Key recommendations

Older adults with diabetes are a heterogeneous population. They can be fit and healthy or frail with many comorbidities and functional disabilities. They have increased risk for physical decline, cognitive dysfunction and mortality.

Frailty is a prognostic factor that identifies older people with diabetes who are at high risk of mortality. Most will have a high CV risk and individualised targets needs to be realistic and safe.

Lifestyle advice:

- Diet focused on glycaemic control, cardiovascular risk reduction and weight reduction, if appropriate, unless frailty is present
- Physical activity, especially walking: exercise also improves body composition and arthritic pain, reduces falls and depression, increases strength and balance, enhances the quality of life and improves survival and quality of life
- Smoking cessation: smoking in people with diabetes is an independent risk factor for all-cause mortality due largely to CVD

Glycaemic management:

- Goals should be individualised and based on the person’s overall health and projected period of survival because risk for complications is duration dependent
- Vulnerability to hypoglycaemia is substantially increased in older adults. Even a mild episode of hypoglycaemia may lead to adverse outcomes in frail older people
- Oral and injectable agents with low risk of hypoglycaemia are preferred in older adults. ‘Start low and go slow’
- Monitor blood sugar if taking hypoglycaemic agents or the person is unwell

Frailty and age factors to consider when individualising glycaemic targets

Older adults with a life expectancy of less than 10 years may be unlikely to derive microvascular benefits from tight glycaemic control.

The aims of treatment for people who are severely frail (eg, those living in aged care or who have a similar level of dependency living at home) should be to (Kirkman et al):
- Avoid hypoglycaemia
- Control symptoms and avoid metabolic complications
- Avoid unnecessary hospital admission
- Maintain/improve quality of life
- Introduce timely end-of-life care.

An unscheduled admission to hospital in an elderly or frail person may be a marker of increased risk of recurrent hypoglycaemia and of substantial reduction in life expectancy. Deprescribing may be appropriate.

If severely frail:
- aim for symptom control
- avoidance of hypoglycaemia
- no ‘target’ HbA1c is necessary except as a means of assessing risk of hypoglycaemia or severe metabolic decompensation
- avoid low levels of HbA1c < 53 if on insulin or sulphonylureas
- reduce medicines:
  - consider stopping sulphonylureas (glipizide, gliclazide)
  - consider stopping metformin (if renal function is deteriorating, reduced appetite)
  - consider stopping other related medicines (statins, beta blockers).

Geriatric syndromes associated with diabetes:

- Cognitive impairment: Diabetes is associated with increased risk of dementia. Cognitive function should be assessed when there is non-adherence with therapy, frequent episodes of hypoglycaemia or deterioration of glycaemic control without obvious explanation
- Depression: Occurs at a higher rate compared with age-matched control. Depression is frequently undiagnosed and remains untreated in this high-risk population.
- Polypharmacy: This is common because of management of multiple risk factors. This increases risk for side effects and interactions. Medication lists should be kept current and reviewed regularly.
- Falls: Risk is increased and multifactorial. Peripheral and/or autonomic neuropathy, reduced renal function, muscle weakness, functional disability, loss of vision, polypharmacy, comorbidities, like osteoarthritis and even mild hypoglycaemia, may contribute to falls in frail older adults.
Cardiovascular risk reduction:
- Older people with diabetes have higher cardiovascular risk, morbidity and mortality, compared with older adults without diabetes
- Benefit of cardiovascular risk reduction depends on the person’s frailty, overall health and projected period of survival

Hypertension
- Treatment of hypertension in older people, including those > 80 years, is beneficial
  - Controlling blood pressure decreases the risk of myocardial infarction, heart failure, stroke and all-cause mortality, albuminuria, nephropathy, retinopathy and other microvascular complications
  - An ACE inhibitor is the preferred antihypertensive; an angiotensin II receptor blocker (ARB) is recommended if an ACE inhibitor is not tolerated

Dyslipidaemia
- Lipid-lowering: There is a role in secondary prevention for older people
  - Primary prevention: Should be based on individual clinical judgement. Age alone should not determine whether or not a statin should be prescribed
  - Older people are more likely to gain greater reduction in morbidity and mortality from CV risk reduction with statin therapy than from tight glycaemic control

Glycaemic control
- Intensive glycaemic therapy in people at high risk for cardiovascular disease and especially with polypharmacy may increase risk for mortality

Reduce renal disease
- Control blood pressure. An ACE inhibitor is the preferred antihypertensive (if not tolerated, an ARB is recommended)

Reduce risk for stroke and MI
- Aspirin as secondary prevention. Benefit is greatest in those aged > 65 years

Prevent vision loss:
- Regular eye examinations are extremely important because poor vision can lead to social isolation, an increased risk of accidents and impaired ability to measure blood glucose and draw up insulin.
- A complete ophthalmologic exam should be performed by a qualified ophthalmologist or optometrist at the time of diagnosis and 1–2-yearly thereafter.
- The purpose is to screen not only for diabetic retinopathy but also for cataracts and glaucoma, which are more common in older diabetics, compared with non-diabetic subjects.

Preventing active foot problems and lower-limb amputation:
- Foot ulcers are an important cause of morbidity in people with diabetes. Both vascular and neurologic disease increase the risk of foot ulcers. Address whether older people can see and reach their feet. If they cannot, another person should do the routine foot inspections.
- No problems: daily visual inspection + supportive well-fitting closed shoes + community podiatry review as needed
- Diabetes podiatry review in the following:
  - High-risk feet: eg, previous tissue loss, deformity, peripheral vascular disease, neuropathy, custom built footwear or orthotic insoles
  - Peripheral vascular disease and tissue loss: as above, and refer to vascular specialist, closely monitor wounds, regular wound care
  - Clinically infected diabetic foot ulcer: broad spectrum antibiotic, cellulitis or osteomyelitis (suspected or present) refer promptly for intravenous antibiotics

In older people, pharmacological control of blood pressure to ≤ 130/70 mmHg is not recommended. It has not been shown to improve cardiovascular outcomes. Treating to diastolic blood pressure of 70 mmHg has been associated with higher mortality (page 119, Standards of Care)
- Systolic blood pressure of < 120 mmHg is associated with increased risk of hypotension, falls and cardiac dysrhythmias
- Treatment of dyslipidaemia should be based on life expectancy, comorbidities, cognitive status and personal preferences
- The risk of myopathy is usually dose related and is increased in the elderly and with combination treatments
- Low lipid level may be an indicator of poor nutritional status or occult disease and reflect increased risk of underlying morbidity and mortality
- Check HbA1c 3–6 months and more frequently in those with frequent hypoglycaemia, hypoglycaemic unawareness, frailty or significant comorbidities
- In older people already taking an ACE inhibitor or ARB, it may not be necessary or helpful to continue testing for increased urinary albumin excretion on an annual basis
### Annual diabetes review

<table>
<thead>
<tr>
<th>Annual diabetes review</th>
<th>Mmol/mol</th>
<th>Appropriate HbA1c targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessed at least annually</td>
<td>&lt; 42</td>
<td>Non-diabetic range</td>
</tr>
<tr>
<td>If moderate to high risk of complications</td>
<td>&lt; 53</td>
<td>Increased risk of hypoglycaemia, warning of possible over treatment</td>
</tr>
<tr>
<td>HbA1c</td>
<td>53–64</td>
<td>Target range to avoid recurrent hypoglycaemia and optimise wellbeing</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>64–69</td>
<td>In frail/very elderly on insulin/sulphonylurea to avoid hypoglycaemia and preserve quality of life</td>
</tr>
<tr>
<td>Lipid profile</td>
<td>Up to 70</td>
<td>For those with dementia and/or at the end of life there is no benefit to tight glycaemic control except in avoiding symptomatic hyperglycaemia</td>
</tr>
<tr>
<td>Feet</td>
<td></td>
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<tr>
<td>Retina check</td>
<td></td>
<td></td>
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<tr>
<td>Albumin / creatine ratio</td>
<td></td>
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<tr>
<td>eGFR</td>
<td></td>
<td></td>
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<tr>
<td>BMI/weight</td>
<td></td>
<td></td>
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<tr>
<td>Teeth and gums</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy lifestyle advice</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Agent

<table>
<thead>
<tr>
<th>Agent</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metformin</td>
<td>• CrCl &lt; 15 ml/min - contraindicated</td>
</tr>
<tr>
<td>Short-acting sulphonylurea (glipizide, gliclazide)</td>
<td>• Use if contraindication and/or intolerance to metformin</td>
</tr>
<tr>
<td>Insulin</td>
<td>• Consider only if the goal is to improve glucose control in those on oral medicines</td>
</tr>
</tbody>
</table>

### Agent (continued)

<table>
<thead>
<tr>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Avoid long-acting sulphonylureas (glibenclamide) due to risk of hypoglycaemia</td>
</tr>
<tr>
<td>• Avoid the use of sliding scale insulin regimes</td>
</tr>
</tbody>
</table>

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**Frailty Care Guides – 15 Diabetes (draft 1-1118)**
**Diabetes**

**Type 1:** Requires insulin every day

**Type 2:** May have a mix of treatments: diet, oral hypoglycaemics and insulin

**Definition:** Capillary glucose < 4mmol/l in someone who has diabetes and is on a sulphonylurea and/or insulin

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**Hypoglycaemia**

**Signs and symptoms:**
- Nervousness
- Sweating, chills and clamminess
- Irritability or impatience
- Rapid/fast heartbeat
- Light headedness or dizziness
- Hunger and nausea
- Blurred/impaired vision
- Tingling or numbness in the lips or tongue
- Headaches
- Anger, stubbornness or sadness
- Lack of confidence
- Nightmares or crying out during sleep
- Shakiness
- Unconsciousness

**Treatment of hypoglycaemia in the conscious person**

**Capillary glucose < 4 mmol/L**
- Give either:
  - ½ cup
  - 4 glucose tablets or
  - 3 heaped teaspoons sugar in water

**Give either a slice of bread, a small potte of yoghurt, 2 plain biscuits or 1 glass of milk or meal if due within 15 minutes**

**Re-test in 5–10 minutes**

**IV access**

- 50 mls of 50% dextrose
- Commence IV infusion 10% glucose at 100 mls/hour

**No IV access**

- Glucagon 1 mg stat IM
- If no response after 15 minutes, repeat (effect of glucagon can take 15 minutes and action is short)

**When patient is conscious and cooperative, follow advice for conscious person above**

**IV access**

- Commence IV infusion 10% glucose at 100 mls/hour

**No IV access**

- Glucagon 1 mg stat IM
- If no response after 15 minutes, repeat (effect of glucagon can take 15 minutes and action is short)

**Treatment of hypoglycaemia in the unconscious person**

**Hypoglycaemia happens suddenly in minutes to hours**

**Review for cause of hypoglycaemia:**
- Over-treatment with insulin or sulphonylurea (long-acting sulphonylurea not recommended for older adults)
- Inadequate carbohydrate intake
- Increased physical activity without carbohydrate top up
- Alcohol consumption
- Increased insulin sensitivity, eg, weight loss
- Reduced renal clearance of medication

**Over-treatment of hypoglycaemia may result in rebound hyperglycaemia. Do not give insulin to correct high capillary glucose after hypoglycaemic treatment.**

**Consider the increased risk of hypoglycaemia in older adults with the following:**
- Cognitive impairment, poor eating habits (under-nutrition)
- Low body weight
- GI disorders, malignancy
- Ongoing/acute infections
- Comorbid illnesses

---

Notify GP/NP if capillary glucose not above 4 mmol/L within 30 minutes. Continue with hypoglycaemic treatment. Check airway in patient and place in recovery position. This is a medical emergency. If no doctor or NP immediately available, dial 111. If unable to swallow due to drowsiness, do not force oral treatment. Follow advice for unconscious person. Repeat capillary glucose every 5–10 minutes.

*Frailty Care Guides – 15 Diabetes (draft 1-1118)*
### Diabetic ketoacidosis (DKA)

**Definition:** capillary glucose > 20 mmol/L
- Earliest symptoms: polyuria, polydipsia and weight loss
- Progression is marked by neurologic symptoms, including lethargy, focal signs and altered level for consciousness
- Can progress to coma in later stages

### Hyperosmolar hyperglycaemic state (HHS)

Hyperosmolar hyperglycaemic non-ketotic state (HHNK)

### Hyperglycaemic emergencies happen gradually over hours to days

If unconscious: This is a medical emergency.  
If no doctor/NP is immediately available dial 111.

### Treatment of mild hyperglycaemia in the conscious person

- **Capillary glucose (CG) > 15 mmol/L?**  
  Recheck CG in 3–4 hours or before next meal  
  
  Note: wash patient's fingers before test

- **Patient unwell?** Notify GP/NP
- **Increase frequency of CG monitoring and encourage fluids**
- **Find cause of illness and check for possible UTI**
- CG returned to acceptable range for patient – continue routine care

### Diabetes

<table>
<thead>
<tr>
<th>Common causes</th>
<th>DKA and HHS are two of the most serious acute complications of diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Infection, non-compliance</td>
<td>Infection or other illness, non-compliance, inappropriate adjustments, or cessation of insulin, dehydration, medicines that affect blood sugar</td>
</tr>
<tr>
<td>• Inappropriate adjustment or cessation of insulin</td>
<td></td>
</tr>
<tr>
<td>• New onset diabetes mellitus and myocardial ischemia</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plasma glucose</th>
<th>&gt; 13.9 mmol/L</th>
<th>&gt; 33.3 mmol/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine ketones</td>
<td>Positive</td>
<td>Little or none</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alertness</th>
<th>Progression from alert to drowsy to stupor or coma</th>
<th>Stupor/coma</th>
</tr>
</thead>
</table>

| Clinical presentation | Usual evolves rapidly over a 24-hour period. May have a fruity odour due to exhaled acetone (like nail polish remover). Deep respirations reflecting compensatory hyperventilation. Hyperventilation and abdominal pain more common | Develops insidiously with polyuria, polydipsia and weight loss, often persisting for several days. Neurological symptoms are more common |

| Physical examination | Signs of volume depletion are common in both DKA and HHS and include decreased skin turgor, dry axillae and oral mucosa, low jugular venous pressure, tachycardia and, if severe, hypotension. Neurologic findings may be seen, particularly in people with HHS |

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Both diabetic ketoacidosis (DKA) and hyperosmolar hyperglycaemic state (HHS) are medical emergencies that require prompt recognition and management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DKA or HHS: Vigorous IV electrolyte and fluid replacement to correct hypovolemia and hyperosmoality, metabolic acidosis (in DKA), potassium depletion, administration of insulin</td>
</tr>
<tr>
<td></td>
<td>Mild DKA can be treated with subcutaneous rapid-acting insulin but only when adequate staffing is available to carefully monitor the patient and check capillary blood glucose hourly</td>
</tr>
</tbody>
</table>

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