for your patients

Features	CareSens N	CareSens N POP	CareSens N Premier	CareSens Dual
				
Test	Blood Glucose	Blood Glucose	Blood Glucose	Blood Glucose and Blood Ketones
Compatible test strips	CareSens N 	CareSens N 	CareSens N 	CareSens PRO (For blood glucose testing)  KetoSens (For blood ketone testing) 
Bluetooth data transfer to SmartLog app	NO	NO	YES	YES
Manual data entry to SmartLog app	YES	YES	YES	YES
Data download to Windows and Mac computer	YES	YES	YES	YES
Illuminated numbers	NO	YES	YES	YES
Meal Flags	Pre and post meal	Pre and post meal	Fasting, pre and post meal	Fasting, pre and post meal
Memory	1000	1000	1000	1000
Averages	1, 7, 14, 30 and 90 days	1, 7, 14, 30 and 90 days	1, 7, 14, 30 and 90 days	1, 7, 14, 30 and 90 days
Strip ejector	NO	NO	YES	YES
Ideal for	People with diabetes looking for a simple easy to use meter to test blood glucose levels	People with diabetes looking for a compact and discrete meters to test blood glucose levels	People with diabetes needing advanced meter with Bluetooth functionality and bigger screen	People with diabetes for testing blood glucose and blood ketone typically people with type 1 diabetes

Pharmaco Diabetes

i-sens

www.PharmacoDiabetes.co.nz

Always read the label. Follow the manufacturer's instructions, and the advice provided by your healthcare professional.

Pharmaco (NZ) Ltd, Auckland. TAPS DA18271M.

For more information on eligibility criteria please refer to the pharmaceutical schedule.

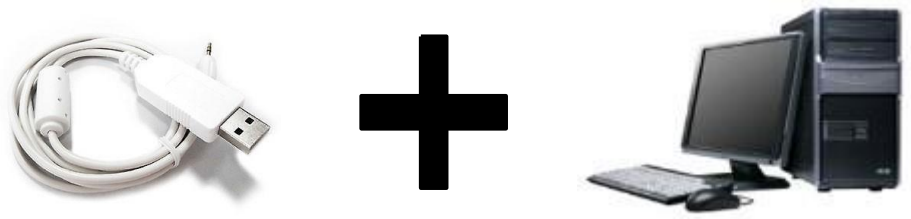
For more information on CareSens meters and test strips contact Pharmaco Diabetes on support@pharmacodiabetes.co.nz or 0800 GLUCOSE (0800 45 82 67)

CareSens N 0800 742 762

Ensure you have enough replacement meters—use MPSO and the vouchers available from your caresens rep. Mob. 021575128 or 0800 glucose.

Smartlog – downloading meters

This is really useful for helping to adjust medication to BGL profiles



The software is free and the cord you can get free from the rep.

Patients can also buy their own + download the free software on the website

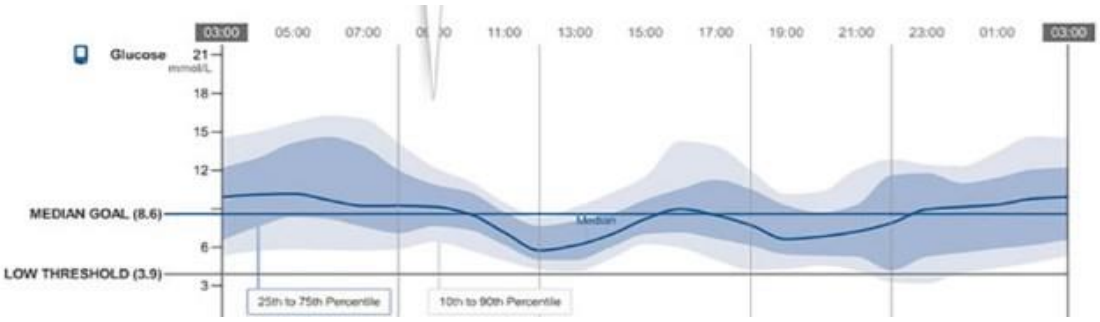
Sue Laywood
Diabetes Territory Manager Pharmaco (N.Z.) Ltd
PO Box 4079, Auckland 1140
P 09-377 3336 **TF** 0800 GLUCOSE (458 267)
M 021 575 128

https://www.pharmacodiabetes.co.nz/smartlog-data-management/smartlog-software/

CareSens N Voice

- With its talking function, the N Voice makes testing easier for those who are visually impaired.
- In addition to the talking function, the N Voice has a larger screen and numbers.
- The N Voice comes with a test strip ejector for the easy removal of a used strip.

The **FreeStyle Libre** Flash Glucose Monitoring System is a glucose monitoring device used to detect trends and tracking patterns without the use of finger pricking. The reader is currently about $90.00 and the sensors (which last 2 weeks) a similar price. People can use them continuously or use them when they want more in-depth picture of their BGL.



More information can be found at Mediray New Zealand

https://www.mediray.co.nz/diabetes/shop/freestyle-libre-flash-glucose-monitoring-system/freestyle-libre-flash-glucose-monitoring-system/

CareSens Dual meter is perfect for people who need to test for blood glucose and as well as blood ketones. With the Bluetooth connectivity to compatible smartphones, results can be uploaded to the SmartLog phone app. If you are currently using CareSens N or CareSens N POP meters, you need to change your glucose test strips to CareSens PRO strips and KetoSens for ketone testing.

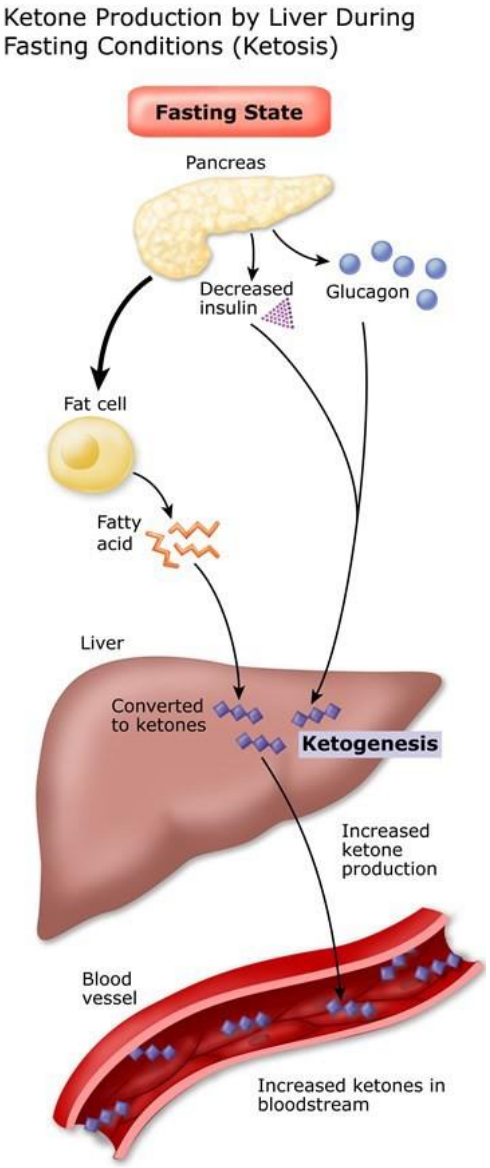
Ketone Testing

A bit of Pathophysiology

When there is not enough insulin, the fat cells keep releasing fat into the circulation, and the liver keeps making more and more ketones and ketoacids. The rising ketoacid levels make the blood pH too low (acidotic), which requires immediate medical attention.

A person with Type 1 diabetes, has the highest risk of developing ketoacidosis.

However, ketoacidosis also can occur in some- one with Type 2 diabetes if there is a major increase in insulin resistance (such as infection or treatment with steroids) or reduction in insulin release from the pancreas.



People are most likely to develop ketones when unwell.

If a person with Type 2 Diabetes presents to general practice and is physically unwell - it is useful to do a ketone test. You can get Ketone tests on MPSO and they work with the CareSens duo meter.

Ketone blood testing is the preferred method for assessing the presence of ketones during times of sickness, as they are more accurate and timelier than urine tests. When using a combination meter results will fall into one of the following three ranges:

- **Below 0.6 mmol/**L: Normal range
- **0.6 to 1.5 mmol/L:** This may develop into a problem if not treated
- **Above 1.5 mmol/L**: Readings above 1.5 indicate a greater risk for developing Ketoacidosis (DKA). Discuss with GP and consider acute sick day management.

ORAL MEDICATIONS

Common Oral Hypoglycaemic Agents

Full information can be found on the New Zealand Formulary (nzf.org.nz) Prescribers need to be aware that this page is for a *quick reference* only.

Insulin Sensitising

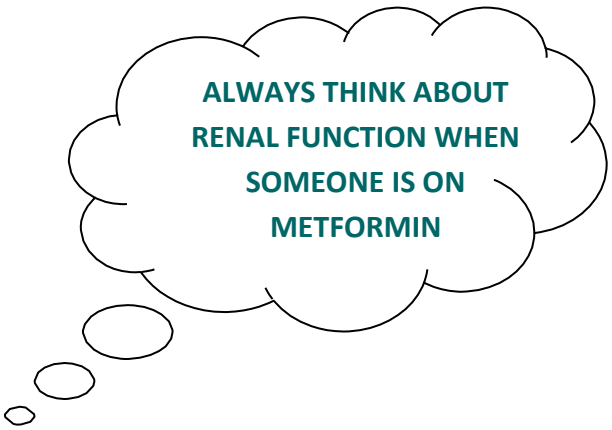
METFORMIN HYDROCHLORIDE

Adult: Initially 500mg 1-2 times daily, **increased gradually as tolerated** to 1.5-2g daily in divided doses; **maximum** 3g daily in divided doses.

Patient Advice:

- Take with or just after food, or a meal
- Contact your doctor immediately if symptoms such as increasing drowsiness, loss of appetite, nausea, vomiting, abdominal pain, cramps, fatigue, diarrhoea, unexplained weight loss, muscle pain, and non-specific abdominal upset.

Additional information is available through **Diabetes New Zealand** and SafeRx patient information guide:



Renal Impairment:

- eGFR 30-60mL/min/1.73m2, maximum 1g daily
- eGFR 15-30mL/min/1.73m2, maximum 500mg daily
- eGFR less than 15mL/min/1.73m2, AVOID

Remember:

Withdraw or interrupt treatment in those at risk of tissue hypoxia or sudden deterioration in renal function, such as those with dehydration, severe infection, serious trauma, shock sepsis, acute heart failure, respiratory failure or hepatic impairment, or those who have recently had a myocardial infarction - increased risk of Lactic acidosis

If you find people have had a GI upset from Metformin, encourage them to try again with a 250 mg dose once a day. Increase this very slowly. It doesn't matter how small the dose is and how slowly you increase it, there will still be some benefit!

Take it up as far as they can until they get GI upset again and then pull it back slightly and you have found their tolerated dose!

Sulphonylurea

Since sulfonylureas work by stimulating the pancreas to release insulin, they are only useful in people with Type 2 diabetes whose beta cells still produce insulin. Over time the effectiveness of sulphonylureas diminish as the beta cells ability to make insulin declines.

Patient Advice:

- Take before breakfast or first main meal; if dose is split during the day, take remainder of the daily dose before the evening meal.
- Do not skip meals if you have taken the tablet.

GLICAZIDE:

Adult: Initially 40mg daily, adjusted according to response; up to 160mg as a single dose, with breakfast; higher doses divided; **maximum** 320mg daily.

GLIPIZIDE:

Adult: Initially 2.5-5mg daily shortly before breakfast or lunch, adjusted according to response by 2.5-5mg at weekly intervals; usual maintenance 2.5-30mg daily; maximum 40mg daily; up to 15mg may be given as a single dose; higher doses divided before meals.

Remember with sulphonylurea:

- Avoid if both renal and hepatic impairment.
- Use with care in mild to moderate renal impairment (hazard of hypoglycaemia)
- all sulfonylureas can encourage weight gain and should be prescribed only if poor control and symptoms persist despite adequate attempts at healthy lifestyle.

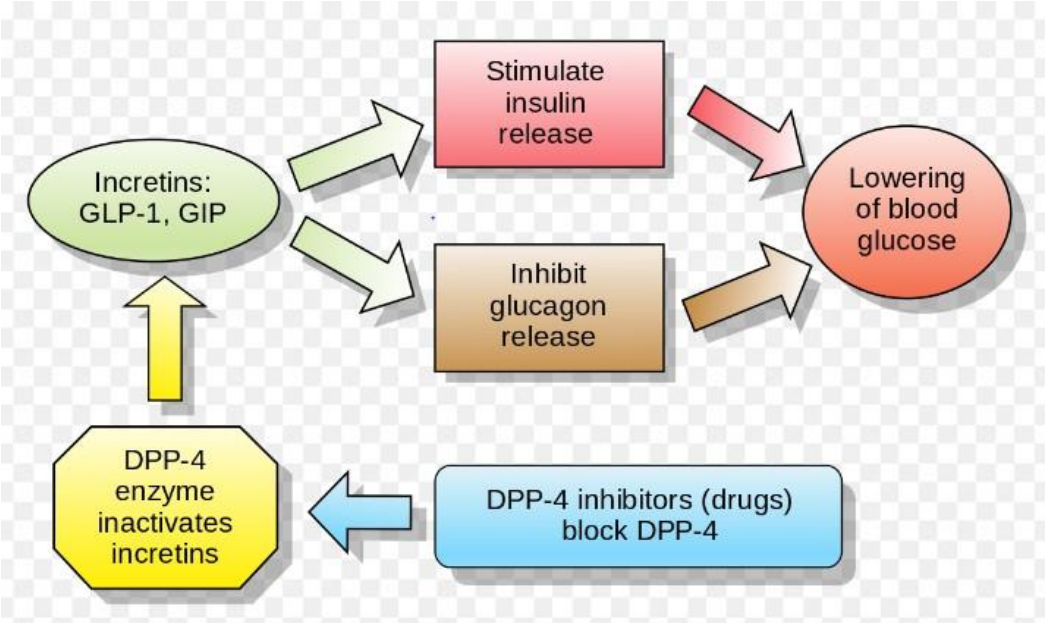
Sulphonylureas can cause **hypoglycaemia**—it is important the person with diabetes understands what a hypo will feel like, what to do if they do experience a hypo and why it happens.

It is best to stop the sulphonylurea once a rapid acting insulin is started.

It simply gets too confusing when altering insulin doses—is the injected insulin that worked with the meal or the sulphonylurea?

DPP4 inhibitors (Dipeptidylpeptidase -4 inhibitor)

DPP4 is an enzyme that deactivates GLP-1 (glucagon-like-peptide-1) and GIP (glucose-dependent insulinotropic polypeptide). After eating a meal these hormones inhibit glucagon release and increase insulin production, they also delay gastric emptying and all of the above lower blood glucose levels. DPP4 inhibitors block the enzyme DPP4 and enables the GLP-1 and GIP incretins to work properly so improving blood glucose control.



DPP4 inhibitors are now funded in NZ.

Vildagliptin (galvus) available in 50mg tablets

Galvumet which combines galvus and metformin. Available in 50/850mg tablets and 50/1000mg tablets.

- Vildagliptin can be used at a dosage of 50mg once or twice daily. It should be reduced to 50mg if eGFR is less than 50mL/minute/1.73m2. It does not cause hypos by itself but used in combination with sulphonylureas or insulin hypoglycemia can occur.
- Vildagliptin is an option for second- line pharmacological treatment as lifestyle intervention and metformin are still first line treatment.
- Gliptins are a class of medications that are weight neutral so are often considered before adding in sulphonylureas which tend to make people put on weight. They can cause a reduction of HbA1c between 7-12mmol after 12 weeks of treatment.
- There seems to be few side effects but the most common of these are nasal stuffiness, headache and dizziness which can occur in 6-9% of patients.
- Contraindications: do not use if liver enzymes (ALT or AST) are two and half times the upper limit of normal pretreatment. The use of DPP4 inhibitors have been associated with an increased risk of pancreatitis although there is still uncertainty and debate around the strength of this association but probably best to avoid in this group of patients.
- A very comprehensive Bpac article can be found here: https://bpac.org.nz/2018/vildagliptin.aspx

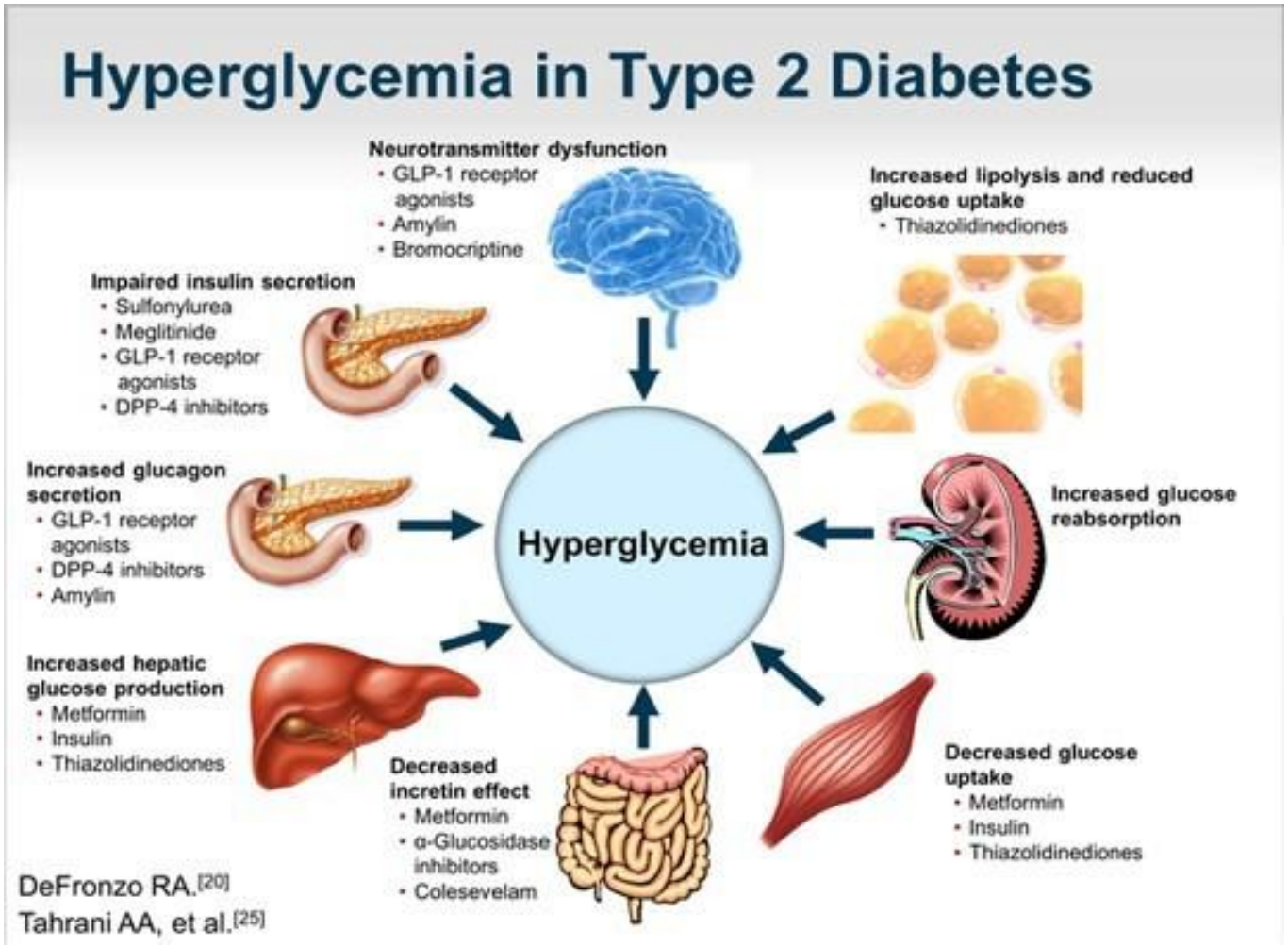
Other oral medications

A snippet of less used/available oral medication options.

Find all the up to date information at: https://www.nzf.org.nz/home/pdf

Class	Name	Background Information	Approx. cost for 28 days
Thiazoli-dinediones	Pioglitizone	• Makes cells more sensitive to insulin • Shown to decrease cardiovascular outcomes • Beneficial with some mild NAFLD, high Tg, or low HDL • Caution in patients with Renal dysfunction/liver failure • AVOID in patients with Heart Failure • 2.3-4.9kg weight gain • Side effects: Peripheral oedema, expansion of plasma volume, increased risk of Anaemia, Heart Failure • **Contraindications**: History of Heart Failure, Bladder Cancer, Osteoporosis • Only continue beyond 6 months with a reduction of 5mmol/mol in HbA1c	**FUNDED**
SGLT2 Inhibitors	Dapagliflizon Forxiga	• Decreases blood sugar by stopping excess glucose entering the blood via the kidney, and removes excess sugar in urine • Weight Neutral • Unlike others available outside of New Zealand, there are no advantages for better cardiovascular outcomes with SGLT2 Inhibitors available	**$100**
GPL-1 (Glugacon like peptide agonist)	Exenitide (Byetta)	• Helps with weight loss but no decrease in cardiovascular outcomes • Mimics endogenous incretins that are secreted post meals • Enhances insulin secretion • Suppresses appetite • Injected twice daily - at least 6 hours apart • Effective in reducing HbA1c by approximately 10mmol/mol • Advise patient to eat slowly and decrease portion sizes to avoid GI effects • Adverse effect: Nausea and Vomiting/diarrhoea. NOT to be initiated/ continued in patients with a history of pancreatitis	**5mg/0.02m l pen $270**
a-Glucosidase Inhibitors	Acarbose	• Taken orally and reduces the amount of glucose absorbed in the small intestine by blocking the a-glucosidase enzymes. • Can be used as first line or added to any of oral anti-diabetic meds • Hypoglycaemia can occur is used with insulin/sulfonylurea - patients should consume glucose not sucrose if hypos occur • Flatulence, soft stools and diarrhoea are common side effects • Abdominal distension, pain and hepatitis have been reported • **Contraindicated**: in people who are pregnant, have hepatic/renal, impairment, have inflammatory bowel disease, history of intestinal obstruction/hernia, previous abdominal surgery or GI disorders with malabsorption	**FUNDED**

A visual overview of oral medications mechanisms of action:



Each of these different medications has a different mode of action. Unfortunately, they are not all available freely in New Zealand. People emigrating into New Zealand may be using medications that we are not familiar with here.

INITIATING INSULIN

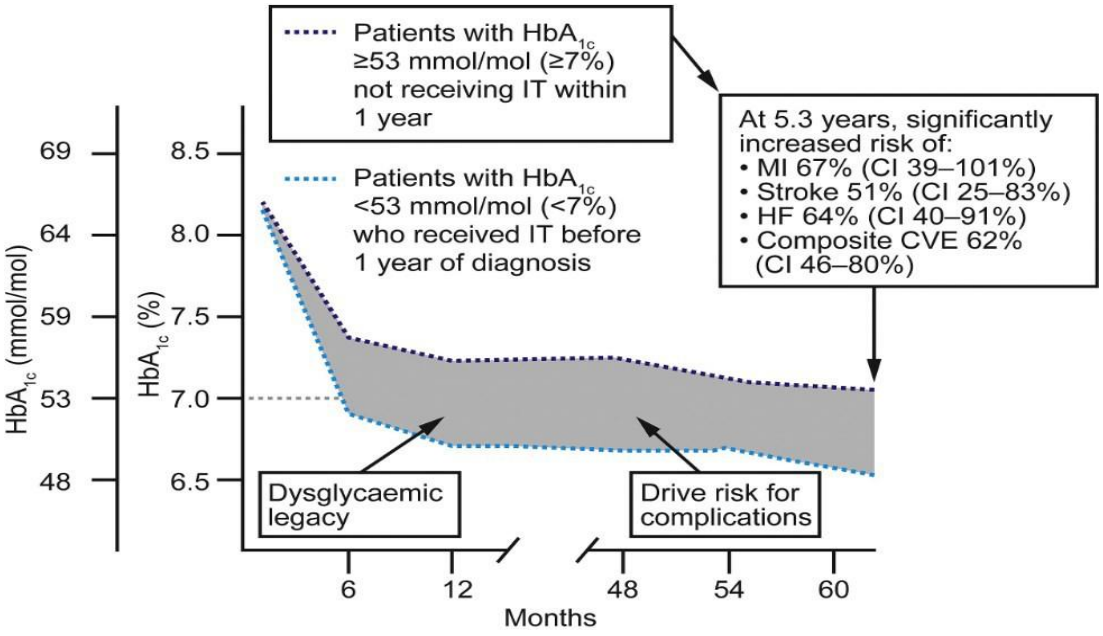
Introduction

When starting a person on insulin have a clear plan of what you are aiming to achieve. The agreed HbA1c target, know that they are already on maximum oral medication, and that the person has had some time to talk about their concerns. Have a check list, clear documentation and a follow up strategy to ensure the correct dose is obtained. The process takes time and the whole practice needs to support the additional time and effort this takes.

The following chapter starts with two check lists. One is the process involved, the next is an education check list for the patient. Then each of the points on the education check list is explained in detail. This may be completed in one session, but in reality, only a small portion of what is taught is retained. You will need to create multiple opportunities to reinforce the information in the short term, but also over the years. The DAR is always a great opportunity to ask questions related to insulin administration, hypo management, sharps disposal.

<u>The earlier the insulin is started, the more of the remaining beta cell function is preserved.</u>

This is a sobering graph showing the consequences of delaying insulin treatment (IT) by 1 year taken from Primary care diabetes review regarding clinical inertia.



If you need any support or further education regarding insulin initiation contact your local diabetes CNS

Lisa Smith Mob. 027 2756 5889 Ph. 06 8690500 ext. 8600 lisa.smith2@tdh.org.nz

Kim Cameron Mob. 021 579 756 Ph. 06 8690500 ext. 8600 kim.cameron@tdh.org.nz

Have a plan:

Before—During –After

Before starting insulin – consider these factors:

- What other things could be causing hyperglycaemia?
- Food, Fluids, exercise, stress, medication, lack of sleep, unwell, illness.
- Check understanding of why control is necessary.
- Do they take their oral meds?
- Are the orals at maximum dose for that patient?
- What are their blood glucose levels like – log book profile.
- (No testing, no insulin)
- Address their concerns about starting insulin.
- Script:
- Insulin (plus 2 units for priming)
- Needles BD microfine 4 mm / 5 mm
- Test strips if required.

Your practice needs to have a clear pathway for getting the initial dose of insulin to correct level.
Either physician led titration, or patient led titration can work.

During insulin initiation - consider these factors:

- 45 – 60 minutes.
- Use check list.
- Consider having check list for patient as well.
- Company handouts.
- Principles of adult education. (don't 'tell' patient what to do!)
- Lots opportunity for hands on with device
- Consider having first dose while in clinic.
- Key information vs extra information. Dose/pen/hypos
- Clearly arrange next contact moment.
- Document.
- Claim Insulin initiation through advanced primary options

After the initial education session – consider these factors.

- Phone call, email, face to face.
- Blood glucose levels.
- One 'topic' e.g. hypos – so tell me what it would feel like, what have you got prepared to treat…….
- document
- insulin adjusted with GP.
- next contact arranged.
- Exit appointment – ensure all information covered and documented.
- Next blood test arranged and encourage to make contact if anything changes.

Checklist

Using a check list helps you and the patient know what to expect and provides a framework for the education process. The following is one example.

Starting Insulin

Patient name: _____ **Date:** _____

Testing

When to test, how to test, how to record

Increase if unwell, test if hypo, looking for patterns.

Insulin regimen

Which insulin, what dose, and when to administer

How to use injection device and importance of priming

How to administer the insulin

System in place for titration

Sharps disposal

Storage of insulin

Hypoglycaemia advice

How to recognise, manage and treat hypos

Formulate individualised plan of action – what and where will their hypo kit be.

Discuss hypo prevention

Oral medications

Any changes

Lifestyle advice

Maintaining healthy weight by healthy eating and exercise

Risks with alcohol consumption and insulin

Driving

Ensure understanding of their responsibility to maintain a reasonable level of glycaemic control when driving. Particularly how to minimise their risk of hypos.

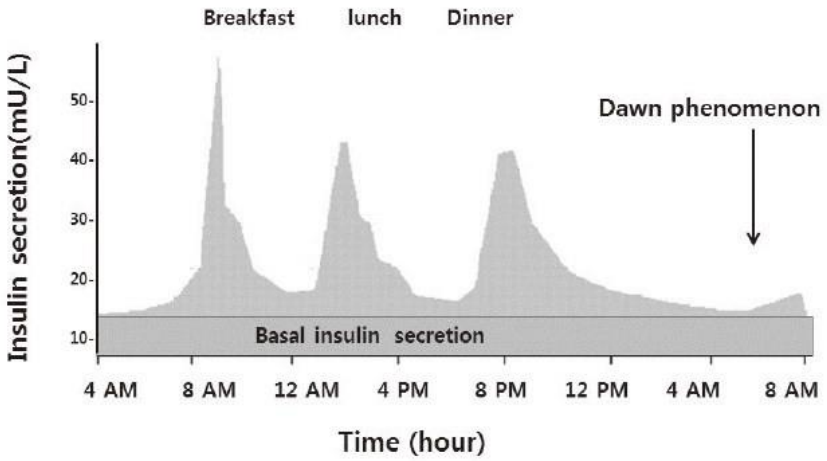
If vocational driver – refer for specialist advice.

Next contact time: _____

Practice Tip: DOCUMENTATION:

Set up a key word that mimics your education check list. It is then simple to document what you have covered today and what needs to be covered next time.

Background information



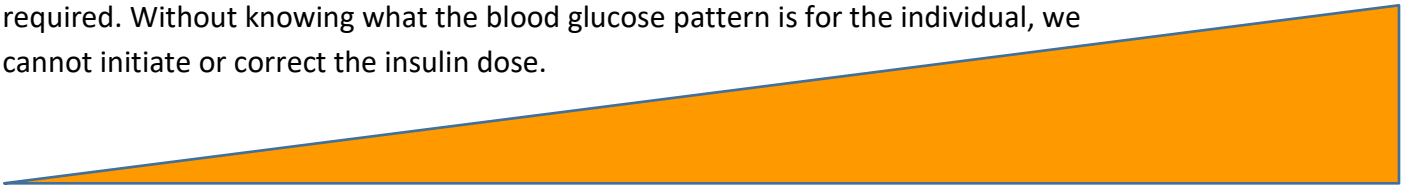
This is the insulin profile when we do not have diabetes. When people have diabetes, and their blood glucose control deteriorates the aim of treatment is to mimic this natural profile. (without causing hypos).

Initially the natural function of the pancreas is supported by adding in a basal insulin. The aim being to reduce the overall BGL, assuming that the beta cells can still make enough post prandial (after food) insulin on their own. Over time, the ability to make post prandial insulin diminishes and we need to also add a rapid acting insulin that matches the food intake (also called a bolus dose). This can be as a separate dose of rapid acting insulin, or a premixed insulin.

Blood glucose testing when starting/changing insulin

Refer chapter 5 on Monitoring for more information.

While insulin is being initiated and titrated to the correct dose, a commitment to some glucose testing is required. Without knowing what the blood glucose pattern is for the individual, we cannot initiate or correct the insulin dose.



Bare minimum testing → most intensive testing

Pre breakfast, pre bed → pre and 1 ½ hour post meals (6) + pre bed (7) plus 2 am (8 tests)

2 am testing:

If starting a new insulin or concerned about overnight hypos (often people sleep through these) ask the person to check at 2 am. Clues to overnight lows – HbA1c is lowish, but daytime testing high. Waking with nightmares or sweaty, elevated results in am (there can be a rebound like effect) or simply that something just does not make sense.

Paired testing:

Refers to tests before a meal and 2 hours after a meal. The thinking is that if the rise between the two tests is more than 3mmols, a rapid insulin is required with the meal.

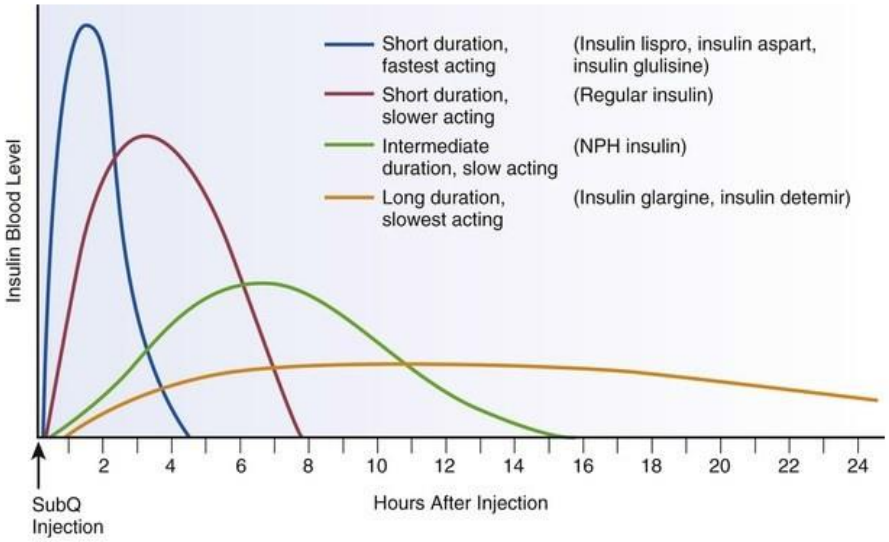
Insulins to choose from:

Three companies provide insulin – Sanofi, Novonordisk and Lilly. Get to know the reps and keep up to date with their handouts. There are a limited number of insulin options – Long acting, intermediate acting, rapid acting and a number of premixed options. There is also short acting – but rarely used in primary care. Most clinics are very familiar with 3 – 4 insulins and get to know how they work and when one is more appropriate than the other. Be aware there are more options than this and be open to trying different types. One insulin option will not work for every person. The trick is to look at the blood glucose profile and fit the insulin that best matches, while also considering the person's lifestyle and the goals of management. Consider that a person may need one insulin in the morning and a different insulin regimen in the evening; or weekday at work is one regimen and weekends they take something different.

Insulin regimens:

Simplest most complex

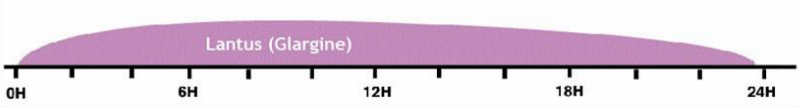
Long acting daily	Intermediate daily and BD	Premixed	Basal bolus
Once day, doesn't intrude into lifestyle (often taken at night) Dose is same time every day and does not need to be taken with food.	Works well for people with high BGL at one end of day but not the other. Simple. Easy to progress from once a day to twice.	Gives some post-prandial control. Once twice or three times a day.	Most flexible, can achieve great results pre and post prandial Consider one, two or three bolus doses depending on need
Gives no post prandial control (relies on some residual insulin supply) Impact on BGL may not cover 24 hours	Gives no postprandial control.	Best for people whose lifestyle is routine. Less flexibility, but also less work. Taken just before or with meals.	Works best if testing pre (and post) meals, CHO counting and awareness of activity impact.



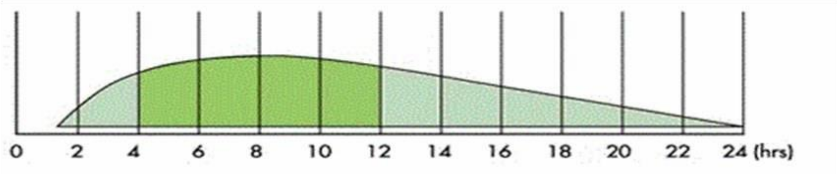
Take time to discuss with the person the difference in insulin regimens. You may be surprised what they choose.

Basal Insulins (New Zealand)

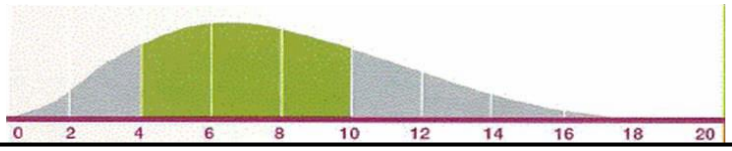
Lantus

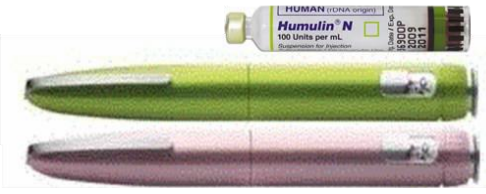


Protaphane



Humulin NPH





Rapid Insulins (New Zealand)

Peak at 1-3 hours, lasts up to 5 hours

Insulin type	Brand name	Manufacturer	Nature	Appearance
Insulin lispro	**Humalog®**	Lilly	Analogue	Clear
Insulin aspart	**NovoRapid®**	Novo Nordisk	Analogue	Clear
Insulin glulisine	**Apidra®**	Sanofi	Analogue	Clear

Humalog®

NovoRapid®

Apidra®

Premixed Insulins with analogue (rapid)

- Includes rapid-acting insulin.

Insulin type	Brand name	Manufacturer	Nature	Appearance
Lispro 25%/lispro protamine 75%	Humalog® Mix25™	Lilly	Analogue	Cloudy
Lispro 50%/lispro protamine 50%	Humalog® Mix50™	Lilly	Analogue	Cloudy
30% rapid-acting / 70% protaminated insulin aspart (rys)	NovoMix® 30	Novo Nordisk	Analogue	Cloudy

Humalog® Mix25™

Humalog® Mix50™

NovoMix® 30

The following insulins are not used as much but are still available in New Zealand. They contain short acting, or human insulin as op- posed to analogue insulin (rapid acting) Note—human insulin is manufactured in a laboratory using recombinant DNA technology— not from humans per say!

Short acting insulin with human component

Actrapid®

Peak at 2–5 hours, lasts 6–8 hours

Insulin type	Brand name	Manufacturer	Nature	Appearance
Neutral	**Actrapid®**	Novo Nordisk	Human	Clear
Neutral	**Humulin® R**	Lilly	Human	Clear

Premixed insulins with human insulin (short acting)

- Includes rapid-acting insulin.

Insulin type	Brand name	Manufacturer	Nature	Appearance
Neutral 30%/isophane 70%	Humulin® 30/70	Lilly	Human	Cloudy
Neutral 30%/isophane 70%	Mixtard® 30	Novo Nordisk	Human	Cloudy
Neutral 30%/isophane 70%	PenMix® 30	Novo Nordisk	Human	Cloudy
Neutral 40%/isophane 60%	PenMix® 40	Novo Nordisk	Human	Cloudy
Neutral 50%/isophane 50%	PenMix® 50	Novo Nordisk	Human	Cloudy

Humulin® 30/70

Mixtard® 30

PenMix® 30

PenMix® 40

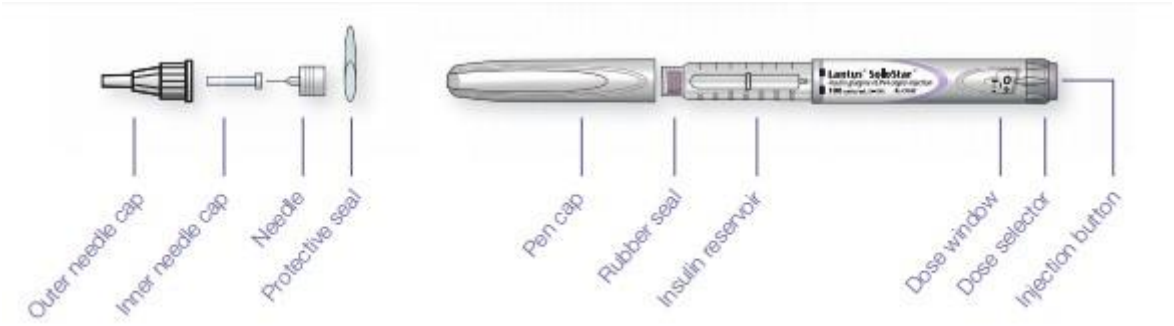
PenMix® 50

Devices

Consider different devices – disposable (best if there is less dexterity, convenient), or non-disposable (environment?), what does the patient prefer. Familiarise yourself with the pens prior to starting a patient on insulin. A well-resourced kit such as the one below means you will have all the gear needed in one place in your clinic.

Practice tip:

A well-resourced demonstration kit such as this ensures that you have all the demonstration pens, needles, cartridges and the dummy tummy in one place.



Follow manufacturer's instructions. https://www.lantus.com/-/media/ems/conditions/diabetes/brands/lantus/consumer/lantus-solostar-pen-guide.pdf

Make sure you know which insulin goes with which pen.

Technique

Wash your hands.

Get supplies.

Remove the pen cap.

Take out new pen needle.

Position the needle along the axis of the pen.

Pierce the center of the cartridge.

Screw on the needle.

Pull off the outer and inner shield.

Prime the pen using 2 units

Perform the injection using the recommended technique.

Count to 10 before withdrawing pen.

Sharps containers

available in pharmacies for patients

Sharps containers are **ONLY** for sharps!

- Disposable pens can be thrown away—**only the needle** goes into the sharps container.
- Insulin cartridges can be thrown away—**only the needle** goes into the sharps containers.
- Plastic caps, band-aids, tissues ...do not belong in sharps containers
- Lancets can be disposed of in sharps container
- The aim is one small sharps container should last about a year!

Pharmacy

- For those prescribed insulin or other injectable medications*
- There may be a part charge up to $5.00
- Available at any pharmacy who will also arrange disposal as required
- Patients need to provide a current prescription or have collected prescription at the pharmacy previously.

*note: not for needle exchange programme sharps

Insulin storage

Insulin is stored in the fridge

Once opened - store at room temperature (so the injection does not hurt as much) Dispose of opened insulin 28 days after opening.

Check the expiry date before using

Look at the insulin—does it look like it normally does? Any particles, discolouration, crystal formation?

Frozen insulin cannot ever be used—throw away.

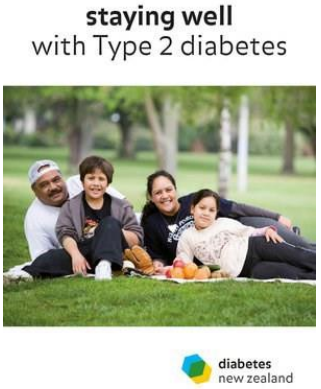
Do not keep insulin in the glovebox of the car—the temperature can rise too far.

Cooling wallets are designed for people travelling to hot climates and are activated by water—no refrigeration needed. Each soak in water keeps the bag cool for 2 days.

The Frio wallet is available in different sizes and available here:
https://www.mediray.co.nz/diabetes/product-category/insulin-cooling-wallets/

Hypoglycaemia

- What does a hypo feel like? People need to be clear between the symptoms of hypoglycaemia and simply feeling tired/rundown. If possible, test.
- Give written information.
- Ask what they have with them to treat a hypo or have in their car.
- No driving for ONE hour after a hypo has been successfully treated.



See the DNZ booklet for more detail

Waiting gives the glucose time to be absorbed

How to treat a hypo

If possible, check your blood glucose on your meter. It may be something else making you feel unwell.

If in doubt, or if you are feeling very unwell, treat your low blood glucose anyway. Remember, 'if in doubt, treat'.

STEP ONE

Eat or drink one serving of a quick-acting carbohydrate. Choose one serving from the list opposite.

STEP TWO

After 10 minutes, test your blood glucose level again. If it is still less than 4mmol/L eat another serving of quick-acting carbohydrate.

STEP THREE

Once your blood sugar is above 4mmol/L, follow up with more substantial carbohydrate food.

If it is your mealtime, eat your meal. Otherwise have a snack such as:

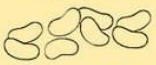
- 1 glass (250ml) of low fat milk,
- 1 medium raw fruit
- 1 small tub of low fat, 'diet' yoghurt
- 3-4 crackers
- 1 slice of wholegrain bread as a small sandwich.

Quick-acting carbohydrate

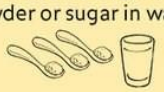
4–5 Dextro Energy tablets

4–5 Glucotabs

7–8 jelly beans



3 teaspoons of glucose powder or sugar in water



A small glass of fruit juice or sugar-sweetened soft drink, not diet (100–150mls)

3 teaspoons of honey or jam

Make sure your family and friends know the signs of a hypo and how to help you.

When you have treated your hypo, ask yourself why it happened and what you need to do to stop it happening again.

You should not have any more than a couple of hypos a week.
If you can't find a cause or they keep happening, see your healthcare team.

Pictures can help

This was done by Claire when her patient could not remember what to do if having a hypo:

1) Feeling dizzy →	
2) Test blood sugar →	
3) 3.0-4.0 → OR <3.0 →	  
4) Wait 10 mins →	
5) Retest →	
6) <4.0 → OR <3.0 →	  

7) Wait 10 mins →	
8) Retest →	
9) Have a snack → OR Next meal if due →	 

Practice point:
Ask the person—"What have you got with you today if you needed to treat a hypo?"
or "What have you got in the car?"

Hypo unawareness—this happens when someone has had so many hypos that their body no longer thinks it is unusual and forgets to warn them when their blood glucose levels drop below 4. This means they can have a blood glucose level of 2 or less in some cases, and yet feel absolutely normal. This puts them at extreme risk of going unconscious without warning. They can partially reverse this condition by keeping their blood glucose levels a little higher with NO hypos for a number of weeks or months. This helps 'reset' their body warning system so that they start experiencing symptoms of hypoglycaemia when their blood glucose levels fall below 4mmols/L. A more scientific explanation can be found in the page about hypo unawareness.

Alcohol

Alcohol is very energy dense and it is easy to gain weight if drinking regularly.

- Alcohol inhibits hepatic gluconeogenesis and induces hypoglycaemia whenever gluconeogenesis is required to maintain normal glucose levels. People with diabetes on sulphonylurea or insulin should be warned about the blood glucose-lowering action of alcohol.

The recommendations for people with diabetes remain the same as for all New Zealanders.

Some tips from the American diabetes association:

- If you have diabetes, do not drink on an empty stomach or when your blood glucose is low, since your risk of low blood glucose increases after drinking.
- Don't skip a meal if you are going to drink. (If you use carbohydrate counting to plan meals, it is important to understand how the drinks you choose affect your blood glucose and often your insulin dose will need to be decreased if having more than one drink)
- Wear an I.D. that notes you have diabetes. If you are in a setting where people are drinking alcohol, hypoglycaemia may be mistaken for being drunk.
- For mixed drinks, choose calorie-free drink mixers like diet soda, club soda, diet tonic water or water.
- As with anyone with or without diabetes, do not drive or plan to drive for several hours after you drink.

Alcohol can cause hypoglycaemia shortly after drinking and for up to 24 hours after drinking. If you are going to drink alcohol, check your blood glucose:

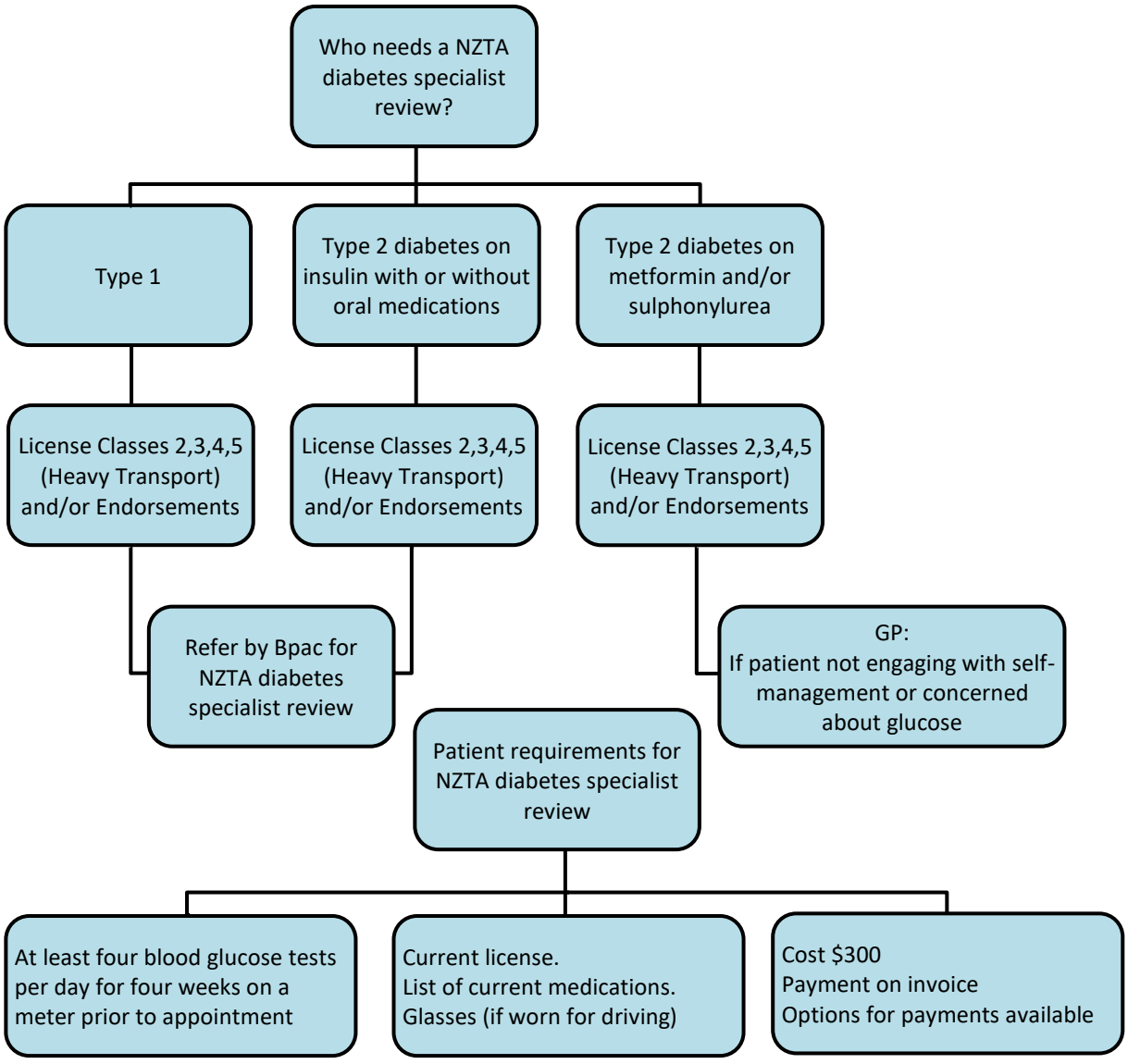
- Before you drink
- Before bed and throughout the night—needs to be over 8mmols before you go to sleep

If your blood glucose is low, eat something to raise it and be sure to check again before you go to sleep, and again over night to be sure it's not dropping too low.

Wondering if adding a glass of wine or beer might help lower your blood glucose if it is high? The effects of alcohol can be unpredictable, and it is not recommended as a treatment for high blood glucose. The risks likely outweigh any benefit that may be seen in blood glucose alone.

Driving

- The biggest risk is that a person has a hypo while driving causing an accident.
- Think—over 5 to drive
- Tips: Test prior to driving and regularly while on a long drive—every 2 hours is recommended.
- Keep your blood glucose meter with you while driving for evidence of regular testing
- Have a hypo kit in the car—nonperishable sweet items—glucose tablets and a longer acting CHO—muesli bar, crackers or similar.
- The NZTA advise that you should not drive for:
    - one hour after a mild hypo
    - 24 hours for a sever hypo (requiring some else's help)
    - 1 month if severe hypo while driving. An urgent review is required.



A Johnstone - Nurse Coordinator NZTA Diabetes Specialist Review – Waikato Regional Diabetes Service, 26 Clarence St, Hamilton 3204.

Titration

- Ensure you have up-to-date contact details – cell phone, landline, email, NOK.
- Make a time and date you will contact them for BGL and to check in how they are managing.
- every phone call is an opportunity to reiterate the education you have given them. Pick one topic each time and go over it. Ask them for what they remember so you can ensure they did understand all the detail.

Typically, a person will be started on quite a small amount of insulin then the dose is titrated up to what they actually require. Talk with the person about what they may expect. This process may take some time and ongoing commitment to blood glucose testing.

A nurse cannot change a prescription:

- If the GP writes a maximum dose in the prescription, the nurse can support the patient to increase a dose up to that point.
- Patient can self-titrate – at GP direction (using titration rates provided by company) – ensure that patient knows an upper limit to titration – otherwise they may just keep going!
- A weight gain of 2 – 3 kgs is reasonably normal (not everyone gains weight – especially if insulin started earlier)
- Contact every 3 – 7 days until BGL within target. Don't take too long to reach ideal dose (risk is patient disengages) If the patient is quite insulin resistant, they may need large doses of insulin and changing a couple of units once a week may take months to reach the ideal amount.
- Consider a percentage increase rather than a unit increase if the person appears to be needing quite a number of increases.

Always be aware that insulin doses may need to decrease if the person is experiencing lower than target blood glucose levels. Talk to the prescriber about this.

- Basal insulin needs to be given at the same time each day
- Premixed insulin must be taken immediately prior to a meal.

Some general notes for the prescriber:

There is no specific maximum amount of insulin, titrate upwards until blood glucose levels are at target. If a person is insulin resistant, they may require larger amounts of insulin. If the patient is gaining weight or regularly hypoglycaemic; they are on too much insulin.

Type 2 diabetes is not an acute condition – aim to commence and titrate insulin safely, but efficiently. Be clear about the agreed HbA1c target with the patient. Tight control is not the aim for everyone.

Troubleshooting - I HELP

Try this mnemonic if there is unexplained hyperglycaemia:

I HELP

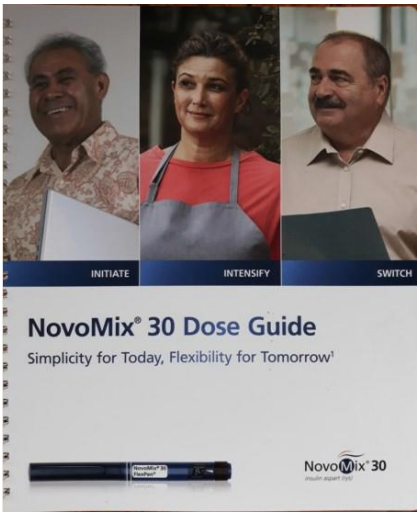
I for Insulin	Is the correct insulin being used? Is the correct insulin in the correct pen? Is the insulin taken at the right time and sites rotated? Is the patient priming the needle and changing it regularly? Are doses of insulin being missed? Is mixed/cloudy insulin being mixed prior to use? Is the insulin being stored correctly? Is the insulin potent/expired/gone off due to extreme temperature change? Is the insulin being absorbed? (check the site when patient is standing for lumps/bumps) Is the correct needle length being used?
H for Health status	Is there an underlying illness? Has a new medication been prescribed e.g. prednisone that changes glucose metabolism? Is there a change in renal function? Has there been change in eyesight making dialling correct dose difficult? Is the patient dehydrated? Has the patients weight increased lately? Check for ketones.
E for Equipment	Check glucose meter and insulin pen are working. Check strips/insulin expiry dates. Check storage of strips (not out of container). Is the technique to test BG and administer insulin correct? (observe technique) If on insulin pump—contact pump team. Check patient is washing hands prior to testing.
L for Lifestyle	Has there been a change in diet e.g. a new food/drink been consumed? Has there been a change in exercise habits? Check alcohol and drug consumption.
P for Psychological issue	Are there stressors that impact on the patient's ability to manage diabetes? Are the prescribed doses of insulin and oral medications being taken? Is there a fear of hypoglycaemia that leads to a reduced dose of insulin administered? Does the patient have needle phobia? Are there underlying mental health issues? Are doses being missed to control weight?

Intensification

There are times when a person needs a different insulin regimen.

- They started on a very simple regimen of one daily dose of insulin, but they no longer achieve adequate control on this.
- They require fewer doses of insulin (i.e. as people age, a basal bolus regimen that requires CHO counting and dose adjustment may be too complex for them to manage, or they simply don't wish to any longer).
- They are planning pregnancy and require excellent control of their diabetes in the preconception time.

Ensure that your clinic has up to date resources from each of the companies. Contact the representative if you have any questions.



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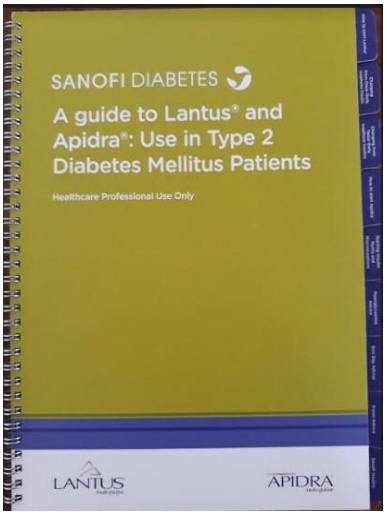

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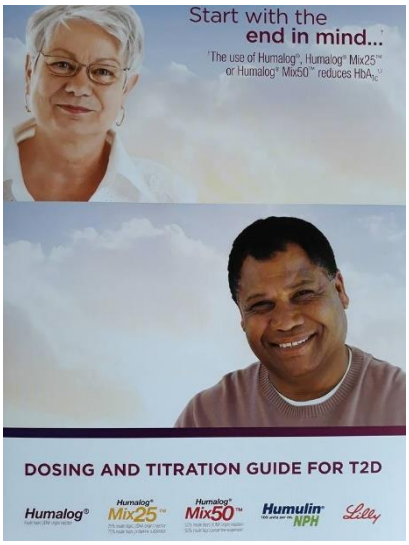
SANOFI

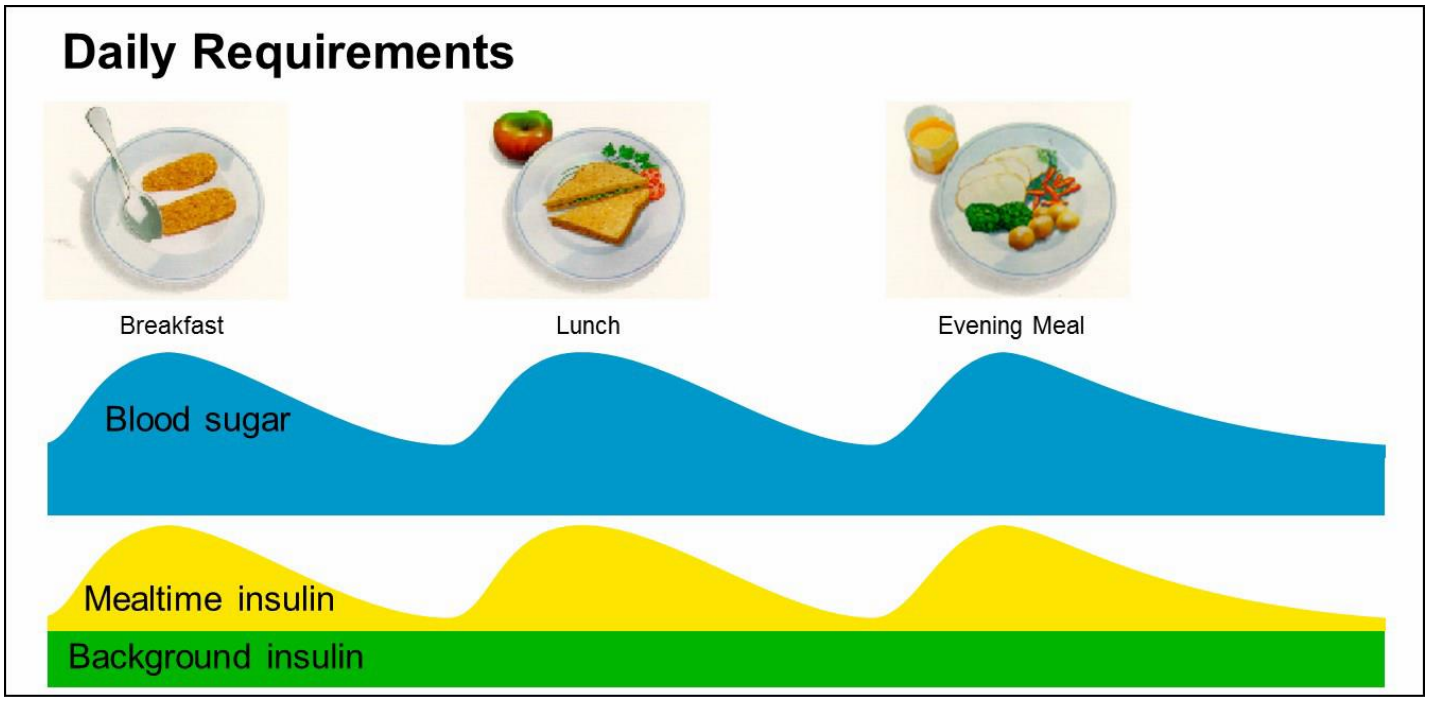


Brian Swain
021378475
Swain_brian@lilly.com
800500909
Eli Lilly and Company (NZ) Limited

CURRENT FEB 2019 NB:

These are Waikato contacts - they will be able to redirect you as necessary.

Summary



- Remember what the person is trying to achieve—individualise targets.
- Often a mixture of different insulins is required over time.
- BG testing is aimed at highlighting a pattern so that the most appropriate treatment is tailored to the individual need.
- Use a check list to start.
- Getting the right dose of insulin takes a number of phone calls, appointments, etc.
- Go back over some of the information during DAR or if in clinic for other reasons.
- Reinforce healthy lifestyle messages at each contact.

SICK DAY MANAGEMENT

This refers to periods of minor inter-current illness that requires changes to the persons usual diabetes self-management. It is important that patients are educated on how to deal with sick days and have an individualised plan and this should be revised at each annual review.

"Do you know your sick day rules?"

Key Concepts of sick day management

- Have a sick day management plan
- Never stop your usual insulin, doses may need adjusting
- Hourly fluids to reduce the risk of dehydration (1 glass/cup)
- Increase the frequency of blood glucose monitoring and blood ketones as necessary (1-hourly if ketones present, if not then 2-hourly if BG >15mmmol)
- Diabetes medication dose adjustment as necessary (type 2) and insulin adjustment (type 1 & 2).
- Metformin may need to be stopped
- Supplementary insulin as necessary (use individualised plan)
- Health professional number and name for assistance when sick—especially after hours.

HHS: high glucose levels can cause hyperosmolar hyperglycaemic state (HHS).

This condition is characterised by hyperglycaemia, hyperosmolarity and an absence of significant ketosis. The blood glucose is usually >30mmol with a raised osmolarity >320mOsmol, dehydration with no significant ketones/or acidosis.

There is insulin deficiency and this condition can lead to coma if untreated.

Always test for ketones if a person with type 1 or type 2 diabetes presents to general practice and is unwell.

Type 1 Diabetes

- patients can develop diabetic ketoacidosis (DKA) when unwell with an increase in levels of counter regulatory hormones which leads to hyperglycaemia and ketone bodies due to not enough insulin present
- They will often require a temporary increase in insulin which can include basal rates and supplementary rapid acting insulin 1-2 hourly if ketones are present and while they remain unwell.
- Dehydration must be avoided with frequent fluid replacement hourly (aim for at least a cup or glass hourly).
- Patient to contact their Diabetes nurse specialist or present to ED if hyperglycaemia/ ketones/vomiting/abdominal pain/fruity breath or shortness of breath are present

Almost all sick day management can happen in primary health care setting.

Preparing the patient prior to them getting sick is important.

HYPOGLYCAEMIA UNAWARENESS

Hypoglycaemia unawareness results from deficient counter regulation, where falling glucose fails to activate the autonomic nervous system to produce neuroglycopenic symptoms that normally help patients identify and respond to episodes (i.e., sweating, palpitations, hunger)

Summary: epidemiology and natural history of hypoglycaemia

- Severe hypoglycaemia is common in insulin-treated diabetes
- Severe hypoglycaemia **is more common in type 1 diabetes** than in insulin-treated type 2 diabetes
- The frequency of severe hypoglycaemia increases with duration of insulin therapy in type 2 diabetes
- The frequency of severe hypoglycaemia in children appears to be falling but is an increasing problem in the elderly
- Hypoglycaemia is associated with serious morbidity and significant mortality

Treatment

Is a range of medical and behavioural modifications:

- Revise blood glucose and HbA1c targets (this will probably mean a reduction in insulin doses for a set time period)
- Education on hypo awareness, identification of personal risk factors and lifestyle modifications to deal with these risks
- Consider continuous glucose monitoring to raise awareness, FreeStyle Libre (if patient is able to pay for cost of flash glucose monitoring)

ORAL HEALTH

People with diabetes (type 1 & 2) have a high prevalence of oral problems such as dental caries, xerostomia (reduced or absent saliva flow causing dry mouth), periodontal disease, taste problems and oral infections. Periodontal disease which is an inflammatory condition destroys the connective tissue surrounding the teeth which can lead to tooth loss. These conditions are caused by poorly controlled blood glucose levels which cause susceptibility to bacterial infections in the mouth.

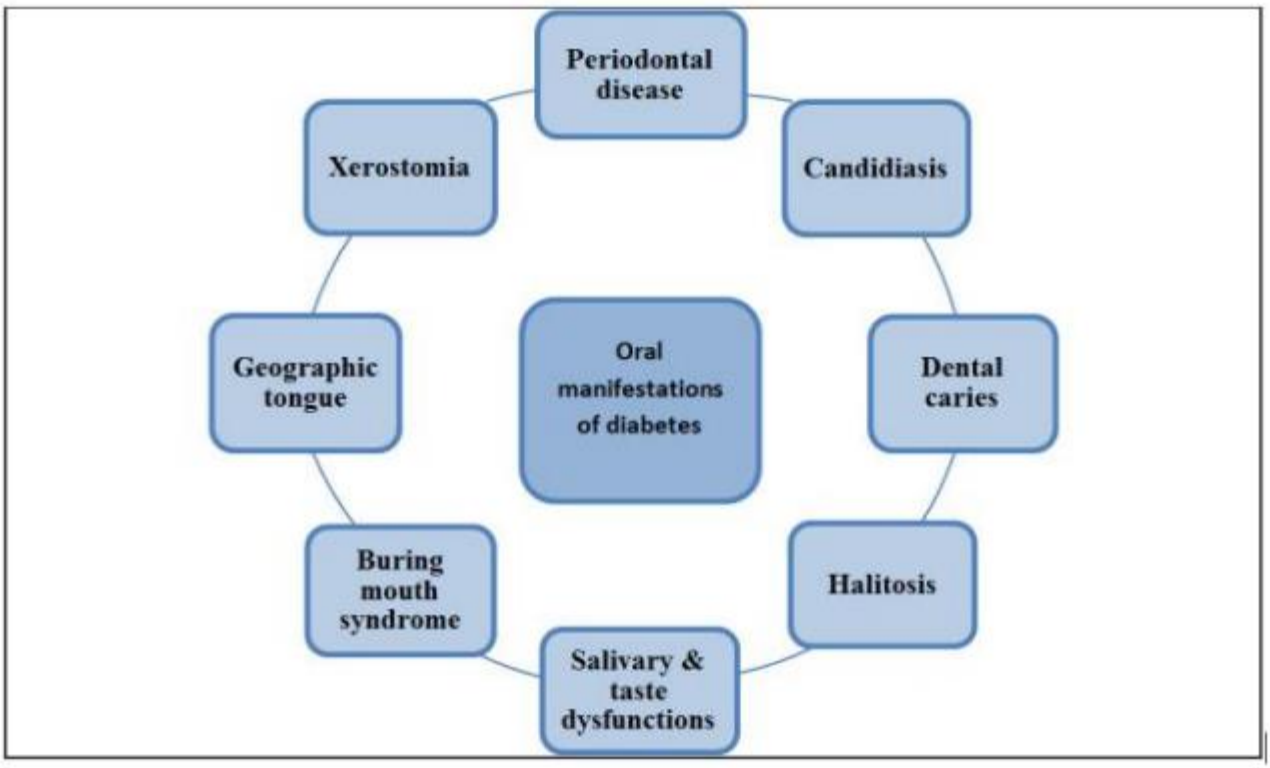


Figure 5: Oral manifestations among diabetic patients [23] [41] Open Access Macedonian Journal of Medical Sciences. 2018.

Patient education includes being aware of the risk for periodontal disease and the importance of maintaining oral health as part of their diabetes management. This includes regular dental checks and care, with collaboration between patient and all health care professionals. Advice should include the use of mouthwashes to prevent caries and plaque build up to prevent periodontal problems. Tooth brushing twice daily, with dental floss once a day to control plaque control.

GASTROENTEROLOGY

Diabetes Management for Gastroenterology Procedures

On most occasions these are outpatient procedures. All situations should be discussed with GP and practice nurse. However, the Endoscopy unit have specific endoscopy protocols for the management of patients with diabetes who are undergoing endoscopic procedures.

These include upper endoscopy, endoscopic ultrasound, endoscopic retrograde cholangiopancreatography, bronchoscopy and anterograde double balloon.

There is also the preparation for lower endoscopic procedures which include colonoscopy and retrograde double balloon procedure, Klean-Prep or Pico-Salax preparation and also capsule endoscopy. These can either be morning or afternoon procedures but for people with diabetes we would expect that these procedures are scheduled for the mornings.

When patients are on insulin, they will **need an insulin reduction** for all these procedures and this is dependent on the preparation involved for procedure in terms of nil by mouth and bowel prep involved. This will involve the days prior to the procedure and the day of procedure as well and the patient's current blood glucose profile must be taken into account as well. This is particularly relevant if they have tight control or you feel that their current dosage might be a bit too high. It will also depend on whether they are using basal/bolus or premixed insulins.

There will also be necessary reductions to medication doses as well including metformin and sulphonylureas the day before procedure and day of procedure.

TRAVEL GUIDELINES

There are a number of recommendations to be given to people with diabetes so that they can travel safely. These include planning travel with the below safeguards in mind:

- Have a medical consultation prior to travel to assess diabetes control and check immunization status
- Ask GP to provide a covering letter for travel stating that the person has diabetes requiring use of insulin, syringes/pen devices, monitoring equipment such as insulin pumps/continuous glucose monitoring devices
- Check with airline if continuous monitoring devices can be operated during flight
- Advise to use travel insurance
- Advise to find out from airline about security guidelines in countries being visited
- Carry supplies on board with the person in their hand luggage
- Do not put insulin supplies in checked in luggage as it will be exposed to extreme temperatures which may degrade the insulin/lose efficacy
- It is a good idea to also carry a printed list of prescriptions in case of medication loss or theft of bag.

If a person is on insulin and changing time zones, they will need to consider how they will change their insulin to meet their needs while away. Any advice given will depend on if the patient is on basal only or basal plus rapid acting insulins. Work out when the most likely time is that the person will be having a meal, and how they can change into the new time zone. Remember there is quite a difference in the insulin needs between a person with type 1 diabetes (contact the diabetes clinic for advice) with absolute insulin deficiency and a person with Type 2 diabetes and some residual beta cell function.

PRE-PREGNANCY PLANNING

It is important that a woman starts the pregnancy with well controlled diabetes so that the baby's vital growth and development is optimised.

Discuss planning pregnancy at every annual review during child-bearing years

Target HbA1c	If on no treatment—the closer to normal glucose levels the better.	< 40mmols
	If taking sulphonylurea or insulin with no hypos.	53mmols
	Defer pregnancy, ensure reliable contraception until BGL stable	> 85mmols

See GP for discussion around medications

Contraindicated in pregnancy:

- Statin
- ACE
- Sulphonylurea—consider starting insulin prior to pregnancy.

Recommended prior to pregnancy:

- Folic acid 5 mgs
- Retinal screening within last 6 months
- Stop smoking and alcohol
- Weight management

The aim for pregnancy is a healthy baby and a well mother. By focusing on pre pregnancy care, the whānau start the pregnancy with the best outcomes in mind. During pregnancy and 3 months prior to, aim to achieve normoglycemia so that the baby is conceived and develops in conditions as close to a pregnancy uncomplicated by diabetes as possible.

At times, this means a lot more effort from the woman with food choices, activity and testing blood glucose. Recommended reading: https://www.nice.org.uk/guidance/ng3/chapter/1-recommendations#preconception-planning-and-care-2

- Once pregnant the woman can be referred to Women's Health on 8690500 ext. 8119 or Diabetes service ext. 8060 for queries regarding Diabetes in Pregnancy and referrals
- Women will be in the care of Obstetrician, Diabetes team and dietician once referred into secondary care

PAEDIATRICS AND YOUTH

If a child presents with a concurrent illness, the role of general practice is to assess and treat the illness with the support of the paediatric team as required. The paediatric team members are:

Clinical Nurse Specialist – Kim Cameron 021 579 0756

Paediatrician - Dr Stan Ng

Taken from the Starship website for parents: āat to do when your child is sick:
https://www.starship.org.nz/sick-days

> *Children and young people with diabetes generally don't get sick any more often than other children if their diabetes is well managed. However, illness can have a significant impact on diabetes. The stress hormones produced during illness can cause changes to blood glucose levels. Levels can go high or low depending on the type of illness.*
> *Infections that cause fever and pain often cause high blood glucose levels.*
> *Gastroenteritis (vomiting and diarrhoea) can cause low blood glucose levels. Vomiting can also be a sign of not enough insulin.*

If your child is sick:

- Always give insulin, but call the diabetes doctor/nurse for advice on changes to the usual amount
- Take your child to your GP for assessment and treatment of the underlying illness
- Test blood glucose levels 2 hourly
- Check blood or urine ketones 2 hourly
- Encourage your child to drink plenty of fluids

If your child is unable to eat:

- If blood glucose levels are under 10, give fluids with sugar such as diluted juice or jelly (not sugar free)
- If blood glucose levels are 10 or higher, give water or sugar-free fluids
- If your child has been vomiting or has diarrhoea, Pedialyte™ may be recommended by the diabetes doctor or your GP (this can be purchased from the pharmacy)
- Relieve the symptoms of pain and fever with Paracetamol or Ibuprofen

Even teenagers who usually manage their diabetes independently need to be looked after when they are sick.

APPENDICIES

Appendix 1: Key contact people

Appendix 2: Setting up Key words

Appendix 3: Recall process

Appendix 1: Key contacts

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Pharmaco
Always from the heart.

Brian Swain 021378475

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Eli Lilly and company (NZ) Limited

PO Box 109197 New Market

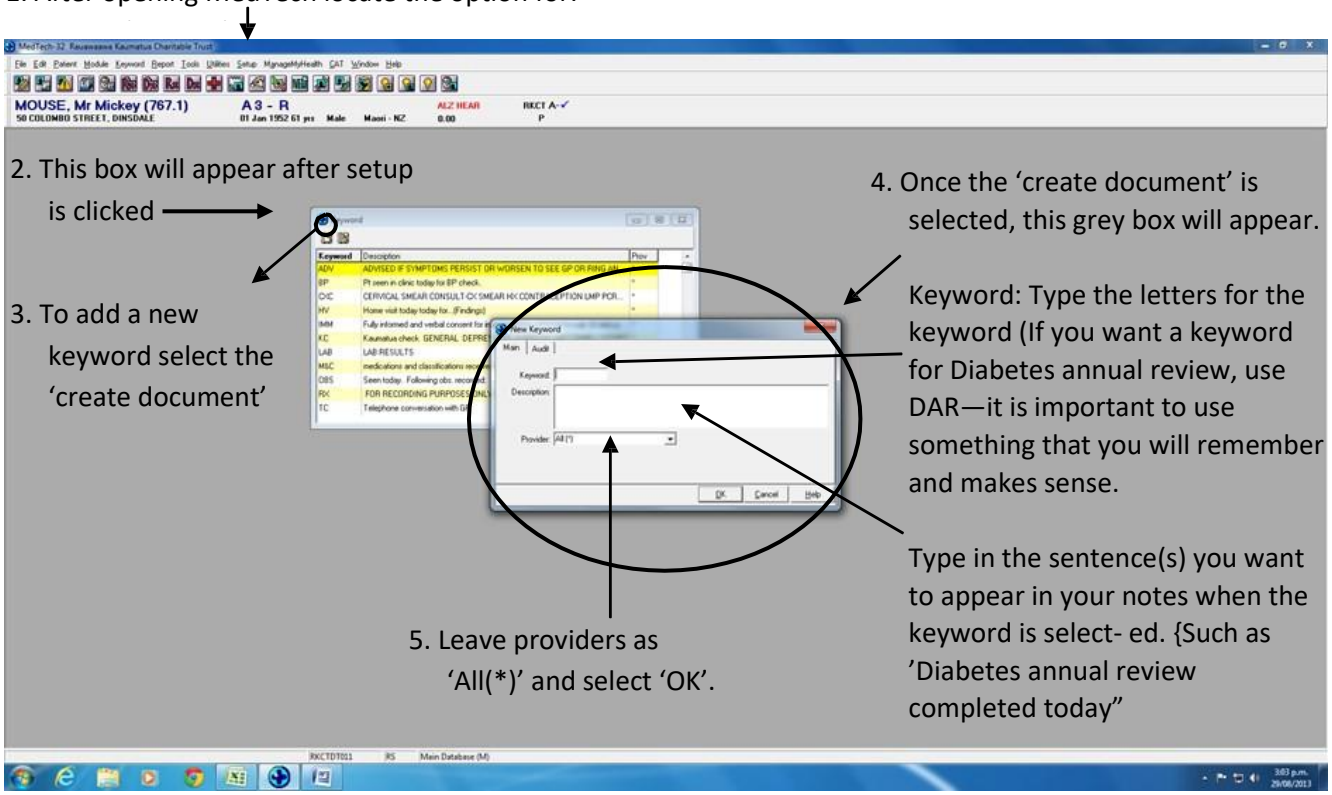
Lilly
DIABETES

CURRENT FEB 2019 NB These are Waikato contacts- they will be able to redirect you

Appendix 2: Key words

Using **KEYWORDS** can make writing notes easier and helps keep documentation consistent between users. This is an example on MedTech—your PMS system will have similar capabilities. Talk with your administrator to set up keywords for your practice:

1. After opening MedTech locate the option for:



Now to practice:

Using MedTech, open the Mickey Mouse practice screen.
In the clinical notes type. DAR (full stop DAR) and press 'Enter', and it will automatically self-populate what you set up.

The headings listed here guide what you are going to record. You start typing after each heading and then press **ENTER**. This will move to the next heading down the consult and you can start typing beside it, repeating until all headings have an entry beside them:

E.g. Diabetes annual review completed today

PLAN: HbA1c remains high, requires more oral medication—task to GP.

CLINICAL FINDINGS: BP LIPIDS WEIGHT *all stable*

NUTRITION: Food plan completed 2016—discussed today and remains very similar. Portion size the biggest issues along with eating out at weekends.

EXERCISE: sedentary at office but has been walking across carpark and up 4 sets stairs.

Try to use keywords for longer blocks of typing.

Aim: to have keywords you can recall easily and that will help save you time.

Appendix 3: Recalls

Every practice will have a different process/system - the key, is to have a system and a key person assigned to:

- monitor/do the recalls
- Be familiar with the recall list and BPI information

Below is a mock-up recall letter - you will need to adapt this for individual needs (annual, 3-month monitoring appointment, Type 1 diabetes, Type 2 diabetes).

The majority of clinics are contacting patients with verbal and paper invitations and we know that those who do not respond to the initial letter or the five phone calls are most probably the people who would benefit the most.

Recall Letter.

Dear Mickey,

Free Annual Diabetic Review

Your annual check-up for your diabetes is now due.
Please do a blood test and make a **double appointment** when it suits your schedule.

Please find enclosed a form for blood tests and also a urine test. These should be done at least 3 days before your appointment.

If you have a meter, please bring this and your logbook to your appointment. We look forward to seeing you soon and assisting you with your diabetes management.

PLEASE ALSO BRING ALONG ALL MEDICATIONS, INSULIN PENS and STRIP SUPPLY for a check.
You will be having a foot check, so wear footwear that is easy to remove and replace.

There is no cost to you for this appointment, however, if you require a prescription there will be a prescription charge of $20.

Yours sincerely,

[Insert Name]

DAR Recall Process

A designated person initiates DAR recalls at the beginning of each Quality quarter (July, October, January and April). If there is a query, this person can clarify recalls. The essence is that no person misses their opportunity to be seen and discuss their diabetes management goals and aspirations.

1. Print off the BPI list of High Needs "Not Achieved" Patients with HbA1c >64mmol/mol Refer to this list when sending DAR invites.

2. Create the Recall Contact List for all patients requiring DAR during the next Quarter, using the toolbar icon or via the "Module" tab.

3. For each patient on the Recall Contact List:

    - Check Classifications: If Type 1 Diabetes, check if patient is under secondary review, and if so, send a task to the designated Diabetes Nurse to decide if a Virtual DAR is best.

    - Check screening: Has DAR already been completed? If so, check if Recall is correct

    - Check Outbox: Has DAR invite/lab form already been sent?

    - Check Inbox: Have lab tests already been completed?

    - Check Daily Record, Classifications and Tasks for any relevant information/exceptions to DAR.

Exceptions to DAR Recall:

For any of the following, send a Task to the designated Nurse to advise DAR is due. The Nurse can liaise as appropriate with either the Doctor or other service provider.

- Patients who are in Rest Home care (See below)

- Patients who are palliative

- Patients who are being intensively managed by a designated Diabetes Nurse

- Patients who are under the care of Specialists services

First Contact (Letter)

- Print DIABAR letter (DAR invite)
- Print DAR lab request. Check Tasks for any other lab tests which are also due (Liaise with Doctor as needed)
- Forward letter and lab form together to Doctor for signing, before being mailed
- If the patient is identified as “High Needs” on the BPI list: Send a task to the designated nurse to follow up in 2 weeks.
- Do not reschedule recall at this stage, to keep the Patient Prompt Recall active
- Adjust “R#” in the Recall Contact List to “1”, to indicate 1st contact made

Second contact (phone)

After 2 weeks if “High Needs” patients, and 6-8 weeks if standard DAR

- Check Screening: Has DAR been completed, and Recalls updated?
- Check Appointments: Has DAR been booked?
- Check Daily Record, Classifications and Tasks for any new relevant information/exceptions before phoning patient
- Check Inbox: Have lab tests been completed?

  ⇒ If not, phone patients to check letter and lab-form were received, and to remind them to complete lab tests and book DAR appointment

  ⇒ If lab tests have been completed, phone patient to book DAR appointment. Consider offering a Doctor’s appointment if prescription or other review is due. The DAR appointment should be scheduled before the Doctor’s appointment.
- Do not reschedule recall
- Adjust “R#” in the Recall Contact List to “2”, to indicate 2nd contact made.

As with all patient phone contact, check contact details are correct, check and advise if other recalls are due (e.g. cervical smear) and update smoking status as appropriate.

Third Contact (letter)

After 2 weeks if “High Needs” patients, and 6-8 weeks if standard DAR

- Check as per Second Contact above
- If no appointment made send DIABR2 letter with a copy of lab test request if not yet completed
- Adjust “R#” in the Recall Contact List to “3”, to indicate 3rd contact made

If DAR incomplete after a further interval, send a Task to GP/designated Diabetes Nurse for review.

Rest Home DARs

Rest Home Contact Information:

Rest Home DAR Process

- If all people with diabetes within the rest home come to your clinic,
- The Diabetes Nurse(s) or HCA responsible for the Rest Home DARs will coordinate these DARs, following the standard DAR Recall Process checks
- A single covering letter is sent to the Nurse in Charge/Manager at the Rest Home, with all the DAR lab request forms for the residents due to their DAR.
- Forward letter and lab forms together to Doctor for signing, before being sent to the Rest Home
- Monitor patients on task list. Make notes of the dates lab request form were sent, when results are received, and leave on task list until DAR documentation complete
- When results are back, arrange visit with the Rest Home Nurse in Charge/Manager
- On the d ay of t h e Rest Ho me visit:
- Check Rest Home has a list of patients being seen, and request patient file be available - *to include copy of medication chart, current weight and height.*
- Take required equipment for DAR, including sphygmomanometer, foot check monofilament, tape measure, steri-gel, as well as DAR forms, and laptop if available
- Invoice via reception on the day seen.
- Complete PMS notes and submit Common Form. Task can then be completed
- Check and adjust Recalls as appropriate
- Send task to Doctor advising DAR has been done

Diabetes Annual Review Decline Process

- If a Patient declines to have a DAR, document this in their notes using a keyword you have set up adjusting as appropriate:

  "Face to face/phone discussion re diabetes annual review invitation. Pt declines to have DAR her as: seen elsewhere …/ declines to participate. DIAP code entered as incomplete, with declined, added to note line"

- In "Screening" under "Outcome" select "Incomplete Screening (IN). Type "declined" in the 'Note' field. This enables available data to still be added.
- Reschedule Recall for 1 year and send a task to the designated nurse to advise of the decline
- Designated Diabetes Nurse to complete Screening template as much as possible, as for "Virtual DAR"

Diabetes Monitoring Recall Guideline

Diabetes Monitoring Recalls are completed by the designated Diabetes Nurse between patient DARs - as a means of providing ongoing Diabetes support to the patient and based on goals set at DAR.

To create the recall contact List:

Process:

- When the DAR is completed, a recall for "Diabetes Monitoring" (DCIP) is automatically generated for 3-6 months' time
- Monitoring notes can be added into DCIP (e.g. repeat HbA1c and BP in 3 months). As a minimum, all patients with diabetes should have their HbA1c checked 6-monthly.
- The designated Diabetes Nurse is responsible for implementing the Diabetes Monitoring Process for their own patients. This may include reminding patients to complete lab tests, reviewing current Diabetes control and management, medications reviews and liaising with the Doctor as required

Before contacting patients, the designated Diabetes Nurse should check the patient records for any new information, including the Daily Record and Inbox.

- Make an entry in the notes using the Diabetes Monitoring classification, noting current Diabetes management and control, any recent investigations, and advice given including intensification of treatment
- Liaise with/send task to GP if further input required or send task to self to provide further follow-up.
- Reset Diabetes Monitoring Recall as appropriate.

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