Hypoglycaemia

Resident with hypoglycaemia - see: *When to suspect hypoglycaemia* (Practice point 1)

1. Where resident presents with fever and / or delirium, isolate resident and place under *standard and transmission-based precautions* until GP review
2. Check vital signs - review *Recognition of the deteriorating resident*
3. If not immediately life-threatening, review *Checklist for contact* and contact GP*

STABLE VITALS → Identify and escalate *Red flags* (see Practice point 2)

UNSTABLE VITALS

1. Review advance care plan and refer to *Management of residents with unstable vital signs*
2. If unconscious, lie resident on their side and, where aligned to the resident's goals of care, proceed to:
   a. Administer **1mg IM glucagon** and repeat BGL 10 minutes post-IM glucagon (or earlier if condition deteriorates)
   b. If repeat BGL greater than 4 mmol/L **and** resident is alert, provide resident with a serve of *slow-acting carbohydrate* (see Practice point 3) and monitor BGL hourly while awaiting medical review or transfer
   c. If BGL less than 4 mmol/L or resident has a decreased level of consciousness, administer a second dose of 1mg IM glucagon and repeat BGL in 10 minutes. If BGL persistently less than 4 mmol/L notify GP urgently or where GP is not contactable, refer to *HHS RaSS* - ongoing management should be guided by resident's goals of care and life trajectory

RED FLAGS PRESENT

RED FLAGS ABSENT

1. Provide resident with one serve of *fast-acting carbohydrate* (see Practice point 3)
2. Assess for and manage *cause of hypoglycaemia* (see Practice point 4)

Repeat BGL in 15 minutes and review resident for *symptoms and signs of hypoglycaemia* (see Practice point 1)

BGL LESS THAN 4 mmol/L OR 4.0 TO 5.9 mmol/L WITH SYMPTOMS OR SIGNS OF HYPOGLYCAEMIA

BGL LESS THAN 6 mmol/L

BGL GREATER THAN 6 mmol/L

1. Provide resident with one serve of *fast-acting carbohydrate* (see Practice point 3)
2. Recheck BGL in 15 minutes

BGL GREATER THAN 4 mmol/L AND NO SYMPTOMS OR SIGNS OF HYPOGLYCAEMIA

1. Provide one serve of *slow-acting carbohydrate* (see Practice point 3)
2. Repeat BGL hourly for next 4 hours, then every 4 hours for 24 hours
3. If resident develops recurrent hypoglycaemia, recommence pathway and arrange more urgent GP review
4. Refer to *HHS RaSS* at GP discretion

With GP, initiate ongoing management of the resident following an *episode of hypoglycaemia* (see Practice point 5)

*Where feasible, arrange telehealth or face-to-face GP review

Hypoglycaemia practice points

1) When to suspect hypoglycaemia

Hypoglycaemia is defined as blood glucose level (BGL) of less than a resident's target range, or low enough to cause symptoms. The target range for BGL in the older person with diabetes should be individualised, however, 6 to 15 mmol/L is generally acceptable. Hypoglycaemia is associated with increased morbidity and mortality. It may be associated with major cardiovascular events or falls and adversely affects temperature regulation, cognitive function and quality of life.

For the purpose of this pathway, hypoglycaemia is defined as:

1. BGL less than 4.0 mmol/L in any resident or
2. BGL of 4.0 to 5.9 mmol/L where the resident has symptoms or signs of hypoglycaemia.

Symptoms of hypoglycaemia may include:

1. Dizziness
2. Weakness
3. Headache
4. Palpitations
5. Anxiety
6. Vision changes
7. Hunger
8. Tingling sensation around the mouth

Signs of hypoglycaemia may include:

1. Pale appearance
2. Flushed face
3. Sweating or shaking
4. New onset confusion or behaviour change (this may include aggression or irritability)
5. Balance disturbance and falls
6. Seizure
7. Altered level of consciousness or coma

2) Red flags for deterioration in resident with hypoglycaemia

Red flags for deterioration or an underlying life-threatening cause / complication in residents with hypoglycaemia should prompt review of *Management of unstable residents* pathway.

Red flags include:

- Unstable vital signs including altered level of consciousness
- Nausea and vomiting
- Seizures or development of acute focal neurological change (focal weakness, vision loss or other neurological changes)
- Concurrent severe abdominal pain
- Concurrent chest pain
- Resident with recurrent hypoglycaemia less than 4 mmol/L and resident has been administered a long-acting sulphonylurea (e.g. glibenclamide) within the last 24 hours

Hypoglycaemia practice points (cont'd)

3) Carbohydrate options in hypoglycaemia

Note: low sugar or sugar-free options are NOT appropriate

Fast-acting carbohydrates

Resident's usual diet	Options for fast-acting carbohydrates
Normal	• 100 mL Lucozade • 1 serve Poly Joule (3 scoops) • 150mL lemonade or other soft drink • 3 teaspoons sugar dissolved in 50 mL water • 7 small or 4 large glucose jellybeans • 150 mL orange juice • 30 mL cordial mixed with 150 mL water • 250 mL Gatorade or Powerade sports drink
Thickened fluids	• 1 tube pre-prepared thickened cordial • 3 individual serves jam
PEG tube (via tube)	• 100 mL Lucozade • 1 serve Poly Joule (3 scoops) • 150 mL orange juice • 30 mL cordial mixed with 150 mL water

Slow-acting carbohydrates

Resident's usual diet	Options for slow-acting carbohydrates
Normal	• 250 mL milk • 1 tub (200g) yoghurt • 1 slice bread • 2 sweet plain biscuits • 1 piece fruit • Next meal (if due within 20 minutes)
Thickened fluids	• 1 tub pureed fruit • 1 serve thickened milk drink
PEG tube (via tube)	• 150 mL enteral feed

Hypoglycaemia practice points (cont'd)

4) Assessment of resident with hypoglycaemia

The goals of assessment of a resident with hypoglycaemia are to:

A. Identify underlying causes of hypoglycaemia
B. Identify complications of hypoglycaemia

A. Identify the underlying cause of hypoglycaemia

Hypoglycaemia may be caused by:

1. Acute illness or infection: any illness causing a significant stress response can precipitate hypoglycaemia in an older frail diabetic. A systematic review of the resident for acute illness is indicated.
2. Medication:
   - Diabetes medications:
     - Type of medication: insulin and many oral glucose-lowering medications may precipitate hypoglycaemia. Sulphonylureas in particular are generally unsuitable for frail older persons due to significant risk of hypoglycaemia in liver or renal dysfunction. Review *Diabetes management in aged care handbook* for a comprehensive outline of glucose-lowering medication in aged care
     - Inappropriate timing of administration of medications - glucose-lowering medications should generally be administered at mealtimes to reduce hypoglycaemia risk
   - Rarely the following medications may contribute to hypoglycaemia - consider if persistent hypoglycaemia and after common precipitants have been excluded - specialist endocrinology input is recommended. Sulphonamides, salicylates, warfarin, monoamine oxidase inhibitors, alcohol, alternative medicines such as fenugreek, bitter melon, opuntia, ginseng, aloe
   - Cessation of medications that can contribute to hyperglycaemia (e.g. steroids)
3. Worsening renal or liver function
4. Diet: delayed or missed meals or skipping carbohydrate portions or stopping a PEG feed
5. Activity: increased physical activity

B. Identify complications of hypoglycaemia

Complications of hypoglycaemia may include:

1. Seizures
2. Falls
3. Altered level of consciousness or confusion
4. Increased risk of acute vascular events such as stroke, myocardial infarction, cardiac failure

Hypoglycaemia practice points (cont'd)

5) Ongoing management of a resident with and following an episode of hypoglycaemia

A. With GP review / develop individualised diabetes management care plan to address and reduce incidence of hypoglycaemia. Management targets should consider the resident's functional status, life expectancy and comorbidities. The care plan should include guidance for:

- **BGL monitoring frequency**
  - Tailor monitoring to the individual resident's requirements and goals of care
  - Increase monitoring pre-emptively when residents have an acute illness or change in condition or when medications associated with hypoglycaemia are commenced
  - In general, monitoring should occur prior to meals and / or 2 hours after meals and occasionally overnight at 2.00 am
- **BGL target range**
  - Generally 6 to 15 mmol/L is appropriate (with a HbA1C target of up 8.5 per cent appropriate for frail older persons requiring insulin with a life expectancy predicted at less than 5 years)
- **Individual resident's symptoms / signs of hyper- and hypoglycaemia** and related management plans - take particular care to document if the resident is unaware of hypoglycaemia when it occurs; such residents are at risk of severe hypoglycaemia and warrant close monitoring of BGL
- **An individualised sick day plan** including adjustment to glucose-lowering medication doses. It is important to note that supplementary sliding scale or sporadic top-up insulin dosing is generally inappropriate in older and / or frail persons due to increased risk of hypoglycaemia. Instead, residents may require judicious adjustments to insulin dosing for the duration of their acute illness
- **Medication review**

  For residents who require insulin:

Cause of hypoglycaemia	Response to hypoglycaemia
Missed, delayed or reduced oral or enteral intake and intake returned to normal	No indication to adjust dose of short-acting insulin unless hypoglycaemia is recurrent
Reduced oral intake	GP to consider reducing mealtime short-acting insulin if on a basal bolus regimen or reduce basal insulin if on this alone
Cause of hypoglycaemia not identified or cannot be corrected	• Hypoglycaemia that occurs within 4 hours after mealtime insulin: reduce dose of **that** mealtime insulin by 20 per cent the following day • Hypoglycaemia that occurs outside of 4 hours after mealtime insulin: reduce basal insulin dose by 20 per cent

- **Ensure standing orders for glucagon** and indication are documented on the resident's medication chart

B. Risk management strategies:

- Regular RACF staff education on identification and treatment of hypoglycaemia
- Regular BGL monitoring for all residents with diabetes
- Diet:
  - Ensure access to regular nutritious meals and snacks and provide additional carbohydrate when residents are more active
  - Standard diets that include desserts and snacks are generally appropriate in residents with diabetes. Specific "diabetic diets" are not required
  - Record nutrition, hydration and intake each care shift
- Ensure prescribed medications are administered in correct doses at correct time
- Every resident with diabetes should have an individualised *diabetes sick day management* plan

Hypoglycaemia references

1. National Diabetes Services Scheme. Diabetes management in aged care: a practical handbook; 2020. https://www.ndss.com.au/wp-content/uploads/resources/aged-carediabetes-management-practical-handbook.pdf. Accessed April 2022.
2. Dunning T, Duggan N, Savage S. The McKellar guidelines for managing older people with diabetes in residential and other care settings. Geelong: Centre for Nursing and Allied Health, Deakin University and Barwon Health; 2014.
3. Diabetes Expert Group, Therapeutic Guidelines: Diabetes. Hypoglycaemia in patients with diabetes. Melbourne: Therapeutic Guidelines limited; 2019. https://tgldcdp.tg.org.au/viewTopic?topicfile=hypoglycaemia-in-patients-withdiabetes&guidelineName=Diabetes&topicNavigation=navigateTopic. Accessed April 2022.
4. Aged Care Quality and Safety Commission. Services and supports for daily living: standard 4. 2019. https://www.agedcarequality.gov.au/sites/default/files/media/Guidance%20and%20resources_Standard%204.pdf. Accessed April 2022.
5. Agency for Clinical Innovation. NSW Government. Diabetes management in residential aged care facilities during COVID-19: principles. https://aci.health.nsw.gov.au/__data/assets/pdf_file/0006/654387/Diabetes-management-in-RACFs.pdf. Accessed April 2022.
6. Canadian Agency for Drugs and Technologies in Health. CADTH rapid response report: summary of abstracts: management of diabetes in long-term care facilities: guidelines. 2018. https://www.cadth.ca/sites/default/files/pdf/htis/2018/RB1238%20LTC%20Diabetes%20Management%20Final.pdf. Accessed June 2022.
7. Munshi MN, Florez H, Huang ES, Kalyani RR, Mupanomunda M, Pandya N, et al. Management of Diabetes in Long-term Care and Skilled Nursing Facilities: A Position Statement of the American Diabetes Association. Diabetes Care. 2016;39(2):308-18.
8. National Diabetes Services Scheme. Clinical guiding principles for sick day management of adults with type 1 or type 2 diabetes. 2020. https://www.adea.com.au/wpcontent/uploads/2020/09/Sickdays-_12.pdf. Accessed April 2022.
9. Royal Australian College of General Practitioners. Management of type 2 diabetes in older people and residential aged care facilities. https://www.racgp.org.au/getattachment/ae9bdf51-7a91-4196-ac81-92980527ab65/Management-of-type-2-diabetes-in-the-elderly-and-r.aspx. Accessed June 2022.
10. Van Brunt K, Curtis B, Brooks K, Heinloth A, de Cassia Castro R. Insulin Use in Long Term Care Settings for Patients With Type 2 Diabetes Mellitus: A Systematic Review of the Literature. Journal of the American Medical Directors Association. 2013;14(11):809-16.

Hypoglycaemia version control

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