The University of Auckland, The University of Waikato & NZSSD

PRESENTS

PACIFIC DIABETES MANAGEMENT COURSE

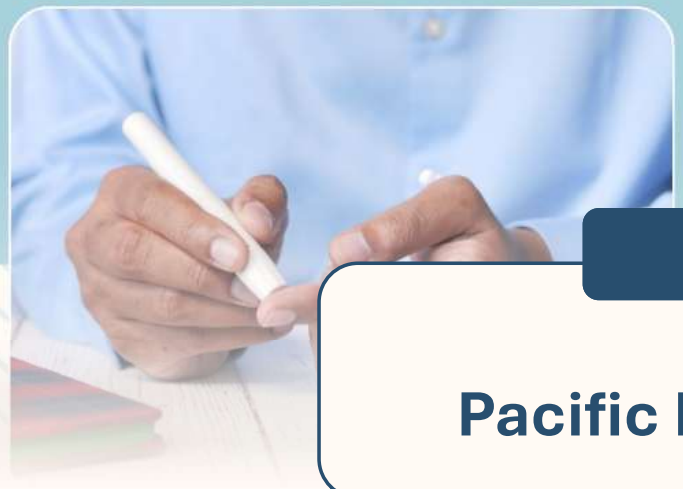
THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

New Zealand Society for the Study of Diabetes
NZSSD

Your session will start shortly

with support & facilitation from AOTEAROA DIABETES COLLECTIVE Aotearoa Diabetes Collective



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Welcome to the 2025

Pacific Diabetes Management Course

Housekeeping

- Please stay on **mute** during the webinar
- You can ask questions anytime during the webinar using the **Q+A function**
  - Any question is fine and will be answered at the end of the session
  - You can **upvote** questions that you want answered first
  - You can also ask questions verbally at the end of the session – please use the hand function if able
- **Confidentiality is a must** – These sessions will be recorded and available in a public format
- **Respect** one another
  - This is a collaborative, non-judgemental learning environment for everyone

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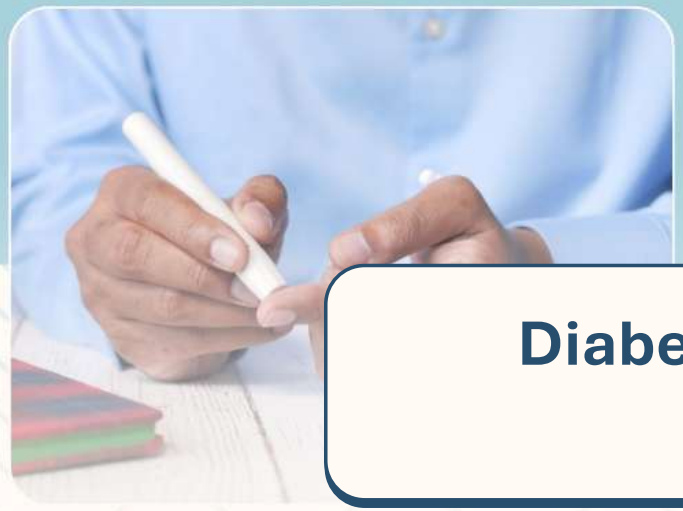


Webinar 5.

Diabetes & sick day management, pregnancy + driving

Diabetes + driving

Diabetes + driving

- Patients on **insulin and/or sulfonylureas** need to be informed of the law + recommendations around driving
  - Patients may be prosecuted if they have not followed these recommendations

- **Key points to emphasise to patients are – they must:**
  - Ensure their glucose levels are > 4.2 mmol/L before they drive
    - (above 5 is safe to drive or to stay alive)
  - Have their glucometer and/or CGM + treatment for hypoglycaemia in the vehicle
  - To stop the vehicle + check their glucose levels immediately if any symptoms of hypoglycaemia
  - Not drive for 1 hour after an episode of mild hypoglycaemia
  - Not drive for 24 hours after an episode of severe hypoglycaemia (48 hours if on sulfonylureas)
  - Not drive for 1 month if an episode of severe hypoglycaemia whilst driving
  - Useful to check glucose levels ≥ 2-3 hourly on long trips + not drive if unwell with very high glucose levels

Diabetes + driving

- Key part of clinical assessment for driver's licence is to **determine risk of hypoglycaemia**:
  - Adequacy of monitoring + any evidence of hypoglycaemia
  - Hypoglycaemic unawareness + previous severe hypoglycaemia
  - Irregularity of shift patterns/meal breaks etc.

- **Also important to consider other related factors** in fitness to drive:
  - Peripheral neuropathy + vascular disease
  - IHD + cerebrovascular disease
  - OSA + daytime somnolence
  - Cognitive impairment
  - Vision
    - Cataracts + previous panretinal photocoagulation may disproportionately affect night vision

When to refer to specialist care

- **Whenever legally required**
- **Whenever you have doubts on the patient's fitness to drive**
- **Red flags include**:
  - Applications for special or heavy vehicle classes and endorsements on licence 2,3,4,5 licences
  - Severe hypoglycaemia and/or frequent episodes of mild hypoglycaemia
  - Long duration of disease and/or elderly → especially if hypoglycaemic unawareness
  - HbA1c < 48 mmol/mol + > 90 mmol/mol on insulin
  - Significant burden of microvascular and/or macrovascular complications

Sick day management

Why is sick day management important?

- People with diabetes are more likely to get unwell
- **Intercurrent illness often results in significant hyperglycaemia even in prediabetes**
- **Hyperglycaemia leads to increased morbidity + mortality** via multiple mechanisms:
  - Decreased immune response + healing & increased thrombosis + fluid shifts
  - May result in life threatening DKA or HHS
- Patients on **insulin and/or sulfonylureas at risk of hypoglycaemia** if reduced oral intake

Why do people get high glucose levels when unwell?

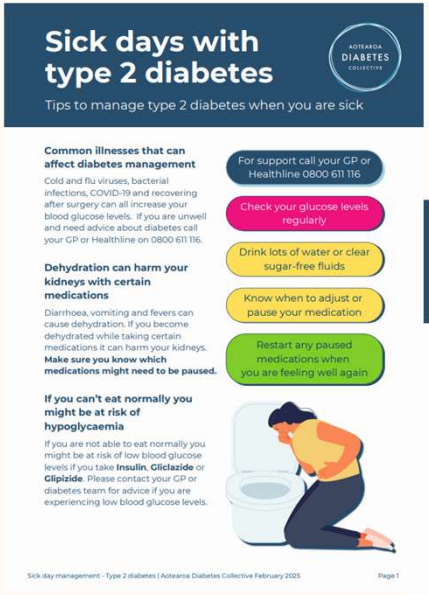
- Stress response of illness
- Reduced physical activity
- Altered diet
- Withholding of glucose lowering agents
- New medications e.g. steroids

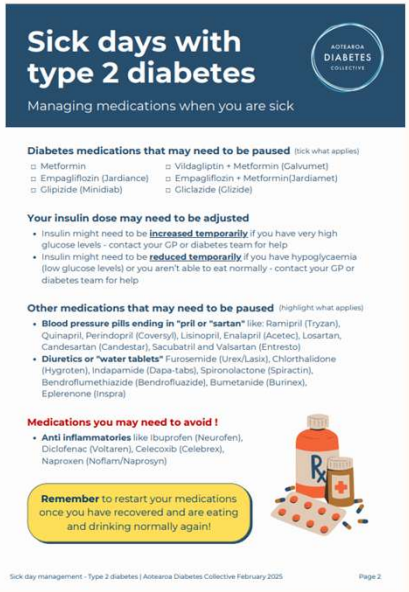
Sick day management plans

Sick day management plan

- All with diabetes should have a **written sick day management plan** that includes:
  - Basic advice to stay well
  - When to check glucose levels
  - What glucose lowering therapies need to be changed
  - When to seek medical attention

- **Ideally provide at diagnosis & ensure up to date if changes made + at annual review**





Available on Healthify & ADC website

Basic advice for sick day management

- Notify somebody that they are unwell
- Avoid strenuous activity
- Avoid NSAIDs
- Stay well hydrated → aim for 1 glass of water per hour
- Continue to eat as per normal → regular light meals if unable to tolerate normal diet

When do people need to check their glucose levels?

- **Whenever they have symptoms of hyperglycaemia or hypoglycaemia**
- **At least 3 - 4 times across the day when unwell**
- **More frequent monitoring may be required particularly around hypoglycaemia**
- Ketone levels (ideally blood) should be checked during illness if:
  - Type 1 or pancreatogenic diabetes
  - Previous history of DKA
  - On empagliflozin – do not qualify for funded CareSens Dual meter + urinary ketones inappropriate

What do I do with their glucose lowering therapies?

- **Empagliflozin needs to be stopped in all acute illnesses**
  - Do not restart until well & eating + drinking normally
  - Need to attend practice or hospital if nausea, vomiting or abdo pain to check ketones

- In gastrointestinal illness withhold any agents that may make symptoms worse:
  - Metformin, vildagliptin + acarbose may need to be withheld
  - Delay next injection of GLP1Ra till well

- **Typically need to greatly reduce or stop sulfonylureas + bolus insulin if reduced intake**

What do I do with their glucose lowering therapies?

- **Important to continue basal insulin in illness**

- Safest to do temporary 20-30% reduction in basal + premixed insulin if reduced intake
  - May need at least a 40-50% reduction if very large doses + reduced oral intake

- **Frequent monitoring of glucose levels essential to ensure safety**
  - Adjust doses of insulin and/or sulfonylureas as required
  - Ideal time to use CGM if able

Other points to consider

- Glucose lowering therapies may need to be reduced if acute kidney injury
- Consider withholding other therapies such as diuretics, antihypertensives etc. as appropriate
- Use antimicrobial treatment early if appropriate
- Optimise preventative care such as vaccination
  - Medic Alert and/or MediAlarm if on insulin and/or sulfonylureas

When should/does care need to be escalated?

When should people seek medical attention?

- **To phone an ambulance when significantly unwell**
- Whenever they would contact the practice irrespective of their glucose levels
  - **Patients should be encouraged to contact if any gastrointestinal illness**
- Any episode of severe hypoglycaemia or frequent episodes of mild hypoglycaemia
- Glucose levels persistently > 16 - 20 mmol/L – individualise threshold

When do I refer to secondary care/hospital?

- **When referral is warranted independent of glucose or ketone levels**
- Capillary ketone levels > 1.5 mmol/L
- Glucose levels persistently > 25 mmol/L and/or symptoms of hyperglycaemia
- Any concerns over the development of HHS or DKA
- Severe hypoglycaemia or high risk for severe hypoglycaemia

Steroid-induced hyperglycaemia

Steroid-induced hyperglycaemia

- Steroids may cause significant hyperglycaemia by ↓ insulin secretion > ↑ insulin resistance
  - Very common with doses of prednisone > 10 mg/day or dexamethasone > 1 mg per day
  - Often results in significant symptoms even in those with prediabetes or normoglycaemia

- **Need an approximately 30% increase in both basal + prandial insulin**
  - **Correction insulin useful to treat ongoing hyperglycaemia**
  - May be more effective to switch basal insulin to mane if prolonged course

- May need to start weight-based basal insulin in insulin-naïve patients
  - **Once daily isophane insulin (Protaphane) in the morning likely matches prednisone profile best**
    - **Once daily glargine insulin (Lantus) in the morning likely matches dexamethasone profile best if available**
  - **Sulfonylureas may be useful alternative in mild steroid-induced hyperglycaemia**

Example of steroid-induced hyperglycaemia

- Mr F is a 68 year old man with T2D with an HbA1c of 58 mmol/mol on metformin/empagliflozin, vildagliptin + gliclazide
- Frequent exacerbations of COPD treated with prednisone 40 mg daily for 1 week
- Associated with significant hyperglycaemia + appropriately stops Jardiamet when unwell
- **Start 0.2 units/kg Protaphane mane + add correction with rapid-acting insulin**
- **E.g. If 80 kg start 16 units Protaphane mane + use glucose levels to titrate**

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How do I use correction insulin?

- Allows ‘correction’ of hyperglycaemia pre-meals or at times of reduced oral intake e.g. when unwell

- **Only use Actrapid insulin for correction insulin + do not typically repeat within 6 hours**
  - Needs to be administered separately if on basal or premixed insulin alone

- **Use 1 unit for every x mmol > 6 mmol/L based on the total daily dose (TDD) of insulin**
  - TDD **≤ 25** units → correction 1 unit for every **4** mmol > 6 mmol/L
  - TDD **26 – 40** units → correction 1 unit for every **3** mmol > 6 mmol/L
  - TDD **41 – 75** units → correction 1 unit for every **2** mmol > 6 mmol/L
  - TDD **≥ 76** units → correction 1 unit for every **1** mmol > 6 mmol/L

- **Often safer to limit initial correction to 6 – 10 units + correct to 8 mmol/L if risk of hypoglycaemia**

How do I use correction insulin?

- E.g. if on basal insulin 40 units + bolus insulin 10 units with meals → total daily dose is 70 units
  - Correction factor is **1 unit for every 2 mmol > 6 mmol/L** provide clear instructions on what dose to administer at each meal

BGL (mmol/L)	Correction dose (units)
4.0 – 7.9	0
8 – 9.9	1
10 – 11.9	2
12 – 13.9	3
14 – 15.9	4
16 – 17.9	5
≥ 18.0	6

How do I use correction insulin?

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BGL (mmol/L)	Correction dose (units)	Total dose with meal (units)
4.0 – 7.9	0	10
8 – 9.9	1	11
10 – 11.9	2	12
12 – 13.9	3	13
14 – 15.9	4	14
16 – 17.9	5	15
≥ 18.0	6	16

Management of glucose lowering therapies around procedures

Glucose-lowering therapies around elective procedures

- No change to glucose lowering therapies typically required for minor procedures

- But need to stop or reduce glucose lowering therapies if reduced oral intake:
  - Stop sulfonylureas + bolus insulin if nil by mouth/minimal intake → can use correction insulin
  - Reduce basal/premixed insulin by > 25% if NBM/minimal intake → can use correction insulin
    - May need ~50% reduction if on large doses e.g. > 0.5 units/kg
  - Stop empagliflozin 3 days (i.e. 2 days before + day of) before bowel prep or low carb diet
  - Stop empagliflozin 3 days (i.e. 2 days before + day of) before any procedure involving:
    - Fasting/reduced oral intake for > 12 hours
    - Any major procedure

Do not restart Empaglilfozin until eating + drinking normally

Glucose-lowering therapies around elective procedures

- Consider withholding last dose of GLP1RA before surgery if high risk of aspiration
  - GLP1RA + vildagliptin do not influence quality of bowel prep or ability to perform colonoscopy
  - Some centres are now recommending 24 hours of clear fluids prior to procedure for those on GLP1Ra

- Risk of metformin-induced contrast injury now shown to be virtually non-existent
  - Current guidance still recommends withholding metformin for > 48 hours if eGFR < 30 mL/min
  - Ensure adequate hydration if high risk

- Avoiding high + low glucose levels around procedures is important to reduce complications

Management post discharge from hospital

Management of diabetes post discharge

- Management of diabetes is difficult in inpatients + often requires marked change in regimen
  - Often withheld medications are forgotten to be restarted

- Glucose lowering therapies on discharge may not be best regimen in outpatient setting
  - **Complex insulin regimens may need to be simplified + doses adjusted**
  - **Knowledge of diabetes care may be greater in community than hospital teams**

- Can usually return to pre-admission regimen if at/close to targets + no major changes

- **Otherwise optimise new regimen as per normal → may need de-escalation of therapy**

De-escalation of therapy

- De-escalation of therapy commonly required in advanced illness e.g. cancer, dementia etc.
- Individualise + relax glycaemic, BP+ lipid targets → stop or reduce medications as appropriate
  - Likely need to stop sulfonylureas + meal insulin & reduce basal insulin with declining oral intake
  - Also sometimes need to start insulin in end of life cares as other glucose lowering therapies may be inappropriate
- Target glucose levels 6 – 18 mmol/L on as few agents as possible useful to maintain quality of life
- **NB: Development of end-stage diabetic complications not necessarily indicator for de-escalation**

Diabetes in pregnancy

Diabetes in pregnancy

- Tight glucose levels periconception + throughout pregnancy is important for best outcomes
  - Risk of miscarriage/stillbirth + fetal malformations exponentially increases with HbA1c > 48 mmol/mol (6.5%)
  - Glucose levels in potential fathers also important

- Ideally all pregnancies in women with diabetes are planned – preconception care involves:
  - Continuing contraception until glucose levels optimised
  - Starting folic acid 5 mg daily + iodine 150 mcg daily
  - Stopping teratogenic medication if safe
    - NB: ACEi/ARBs not teratogenic until at least late 1st trimester + statins low risk of teratogenicity

- May choose to switch glucose lowering therapies to metformin ± insulin pre-conception
  - New guidance suggests that GLP1Ra best stopped 3 months for men + 1 month for women before conception

Diabetes in pregnancy

- If known diabetes → refer to Diabetes in Pregnancy team as soon as pregnancy confirmed
  - NB: Some services will also see high-risk women with T1D or T2D pre-conception

- Referral to Diabetes in Pregnancy teams asap should also occur if:
  - HbA1c ≥ 42 mmol/mol (6%) on booking bloods
  - Fasting glucose ≥ 5.1 mmol/L and/or 1 hour glucose ≥ 10.6 mmol/L on 75 g GTT at 24 weeks
  - If any random glucose is ≥ 11 mmol/L

- Glucose levels are the best glycaemic targets in pregnancy – aim for:
  - Fasting glucose < 5 mmol/L
  - 1 hour post-meal glucose < 7.4 mmol/L **OR** 2 hour post-meal < 6.7
  - Balance against risks of hypoglycaemia + CGM useful if available

Diabetes in pregnancy

- Other important points to consider during pregnancy with diabetes:
  - Eye disease can rapidly progress during pregnancy → refer for photoscreening if preexisting diabetes
  - Aspirin ± vitamin D may be started < 16 weeks to prevent pre-eclampsia if high risk

- Follow up for all wāhine with GDM is important as 50% will develop T2D within 5 years
  - Ensure HbA1c at 3 months post delivery is normal or treat if persisting prediabetes/T2D
    - If normal → annual HbA1c to screen for any progression to prediabetes/T2D

What are the take home messages?

Take home messages

- **All patients with diabetes should have a written sick day management plan**

- **Glucose lowering therapies often need to be adjusted in acute illness**
  - Empagliflozin has to be stopped in all acute illnesses + others with GI illness
  - Doses of insulin + sulfonylureas may need to be reduced to prevent hypoglycaemia
  - Continue basal insulin but reduce if decreased oral intake

- **Insulin is often best treatment of hyperglycaemia of illness** → particularly if steroid-induced
  - May need to start insulin in insulin-naïve patients + **correction insulin very useful**

- Periconception + post delivery care is very important in people with diabetes
  - Primary care + midwives have important role in screening for undiagnosed diabetes + gestational diabetes

Upcoming webinars

1	**Lifestyle management, Metformin & Vildagliptin** Niue - Monday September 8th at 6pm Cook Islands - Monday September 8th at 7pm Aotearoa, NZ - Tuesday September 9th at 5pm	Zoom link
2	**Sulfonylureas & Insulin + Management of Hypoglycaemia** Niue - Monday September 15th at 6pm Cook Islands - Monday September 15th at 7pm Aotearoa, NZ - Tuesday September 16th at 5pm	Zoom link
3	**New Diabetes Medication, Technology & Management algorithm** Niue - Monday September 22nd at 6pm Cook Islands - Monday September 22nd at 7pm Aotearoa, NZ - Tuesday September 23rd at 5pm	Zoom link
4	**Glycaemic, Blood Pressure & Lipid Targets + Management** Niue - Monday September 29th at 6pm Cook Islands - Monday September 29th at 7pm Aotearoa, NZ - Tuesday September 30th at 5pm	Zoom link
5	**Diabetes and Sick Day Management, Driving & Pregnancy** Niue - Monday October 6th at 6pm Cook Islands - Monday October 6th at 7pm Aotearoa, NZ - Tuesday October 7th at 5pm	Zoom link
6	**Management of Complications Related to Diabetes** Niue - Monday October 13th at 6pm Cook Islands - Monday October 13th at 7pm Aotearoa, NZ - Tuesday October 14th at 5pm	Zoom link
7	**Inpatient Management of Diabetes** Niue - Monday October 20th at 6pm Cook Islands - Monday October 20th at 7pm Aotearoa, NZ - Tuesday October 21st at 5pm	Zoom link

Case for discussion – Miss S

- 31 year old woman with type 2 diabetes with HbA1c 75 mmol/mol (9%) on:
  - Metformin 1 g twice daily
  - Empagliflozin 10 mg daily
  - Gliclazide 160 mg twice daily
  - Protaphane 60 units nocte
  - Candesartan 32 mg daily
  - Bendrofluazide 5 mg daily
  - Atorvastatin 20 mg nocte
- She has an acute GI illness + is unable to tolerate much oral intake → what do you advise her to do with her medications?
- She has a subsequent flare of her asthma + starts prednisone 40 mg daily → what do you with her medications now?
- She is keen to get pregnant → what do you advise + what would you do with her medications?

Discussion