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PRESENTS
PACIFIC DIABETES MANAGEMENT COURSE
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with support & facilitation from
Aotearoa Diabetes Collective
Your session will start shortly
Welcome to the 2025
Pacific Diabetes Management Course

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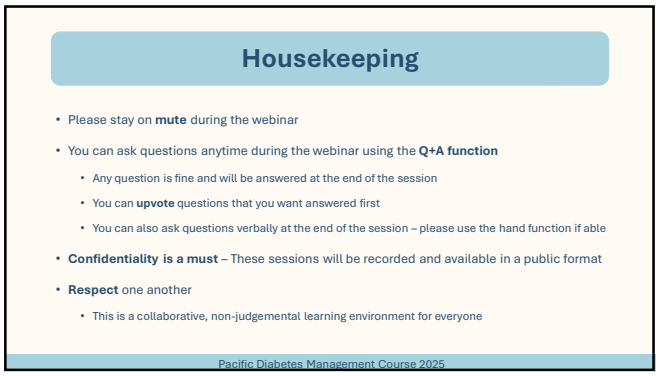
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Please stay on mute during the webinar
You can ask questions anytime during the webinar using the Q+A function
Any question is fine and will be answered at the end of the session
You can upvote questions that you want answered first
You can also ask 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
Pacific Diabetes Management Course 2025

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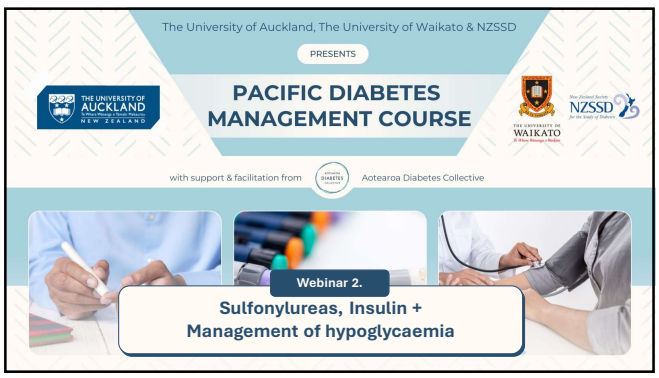
The University of Auckland, The University of Waikato & NZSSD
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PACIFIC DIABETES MANAGEMENT COURSE
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Webinar 2.
Sulfonylureas, Insulin + Management of hypoglycaemia

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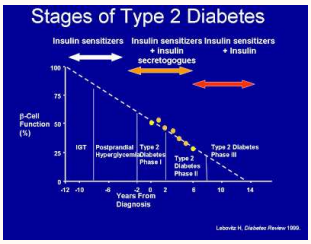
Many patients will require sulfonylureas + insulin as T2D is a progressive disease



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Sulfonylureas

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Sulfonylureas

- Increase insulin secretion by pancreatic beta cells → **may cause hypoglycaemia + weight gain**
  - Patients ideally need to monitor glucose levels for safety + titration of doses
  - Provide education on how to manage hypoglycaemia + safety around driving
- Maximal mean decrease in HbA1c ~ 15 mmol/mol + **do not** independently reduce CVD or renal disease
- 3 sulfonylureas available in Pacific - Gliclazide, glipizide + glibenclamide
  - Glibenclamide should not be used without specialist advice due to long half life
  - Sulfonylureas should be used in pregnancy, breastfeeding or end-stage liver or renal disease
  - Often first line management in steroid-induced hyperglycaemia

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Sulfonylureas

- Typically start with glipizide 2.5 mg or gliclazide 40 mg once with largest meal or twice daily
- Can double the dose every 1-2 weeks at appropriate meal if persistent postprandial hyperglycaemia
  - **Maximal doses - glipizide 10 mg twice daily + gliclazide 160 mg twice daily**
- Glipizide is typically the best sulfonylurea is to use in renal impairment
  - **Often need to reduce dose of all sulfonylureas with ↓ renal function**
- Need to advise to stop sulfonylureas with decreased oral intake

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Insulin

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When do I need to start insulin?

- **Clinical features of insulin deficiency** e.g. polyuria, polydipsia, weight loss, prior DKA or HHS, low C-peptide
  - Low C-peptide is defined as fasting < 250 pmol/L or post-meal < 600 pmol/L with a paired glucose > 8 mmol/L
- Strong suspicion of **type 1 diabetes** or **pancreatogenic diabetes**
- **HbA1c > 90 mmol/mol** at any time
- **HbA1c above target** on maximal other glucose lowering therapies
  - Insulin often required in children, pregnancy, breastfeeding + end stage renal disease

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How do I start insulin?

- Start with **weight-based dosing of isophane (Protaphane** or Humulin NPH) or glargine (Lantus) insulin
  - **0.2 units/kg/day if HbA1c > 64 mmol/mol + BMI > 18 kg/m²**
  - 0.1 units/kg/day if HbA1c < 64 mmol/mol or BMI < 18 kg/m² or elderly or renal/liver failure
  - **Best administered at night** as major role is to counteract hepatic gluconeogenesis
- Demonstrate + check injection technique & provide method of sharps disposal
- Provide education + written information on management of hypoglycaemia + sick days, & diabetes + driving
- Continue with lifestyle management + all other glucose lowering therapies → refer to dietitian if available

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How do I titrate insulin?

- Instruct the patient to monitor **fasting glucose levels** + provide **clear instructions** on how to self-titrate doses
  - **If 3 consecutive fasting levels > 7 mmol/L → increase dose of basal insulin by 10% OR 2 units**
  - Repeat every 3 consecutive fasting glucose levels but **STOP dose increases once:**
    - Any fasting glucose is < 7 mmol/L **OR**
    - Hypoglycaemia occurs **OR**
    - Doses reach 0.5 units/kg/per day
- If blood glucose levels throughout the day and/or HbA1c remain above target then **need to add meal time (prandial) insulin**
- Prandial insulin may be either **bolus insulin (Actrapid) OR premixed insulin (Mixtard)**
  - Choice between bolus or premixed insulin should be based on patient data + preference
  - Referral to dietitian/dietary advice is important to match insulin to carbohydrate intake

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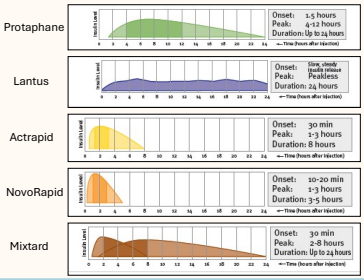
Profiles of available insulins



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Do I choose bolus or premixed insulin?

Favours basal-bolus	Factors to consider	Favours premixed
Yes	Needs flexibility for work patterns, exercise etc	No
Yes	Prefers varied diet + timing of meals	No
Yes	Will likely need rapid intensification of insulin therapy	No
Good ability	Ability to inject (e.g. cognitive ability, dexterity, supervised environment)	Reduced ability
Comfortable with more frequent monitoring	Monitoring of glucose levels	Prefers less frequent monitoring
Comfortable with more frequent injections	Number of injections per day	Prefers fewer injections

NB: Often patient preference biggest determining factor

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How do I start bolus insulin?

- Start short-acting insulin (Actrapid) before largest meal
  - **Start at 4 units or 10% of dose of basal insulin with a maximum starting dose of 10 units**
- Monitor **glucose levels before** + ~ **4 hours post meal** + provide **clear instructions** on how to self-titrate doses
  - If 3 consecutive rise in glucose levels with meals is > 3 mmol/L → increase dose of insulin by 2 units
  - Repeat every 3 consecutive measurements pre- and post-meals but **STOP dose increases once:**
    - Rise in glucose levels with meals < 3mmol/L OR if hypoglycaemia occurs
  - Continue all other management but stop sulfonylurea at that meal once established
- Add in **bolus insulin at other meals** if HbA1c > target OR if glucose levels rise by > 3 mmol/L at other meals

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How do I start premixed insulin?

- **Start once daily Mixtard if predominantly one large meal per day**
- Convert daily dose of basal insulin to premixed insulin before largest meal
  - May choose to start premixed (Mixtard) insulin instead of basal (Protaphane) insulin
- Monitor **glucose levels before** + ~ **4 hours post meal** + provide **clear instructions** on how to self-titrate doses
  - If 3 consecutive checks show meal rise > 3 mmol/L **AND** fasting glucose > 7 mmol/L → **↑ dose of insulin by 2 units**
  - **Stop dose increase** once rise with meals is < 3 mmol/L **OR** fasting glucose < 7 mmol/L **OR** hypoglycaemia occurs
  - Continue all other management but stop sulfonylurea at that meal once established

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How do I start premixed insulin?

- **Start twice daily Mixtard insulin if multiple meals per day**
- Convert daily dose of basal insulin to Mixtard insulin with ½ the dose pre-breakfast + ½ the dose pre-dinner
  - **Consider alternative ratio if large difference in meal sizes** e.g. 2/3rd of total dose at larger meal + 1/3rd at smaller meal
- Monitor **glucose levels before + ~ 4 hours post meal post breakfast + dinner** & provide **clear instructions** on how to self-titrate
  - If 3 consecutive BGL checks show breakfast rise > 3 mmol/L **AND** pre-dinner glucose > 10 mmol/L → ↑ breakfast dose by 10%
  - If 3 consecutive BGL checks show dinner rise > 3 mmol/L **AND** pre-breakfast glucose > 10 mmol/L → ↑ dinner dose by 10%
  - Stop increase in doses once meal rise is < 3 mmol/L OR pre-meal glucose < 10 mmol/L OR hypoglycaemia occurs
  - Continue all other management but stop sulfonylurea at that meal once established

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What do I do if the HbA1c is above target?

- If the HbA1c remains above target on premixed insulin then consider:
  - **Add in bolus insulin at other meals** → ideally space meals out to > 4-6 hours if possible
- If the HbA1c is still above target **OR** hypoglycaemia is problematic **OR** rigid routine problematic then **consider switching to basal bolus regimen:**
  - Easiest way is to convert total daily dose of insulin to 50% basal + 50% bolus insulin
    - E.g. Mixtard 25 units mane + 35 units nocte → 30 units Protaphane nocte + 10 units Actrapid with meals
    - May need to alter starting doses of bolus insulin based on meal sizes + risk of overnight hypoglycaemia → titrate as per normal
- If the HbA1c is above target on basal bolus regimen then consider dietitian referral + adding **correction insulin**

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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 repeat within 6 hours unless close monitoring**
  - 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**

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How do I use correction insulin?

- E.g. if on Protaphane 40 units + Actrapid 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

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≥ 18.0	6

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Insulin management in type 1 diabetes

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Insulin management in type 1 diabetes

- Insulin management in similar in type 1 diabetes but several key differences:
  - Start 0.1 units/kg Protaphane twice daily rather than 0.2 units/kg nocte
    - Consider 0.05 units/kg twice daily if risk of hypoglycaemia
  - Start Actrapid with meals ± correction insulin early
    - Consider starting 2 units with meals if risk of hypoglycaemia
    - Basal bolus regimen typically preferred to premixed insulin
  - Monitoring glucose levels is essential for safety + titrating of insulin
    - Urinary ketones useful in illness if unable to check blood ketones
  - Consider switching Protaphane to Lantus insulin and Actrapid to NovoRapid insulin if available

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Tips for insulin management

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Tips for insulin management

- Ensure adherence + check injection technique if mismatch with glucose levels
- Ensure rotation of injection sites
  - Check for areas of lipohypertrophy at injection sites at least annually
- Premixed & cloudy insulin needs to be gently inverted before administering
- Remember doses of insulin may need to be reduced around exercise + in illness

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Tips for insulin management

- Refer to dietitians when starting bolus or premixed insulin + re-refer if issues
- Consider special strategies in cognitive impairment
- Developing a regular routine around insulin e.g. basal insulin at dinner may aid adherence
- Administer bolus + premixed insulin before meals → optimal doses of bolus insulin likely different at different meals

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Tips for insulin management

- Reassure patients **+ reduce stigma around insulin**
  - Distraction, ice + other tools useful if significant pain
- Often need to reduce insulin doses by ≥ 20% if frequent episodes of hypogycaemia or severe hypoglycaemia
  - NB: Need to reduce insulin doses with declining renal function to prevent hypoglycaemia
- Limit insulin induced weight gain
  - Maximise lifestyle management, metformin + other glucose lowering therapies
  - Provide accurate dietary advice → **patients should not need to eat avoid hypoglycaemia**
  - **Introduce prandial or meal time insulin early** → insulin requirements typically ~ 50% basal/50% bolus insulin
- Depression/diabetes distress often biggest barrier in reaching targets → **screen for depression + utilise supports**

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Insulin algorithm

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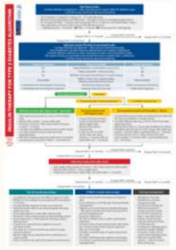
www.t2dm.nzssd.org.nz

- View online here
- Pdf available on Moodle under resources
- Download from NZSSD website here



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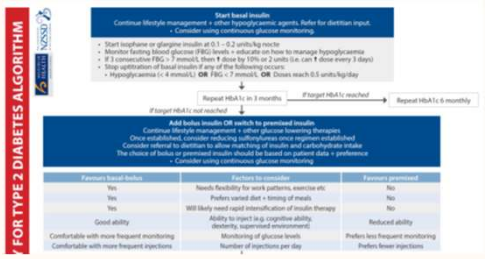
Commencing insulin



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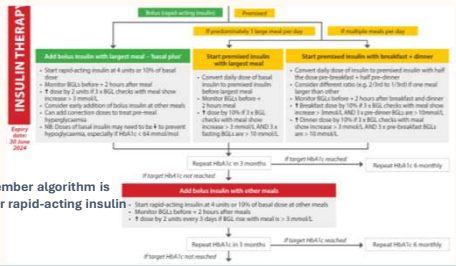
Titrating insulin



NB: Remember algorithm is written for rapid-acting insulin

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Tips for self-management

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Tips for self-management

- Create personalized self-titration sheets
- Download from ADC website

Flowchartversion

Record BGLs version

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Management of hypoglycaemia

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Management of hypoglycaemia

- All patients on insulin and/or sulfonylureas should have a written plan on how to manage hypoglycaemia (< 4 mmol/L)
  - Include when patients should phone for an ambulance + contact practice
- **Best management** of **hypoglycaemia** is **weight based:**
  - **30 g of rapid-acting carbohydrate if weight > 70 kg**
  - **15 g of rapid-acting carbohydrate if weight < 70 kg or type 1 diabetes**

WARNING: Complex carbohydrates (e.g. bread) or carbohydrates mixed with fat and/or protein (e.g. chocolate) are NOT good treatments for hypoglycaemia

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Management of hypoglycaemia

Type 2 diabetes < 70 kg or type 1 diabetes 15 grams of glucose	Type 2 diabetes >70 kg 30 grams of glucose
15 g of glucose powder	30 g of glucose powder
3 teaspoons of sugar dissolved in water	6 teaspoons of sugar dissolved in water
175 mL of fruit juice or non-diet (full sugar) soft drink	350 mL of fruit juice or non-diet (full sugar) soft drink
9 jellybeans	18 jellybeans
1 tablespoons of honey or 1.5 tablespoons of jam	2 tablespoons of honey or 3 tablespoons of jam
1 hypofit gels or 1x 15g Hypopak	2 hypofit gels or 1x 30g Hypopak
5 Dextro or Vita glucose tablets or 3 BD glucose tablets	10 Dextro or Vita glucose tablets or 6 BD glucose tablets

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Management of hypoglycaemia

- Check glucose levels again in 15 minutes
  - If glucose levels still < 4 mmol/L → **repeat** 30 g of rapid acting carbohydrate + re-check glucose levels in 15 mins
  - If glucose levels > 4 mmol/L → have next meal if due OR carbohydrate snack e.g. a piece of toast, 2 biscuits etc.
    - Recheck glucose levels in 30 mins to ensure still > 4 mmol/L
- **If patient is unresponsive or unable to take oral carbohydrate → phone 111**
  - Then attempt to administer glucose buccally if able + available
  - If buccal glucose not available → administer Glucagon 1 mg IM
- Following event determine cause + alter regimen as required
  - NB: ~ 80% of 'accidental' insulin overdoses are actually intentional

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Management of hypoglycaemia

- Available to download on ADC website
- Available on Healthify

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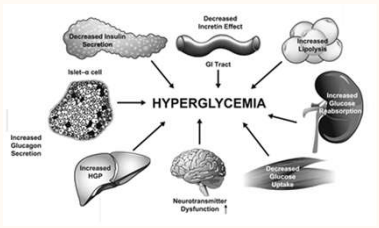
The 'ominous octet'



Thrasher. Am J Card 2017

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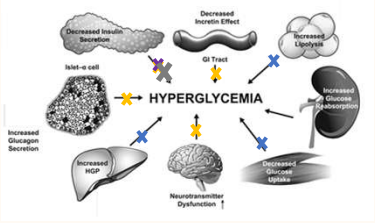
The 'ominous octet'

Metformin

Vildagliptin

Sulfonylureas

Insulin



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Summary of glucose lowering therapies

	Metformin	Vildagliptin	Sulfonylureas	Insulin
Risk of hypoglycaemia	Rare	Rare	Yes (mild)	Yes
Mean maximal HbA1c ↓	15	5-10	15	Any
Independent cardio-renal benefits	Yes	No	No	No
Effect on weight	↓	↔	↑	↑↑

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What are the take home messages?

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Take home messages

- Sulfonylureas + insulin still retain an **important role in managing T2D** due to its progressive nature
- Starting weight-based insulin + introducing prandial insulin early is important in reducing clinical inertia
  - Bolus + premixed insulin are both effective forms of prandial insulin
- **Self-titration** of insulin can be very successful in reducing clinical inertia when appropriate
- **Weight-based management of hypoglycaemia is best to avoid under or over-treatment**

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Upcoming webinars

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Discussion

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