Guidelines for

MANAGING DIABETES

AT THE END OF LIFE

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Yeah, the patients shouldn't have to worry about it… that's the only thing I would say that it's* [diabetes] *not given as high a priority probably as it should be.

You don't want to go on with endless care… you've got to draw a line somewhere but I think I would like to feel comfortable but not be overactive with treatment and I feel that's not done.

Comments people with diabetes receiving palliative care made during individual interviews conducted as part of the consumer consultation process as the Guidelines were developed.

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FOREWORD

The prevalence of diabetes is increasing and people with diabetes are living longer, however, they frequently have significant complications of diabetes and other comorbidities that affect their quality of life and require palliation. The focus of diabetes management in palliative care settings may need to change from tight metabolic control to prevent medium to long term diabetic end organ disease to managing symptoms, maximising quality of life and achieving a peaceful death.

Often health professionals believe monitoring blood glucose levels and continuing diabetes medicines, especially insulin, represents intrusive disease-modifying treatment. However, hypo- and hyperglycaemia produce unpleasant symptoms that affect comfort and quality of life and can exacerbate pain. The 'textbook' symptomatic presentations of these metabolic derangements may not be present or be hard to distinguish from symptoms due to another life threatening illness unless blood glucose monitoring occurs. Likewise, medicines, including insulin, may be required to control hyperglycaemia. Hyperglycaemia occurs as a result of medicines such as corticosteroids, commonly used in palliative care contexts, and physical stressors such as dehydration and pain as well as psychological stress and depression, and can lead to ketoacidosis or hyperosmolar states and unnecessary hospital admissions.

There is very little 'gold standard' evidence for managing diabetes at the end of life mainly because dying people are a very vulnerable group and recruitment is difficult. Thus, it was difficult to identify any Level 1 evidence to support the care suggested in the Guidelines. However, an expert interdisciplinary advisory group consisting of palliative care and diabetes clinicians reviewed the existing literature and provided expert comment during the development of the guidelines. In addition, people with diabetes at the end stages of life and their family members were interviewed. The majority indicated they preferred an individualised approach including monitoring their blood glucose and continuing their diabetes medicines including insulin to prevent excursions in blood glucose until they were actively dying and unconscious.

We are very grateful to these people for willingly and openly discussing such an emotive topic, at such a difficult time for the patients and their carers, and the valuable insights all the contributors provided. We commend the guidelines to you in their name and honouring the memories of those who are no longer with us.

Trisha Dunning

Peter Martin

CONTENTS

LIST OF ABBREVIATIONS AND SYMBOLS

↑	Increased
↓	Decreased
⩾	Equal to, or greater than
>	Greater than
⩽	Equal to, or less than
<	Less than
ACD	Advanced Care Directive
AM	Morning
BG	Blood glucose
CAM	Complementary and alternative medicines
CCF	Congestive cardiac failure
DE	Diabetes Educator
DKA	Diabetic ketoacidosis
eGFR	*estimated* Glomerular filtration rate
GI	Gastrointestinal symptoms
HONK	Hyperosmolar non-ketotic acidosis
Hypo	Hypoglycaemia
ICU	Intensive care unit
IGT	Impaired glucose tolerance/ glucose intolerance
IM	Intramuscular
IRS	Insulin resistance
IV	Intravenous therapy
MI	Myocardial Infarction
OHA	Oral hypoglycaemic agents
mmol/L	millimoles/litre – unit for measuring glucose in blood
PCOC	Palliative Care Outcomes Collaboration
PM	Afternoon
QUM	Quality use of medicines
SVC	Superior vena cava syndrome/obstruction
T1	Type 1 Diabetes Mellitus
T2	Type 2 Diabetes Mellitus
TZD	Thiazolidinediones
UTI	Urinary tract infection
WHO	World Health Organisation

Guidelines for managing diabetes at the end of life

The guidelines use the Palliative Care Outcomes Collaboration (PCOC) palliative care phases of stable, unstable, deteriorating and terminal.

STABLE PHASE: The person's symptoms are adequately controlled on their established management plan but interventions to maintain symptom control and quality of life have been planned.
UNSTABLE PHASE: The person develops a new unexpected problem or a rapid increase in the severity of existing problems.
DETERIORATING PHASE: The person's existing symptoms gradually worsen or they develop new but unexpected problems.
TERMINAL PHASE: Death is likely in a matter of days and no acute intervention is planned or required.

HOW TO USE THESE GUIDELINES

PART 1

Part 1 is a **SCREENING PROCESS** for all people when they are first referred to palliative care regardless of PCOC phase.

Use **Part 1, Section A** if they are known to have diabetes.

Use **Part 1, Section B** if their diabetes status is unknown.

PART 2

Part 2 is the recommended **DIABETES MANAGEMENT** at each PCOC phase.
Determine the PCOC phase of a palliative care patient and use the appropriate section.

Use **Part 2, Section A** for stable phase.

Use **Part 2, Section B** for unstable phase.

Use **Part 2, Section C** for deteriorating phase.

Use **Part 2, Section D** for terminal phase.

PART 3

Part 3 is recommendations for **MANAGING STEROIDS** and other diabetogenic medicines (as listed on Page 2 of the accompanying document) in palliative care patients. People requiring palliative care who are prescribed steroid medicines and some other medicines may develop diabetes.

Use **Part 3, Section A** for type 1 diabetes.

Use **Part 3, Section B** for type 2 or previously undiagnosed diabetes.

Screening process for all people when they are first refered to palliative care, regardless of PCOC* phase

KNOWN TO HAVE DIABETES

- Undertake a comprehensive assessment
- Assess presence of diabetes risk factors (refer to Part 1, Section B)
- Undertake a comprehensive medicine review
- Assess for occult infections

Is the person using diabetogenic medicines?

- Steroids
- Antipsychotics

OR using other medicines known to increase blood glucose?

- Thiazide diuretics
- Sympathomimetics
- Pentamidine
- Dilantin/phenytoin
- Calcium channel blockers
- Enteral nutrition supplements e.g. Glucerna

If the person is using diabetogenic medicines:

- Review need to continue diabetogenic medicines
- Adjust/commence oral hypoglycaemic agents (OHA) or insulin to control hyperglycaemic symptoms and promote comfort
- Monitor according to Managing Steroid Guidelines (refer to Part 3, Section A/B) but individualise according to Advanced Care Directive and PCOC phase
- Provide education about steroids and diabetes
- Consider adrenal suppression and hypercalcaemia as complicating factors if steroids are needed in the long term
- Assess enteral feeds – may lack carbohydrate and therefore contribute to lethargy OR may be high calorie and contribute to hyperglycaemia
- Readjust OHA/insulin doses if steroids are ceased and when weaning the dose to avoid hypoglycaemia

If the person is NOT using diabetogenic medicines:

- Provide usual diabetes management and education according to relevant diet and activity guidelines
- Adjust OHA/insulin as appropriate
- Consider referring to:
  - Treating Specialist
  - Endocrinologist
  - Diabetes Educator
  - Dietitian
  - Dentist
  - Podiatrist

*Palliative Care Outcomes Collaboration (PCOC)

Screening process for all people when they are first refered to palliative care, regardless of PCOC* phase

DIABETES STATUS UNKNOWN

- Undertake a comprehensive assessment
- Assess presence of diabetes risk factors
- Undertake a comprehensive medicine review
- Assess for occult infections

Is the person using diabetogenic medicines AND has hyperglycaemia?**

- Provide education about steroids and diabetes
- Review need to continue diabetogenic medicines
- Monitor according to steroid medicine guidelines but individualise according to Advanced Care Directive and PCOC* phase
- Commence OHA/insulin+ to control hyperglycaemic symptoms and promote comfort
- Assess enteral feeds – may lack carbohydrate, which can contribute to lethargy OR may be high calorie and contribute to hyperglycaemia
- Consider adrenal suppression and hypercalcaemia as complicating factors if steroids are needed in the long term
- Adjust OHA/insulin+ if steroids are ceased and when weaning the dose to avoid hypoglycaemia

Does the person have hyperglycaemia?**

- Commence diabetes management and education according to relevant diet and activity guidelines
- Commence OHA/insulin+ if appropriate
- Consider referring to:
  - Treating Specialist
  - Endocrinologist
  - Diabetes Educator
  - Dietitian
  - Dentist
  - Podiatrist

Are three or more diabetes risk factors present:

- Family history
- Ethnicity (e.g. Asian, Pacific Islander, Australian Aboriginal)
- Overweight, especially central obesity
- Over age 50
- History of gestational diabetes
- Schizophrenia
- Pancreatic cancer

AND/OR are hyperglycaemic symptoms present?

- Continue screening
- Monitor blood glucose levels especially fasting and towards the end of the day
- Monitor for hyperglycaemic symptoms

*Palliative Care Outcomes Collaboration (PCOC)
**Random venous blood glucose ⩾ 11.1 mmol/L or fasting blood glucose ⩾ 7.0 mmol/L
+Oral hypoglycaemic agents/insulin

Recommended diabetes management for Type 1 and Type 2 Diabetes*

PCOC** PHASE: STABLE

DIABETES APPROACH

- Review/document diabetes management plan including medicines: insulins, oral hypoglycaemic agents (OHA)/Incretins
- Document presence of diabetes-related symptoms (see Table 1 in accompanying document)
- Document diabetes short and long term complication status
- Ascertain self-care capacity and carer involvement and capacity
- Consult with GP, diabetes educator, endocrinologist
- Check continuing and planned treatments e.g. dialysis, chemotherapy, radiotherapy, surgery
- Revise or commence Advanced Care Directive that includes diabetes management
- Provide information/discuss management with patients and family members/carers

ASSESSMENT

- Review medicines using Quality Use of Medicines (QUM) framework (see page 3 accompanying document)
- Ascertain whether patient is using complementary medicines and/or other therapies
- Caution with renally excreted medicines and eGFR < 60ml/min
- Assess presence of diabetes-related symptoms
- Assess diabetes complications:

Short term
- Hypoglycaemia
- Hyperglycaemia
- Active infection

Long term

(1) Microvascular disease
- retinopathy
- nephropathy

(2) Macrovascular disease
- cardiovascular disease
- cerebrovascular disease
- intermittent claudication

(3) Neuropathy
- peripheral
- autonomic (responsible for gastroparesis and hypoglycaemia unawareness)

MANAGEMENT

TYPE 1

- Continue usual management
- Insulin regimen might need to be adjusted

TYPE 2

- Decide whether oral hypoglycaemic agents (OHAs) are still appropriate
- Simplify medicines regimen if possible
- Consider using insulin – may be required if altering/ceasing OHAs and/or to control symptoms

NOTE:

For all PCOC phases when patient is on OHAs and Incretins
- Risk of hypoglycaemia is increased with sulphonylureas if renal or liver disease is present
- Metformin and alpha-glucosidase inhibitors can exacerbate gastrointestinal (GI) symptoms, nausea, vomiting, diarrhoea
- Metformin increases the risk of lactic acidosis and should be stopped temporarily if radio-contrast media are used in investigative procedures
- Incretin mimetics cause nausea, vomiting, weight loss and reduce appetite
- Be aware of relevant contraindications e.g. Thiazolidinediones (TZDs) e.g. oedema, congestive cardiac failure (CCF)
- Consider the side effects of medicines chosen e.g. Metformin (GI symptoms), opioids (opioid-induced bowel dysfunction, neurological changes, masks hypoglycaemia)

*Information relates to patients with Type 1 or Type 2 Diabetes unless otherwise stated
**Palliative Care Outcomes Collaboration (PCOC)

Recommended diabetes management for Type 1 and Type 2 Diabetes*

PCOC** PHASE: UNSTABLE

DIABETES APPROACH

- Review/document diabetes management plan including medicines: insulins, OHAs/Incretins
- Document presence of diabetes-related symptoms (see Table 1 in accompanying document)
- Document diabetes short and long term complication status
- Ascertain self-care capacity and carer involvement and capacity
- Consult with GP, diabetes educator, endocrinologist
- Check continuing and planned treatments e.g. dialysis, chemotherapy, radiotherapy, surgery
- Revise or commence Advanced Care Directive that includes diabetes management
- Provide information/discuss management with patients and family members/carers

ASSESSMENT

Assess symptoms:

- Pain
- Nausea/vomiting
- Oral intake/ pathology
- Delirium
- Infection – occult or overt sepsis
- Depression/anxiety
- Acute dyspnoea
- Polyuria, oliguria, thirst
- Anorexia
- Cachexia
- Decreasing performance status

Consider diabetes as a cause of the symptoms
Consider the impact of the symptoms on diabetes
(See Table 1 in accompanying document)

Decide whether symptoms represent a diabetes, oncology or other emergency

MANAGEMENT

Initiate management strategies:

- Monitor BG up to 4/day to determine whether symptoms are diabetes-related and/or contribute to the unstable state
- Blood glucose targets: Fasting 6-8 mmol/L, Postprandial 6-11 mmol/L
- Initiate or change medicines if indicated:
  - Increase or decrease dose
  - Alter dose interval
- Ensure emergency medicines are available
- Provide diabetes management contingency plans for patient and family/carer

TYPE 1: Monitor blood ketones
TYPE 2: Consider introducing insulin

If an emergency:

- Treat underlying cause
- Decide whether admission to hospital (and/or ICU depending on prognosis) is necessary
- Consider referring to endocrinologist
- Provide education if medicines change
- Manage comfort and support family
- Monitor response

If not an emergency:

- Manage comfort and support family
- Monitor diabetes status
- Consider initiating management strategies (see left)

*Information relates to patients with Type 1 or Type 2 Diabetes unless otherwise stated
**Palliative Care Outcomes Collaboration (PCOC)

Recommended diabetes management for Type 1 and Type 2 Diabetes*

PCOC** PHASE: DETERIORATING

DIABETES APPROACH

- Review/document diabetes management plan including medicines: insulins, OHAs/Incretins
- Document presence of diabetes-related symptoms (see Table 1 in accompanying document)
- Document diabetes short and long term complication status
- Ascertain self-care capacity and carer involvement and capacity
- Consult with GP, diabetes educator, endocrinologist
- Check continuing and planned treatments e.g. dialysis, chemotherapy, radiotherapy, surgery
- Revise or commence Advanced Care Directive that includes diabetes management
- Provide information/discuss management with patients and family members/carers

ASSESSMENT

Consider in particular:
- Anorexia
- Cachexia
- Decreasing performance status

Assess symptoms:
- Pain
- Nausea/vomiting
- Oral intake
- Oral pathology
- Delirium
- Infection – occult or overt sepsis
- Depression/anxiety
- Acute dyspnoea
- Polyuria, oliguria, thirst

Consider diabetes as a cause of the symptoms
Consider the impact of the symptoms on diabetes
(See Table 1 in accompanying document)

Decide whether symptoms represent a diabetes, oncology or other emergency

MANAGEMENT

Re-evaluate diabetes management strategies

NOTE:
- BG and ketone monitoring is still useful to determine whether ketosis exists but may be less frequent (1-2 /day)
- New blood glucose targets < 10 mmol/L fasting
- Ensure medicines are optimal for this phase – cease unless using to promote comfort

TYPE 2:
Consider introducing insulin to promote comfort

If an emergency:
- Treat the underlying cause
- Decide whether admission to hospital is necessary
- Consider referring to endocrinologist
- Manage comfort
- Monitor response

If not an emergency:
- Manage comfort
- Consider initiating management strategies (see left)
- Implement additional support/education for family/carers

*Information relates to patients with Type 1 or Type 2 Diabetes unless otherwise stated
**Palliative Care Outcomes Collaboration (PCOC)

Recommended diabetes management for Type 1 and Type 2 Diabetes*

PCOC** PHASE:
TERMINAL

DIABETES APPROACH

- Review/document diabetes management including medicines: insulins, OHAs/Incretins with a view to ceasing
- Note: Carer involvement may increase
- Communicate with GP, palliative care specialist team
- Implement Advanced Care Directive
- Consider implementing the Liverpool Care Pathway
- Provide information/discuss management with patients and family members/carers

ASSESSMENT

- Assess whether short term diabetes complications need to be treated to achieve comfort
- Refer to Advanced Care Directive
- Identify carer/family bereavement risks
- Assess and manage to alleviate symptoms
  - Pain
  - Nausea/vomiting
  - Oral comfort
  - Delirium
  - Infection – occult or overt
  - Depression/anxiety
  - Acute dyspnoea

MANAGEMENT

Focus of diabetes management is on comfort

Re-evaluate diabetes management strategies:

- Consider patient and carer preferences for diabetes management
- Consider ceasing BG monitoring – check Advanced Care Directive and/or discuss with carer if patient has not given instructions to ensure monitoring is consistent with the patient's wishes
- Decide whether care is provided in home/hospital care

Note: Medicines may not be appropriate except to achieve comfort. Rationalise medicines and stop any that are unnecessary

*Information relates to patients with Type 1 or Type 2 Diabetes unless otherwise stated
**Palliative Care Outcomes Collaboration (PCOC)

Managing steroids and other diabetogenic medicines in palliative care patients

TYPE 1 DIABETES

DIABETES APPROACH

- Short course not causing symptoms or ketosis may not require regimen changes but effects on blood glucose often occur after 1-2 doses
- Courses > three days usually require regimen changes

NOTE:
Long term steroid use can:
- cause hypercalcaemia
- suppress the hypothalamic-pituitary-adrenal axis

Both states can complicate management but may not be relevant depending on the prognosis

ASSESSMENT

- Revise medicine regimen: if possible avoid other diabetogenic medicines or use lowest possible dose
- Conduct a collaborative team meeting with specialists – Palliative, diabetes educator, endocrinologist, and patient and family/carers
- Ascertain patient/carer education requirements – Appropriate medicine self-management (when, how, why, interactions, side effects)
  - BG testing
  - Increased risk of hypoglycaemia if hypo unawareness is present especially when weaning or ceasing steroids
- Commence BG monitoring – consider increasing frequency while on diabetogenic medicines (e.g. 3-4/day)
- Revise diet and exercise routines but note food choices should not be limited if the person is cachectic or anorexic

MANAGEMENT

- Increase insulin dose if BG > 10 mmol/L especially if ketones are present.
- Note: Patients in ICU or fasting may require an insulin infusion
- Use subcut insulin if eating
- Adjust prandial doses because the post prandial BG tends to increase.
- Consider the effect of the carbohydrate meal content on BG and the need to provide energy if patient is on enteral feeds
- Monitor and record BG before meals and before bed
- Monitor blood ketones if BG >15 mmol/L
- Manage hyperglycaemia and hypoglycaemia
- An AM insulin dose may be needed because BG often peaks early PM and tends to fall overnight
- Revise patient and carer knowledge and provide education especially managing hyperglycaemia if managed at home
- Consider need for access to 'on call/after hours' support

Managing steroids and other diabetogenic medicines in palliative care patients

TYPE 2 DIABETES
or previously undiagnosed diabetes

DIABETES APPROACH

- Short course not causing symptoms or hyperosmolar non-ketotic acidosis (HONK) may not require regimen changes but effects on BG often occur after 1-2 doses
- People with Type 2 can develop ketoacidosis during significant illnesses
- Courses > three days usually require regimen changes

NOTE:
Long term steroid use can suppress the hypothalamic-pituitary-adrenal axis.

This can complicate management but may not be relevant depending on the prognosis

ASSESSMENT

- Revise medicine regimen: if possible avoid other diabetogenic medicines or use lowest possible dose for the shortest possible time
- Conduct a collaborative team meeting with specialists – Palliative, diabetes educator, endocrinologist and oncologist, and patient and family/carers
- Oral hypoglycaemic agents may need to be altered
- Consider commencing insulin if BG is consistently > 11 mmol/L
- Ascertain patient/carer education requirements – Appropriate medicine self-management (when, how, why, interactions, side effects); hypoglycaemia management
  - BG testing
- Revise diet and exercise routines but note food choices should not be limited if the person is cachectic or anorexic
- Commence BG monitoring – consider increasing frequency while on diabetogenic medicines (e.g. 3-4/day or fasting and pre-evening meal)

MANAGEMENT

- Consider insulin preparations
  - Prebreakfast long acting analogue such as lantus or protaphane OR
  - Premixed insulin before lunch e.g. mixtard 30/70
- Note: Patients in ICU or fasting may require an insulin infusion
- Consider the effect of the carbohydrate meal content on BG and the need to provide energy if patient on enteral feeds
- Monitor and record BG before meals and before bed
- Manage hyperglycaemia and hypoglycaemia
- Revise patient and carer knowledge especially managing hyperglycaemia if managed at home
- Consider need for access to 'on call/after hours' support

OUTLINE OF DIABETES MANAGEMENT

In general diabetes management involves an appropriate diet and activity for both type 1 and type 2 diabetes even when medicines are needed. Managing diabetes involves:

- Lifestyle changes particularly for type 2 diabetes
- Medicines:
  - Type 1 diabetes – insulin
  - Type 2 diabetes oral hypoglycaemic agents and/or insulin
    Note: beta cell function declines over time and approximately 75% of people with type 2 diabetes need insulin
- Managing blood glucose, lipids and blood pressure
- Regular medicines review
- Regular monitoring by health professionals to identify and manage the short and long term complications of diabetes
- Diabetes education including educating significant others
- Self-care by the patient, support from family/carer

HYPERGLYCAEMIA AND HYPOGLYCAEMIA

Two conditions commonly associated with diabetes are hyperglycaemia, a symptom of diabetes, and hypoglycaemia, a side effect of oral hypoglycaemic agents, especially sulphonylureas and insulin.

Hyperglycaemia

Under usual circumstances, many people with type 2 diabetes do not experience the symptoms of hyperglycaemia until their blood glucose levels are extremely high. Common symptoms of hyperglycaemia include:

- Feeling excessively thirsty
- Feeling tired
- Infections e.g. thrush, cystitis, wound infections
- Weight loss in the longer term
- Frequently passing large volumes of urine
- Blurred vision
- Lowered mood

(Diabetes Australia, 2009)

Hypoglycaemia

Hypoglycaemia, also called a 'hypo', low blood glucose or insulin reaction, occurs when the blood glucose level falls below 3.5 mmol/L in people on OHA or insulin. Symptoms of hypoglycaemia vary from person-to-person, however, common feelings are:

- Weakness, trembling or shaking
- Light headedness
- Dizziness
- Tearful/crying
- Irritability
- Numbness around the lips and fingers
- Sweating
- Headache
- Difficulty concentrating
- Behaviour change
- Hunger

(Diabetes Australia, 2009)

Hypoglycaemia unawareness may be present, especially in people with long-standing type 1 diabetes. This means they may not recognise the symptoms of hypoglcycaemia. In addition, symptoms may be masked by analgesia, delirium and other cognitive changes and cancer-related autonomic neuropathy. Significantly, both people with diabetes and their family members/carers are often very fearful of hypos and their consequences.

CORTICOSTEROID MEDICINES

Corticosteroid medicines, more specifically the glucocorticoids (often referred to as steroids), are an essential part of the management of several disease processes such as haematological malignancies, inflammatory diseases, allergies and shock. However, long term use and high doses predisposes people to insulin resistance (IRS), glucose intolerance (IGT) and steroid-induced diabetes and causes hyperglycaemia and the resultant symptoms in people with diagnosed diabetes. IRS and IGT can occur within 48 hours of commencing steroids, especially in at risk individuals and those with diabetes. People should be informed they could develop diabetes when diabetogenic medicines are prescribed.

THE QUALITY USE OF MEDICINES FRAMEWORK

The Quality Use of Medicines (QUM) Framework (PHARM Committee, 2005) is the recommended Australian framework for making medicines-related decisions and was used to formulate these guidelines (see Figure 1, next page).

Factors to consider when determining diabetes medicine regimen for people with diabetes receiving palliative care – if medicines are indicated

- Insulin doses may need to be adjusted frequently.
- Patients on metformin who develop nausea and vomiting especially the elderly, those on diabetogenic medicines, and those with reduced renal function, liver, cardiac and respiratory disease, and people who are not eating may be at risk of lactic acidosis, a rare but serious adverse event. Therefore, metformin may not be the best choice.
- Insulin mimetics can induce weight loss and nausea and may be contraindicated.
- Thiazolidinediones (TZDs) contribute to weight gain due to fluid retention and may be contraindicated.
- Diuretics can exacerbate dehydration and increase blood glucose levels.
- Corticosteroids, and atypical antipsychotics are frequently used in palliative care and other disease processes and increase blood glucose levels.
- Glucagon used to treat severe hypoglycaemia usually increases blood glucose quickly. A second dose can induce nausea but may be ineffective in emaciated people with reduced glycogen stores. This means if oral glucose treatment of hypoglycaemia and IM glucagon are ineffective or contraindicated, IV dextrose may be required.
- Some oral nutrition supplements affect blood glucose levels, often leading to hyperglycaemia.
- The patient may be using complementary medicines (CAM) and other CAM therapies. If so, determine why the person is using CAM, what they are using, and whether CAM is appropriate i.e. the benefits outweigh the risks and there is evidence for its use.
- CAM medicines may interact with conventional medicines. However, some non-medicine CAM therapies can relieve symptoms and may be safer than medicines.
- Opioids and other psychoactive medicines can mask hypoglycaemia.

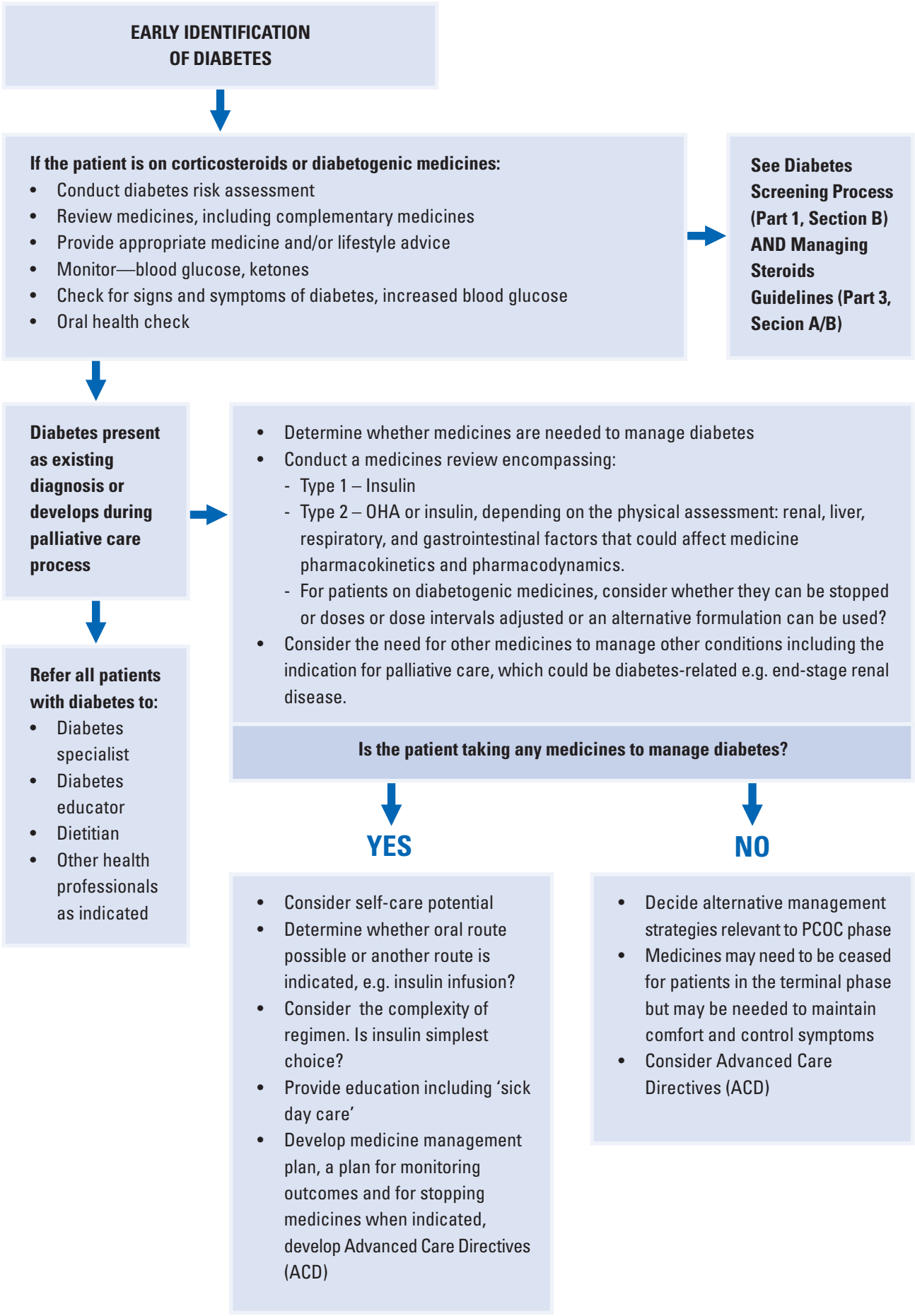

FIGURE 1: Quality Use of Medicines Framework for managing diabetes at the end of life

PALLIATIVE CARE SYMPTOMS AND DIABETES

Sub-optimal symptom control can be due to the diabetes or the life threatening primary illness or both. Distinguishing cause and effect can be difficult. Symptoms not caused by diabetes can have significant effects on diabetes management. Table 1 (next pages) presents the relationships between common palliative care symptoms and diabetes.

Table 1: The relationship between common palliative care symptoms and diabetes

COMMON PALLIATIVE CARE SYMPTOMS	IMPACT ON DIABETES MANAGEMENT	MAY BE DIABETES-RELATED
Pain (acute/chronic)	**Increased:** - somnolence or confusion/cognitive impairment due to pain/analgesia - risk of hyperventilation - hyperglycaemia **Reduced:** - intake - mobility - sleep - self-care ability - quality of life	- Peripheral vascular disease - Amyotrophy - Peripheral neuropathy - MI - Tissue glycosylation (e.g. carpel tunnel syndrome) - Ketoacidosis (abdominal pain)
Depression/anxiety	**Increased:** - fatigue - lethargy, change in performance status - risk of DKA, HONK - social isolation **Reduced:** - self-care ability, disinterest increased risk of hyperglycaemia - confidence - inadequate nutrition increased risk of hypoglycaemia - effects on communication and self-care	- Associated with diabetes especially hyperglycaemia - Renal disease - Steroid medicines - Hypoglycaemia symptoms can be mistaken for anxiety
Oral Pathology (oral and maxillofacial pathology – WHO): Mucositis, ulcers, dry mouth	**Increased:** - pain - dry mouth - inadequate nutrition, inappropriate weight loss, cachexia - hypoglycaemia if on OHA/insulin **Reduced:** - intake - self-care deficits - mood	- DKA, HONK may lead to dry mouth, thirst and clinical dehydration - Risk of dental caries and oral pathology - Risk of hypoglycaemia if on OHAs or insulin
Nausea/vomiting	**Increased:** - confusion - lethargy - disinterest - pain/discomfort - inadequate nutrition – weight loss, cachexia, hyperglycaemia - hypoglycaemia if on OHA/insulin - dehydration and electrolyte imbalance - risk of ketoacidosis **Reduced:** - intake - energy, depleted energy stores	- May be due to gastric autonomic neuropathy - Renal disease - Hyperglycaemia – DKA, HONK **Medicines:** Metformin Byetta

Table 1 (continued): The relationship between common palliative care symptoms and diabetes

COMMON PALLIATIVE CARE SYMPTOMS	IMPACT ON DIABETES MANAGEMENT	MAY BE DIABETES-RELATED
Delirium	**Increased:** - cognitive impairment **Reduced:** - ability to communicate and detect signs/symptoms of hypo/hyperglycaemia - self-care ability	- May be due to many factors including hyper and hypoglycaemia
Sepsis	**Increased:** - confusion - energy requirements - pain - difficulty interpreting elevated white cell count, which could be caused by hyperglycaemia, sepsis, or other factors - bone marrow failure **Reduced:** - intake increased DKA, HONK risk - quality of life - wound healing	- May be silent in diabetes (UTI, MI) - May precipitate DKA, HONK
Acute Dyspnoea	**Increased:** - hypoxia contributing to confusion **Reduced:** - self-management capacity Note: MI often silent in diabetes	- Tachypnoea may be due to DKA and resultant metabolic acidosis - Kussmaul breathing in early stages of DKA could be mistaken for Cheyne-Stokes respiration - Consider lactic acidosis if taking Metformin - Hypoglycaemia - DKA, HONK, Lactic acidosis
Diabetes Emergencies	**Examples:** - Hypoglycaemia - Hyperglycaemia - MI	
Oncology Emergencies	**Examples:** - Spinal Cord Compression (glucocorticoids) and acute immobility - SVC obstruction (acute dyspnoea and delirium) - high dose of glucocorticoids - Febrile neutropenia - Major bronchial obstruction (dyspnoea and use of glucocorticoids)	- Hypoglycaemia - DKA, HONK, Lactic acidosis

SUGGESTED READING

Palliative Care Resources

Clayton J, Hancock K, Butow P, Tattesall M, Currow D. (2007). Clinical practice guidelines for communicating prognosis and end of life issues with adults in the advanced stages of a life threatening illness, and their caregivers. *Medical Journal of Australia* 186 (12): S76–S108.

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Fitzsimons D, Mullan D, Wilson J, et al. (2007) The Challenge of patients' unmet palliative care needs in the final stages of chronic illness. *Palliative Medicine* 21 (4): 313–322.

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CareSearch. (2010). Palliative care knowledge network. http://www.caresearch.com.au/Caresearch/Default.aspx

Therapeutic Guidelines. (2010). *Palliative Care Version 3.* Therapeutic Guidelines Limited, North Melbourne

Diabetes Management Resources

Dunning T. (2009). *Care of People with Diabetes: a Manual of Nursing Practice*. 3rd edition, Wiley-Blackwell, Chichester UK.

Therapeutic Guidelines (2009). Endocrinology version 4, 2009. Victoria. http://www.tg.org.au/index.php?sectionid=44#mozTocId587241

End of Life Resources

Kuhl D. (2005). *What Dying People Want: Practical Wisdom for the End of Life*. Australian Broadcasting Corporation, Sydney, NSW.