

Evidence check

4 May 2020

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.

Diabetes care during COVID-19

Rapid review questions

1. Are there risk stratification approaches to identify diabetes patients that are high, intermediate and low risk during COVID-19?
2. Which clinical pathways and modalities can support diabetes management and service delivery during COVID-19?

In brief

- Recent evidence reviews and meta-analysis have shown:
 - People with diabetes appear to be at increased risk of more severe COVID-19 infection, however the factors that moderate this relationship are unclear.
 - Self-management tools based on text messages and increased blood glucose monitoring have shown benefits to patients. There are algorithms for triaging care for diabetes patients during COVID-19, which guide the use of delivery options including urgent face-to-face, virtual care and deferral of appointments. There are no validated risk stratification tools to identify high risk patients.
- Expert advice from Australian Diabetes Society, NHS Clinical Networks and Association of British Diabetologists recommend services during COVID-19 should include:
 - For inpatient services increased staff capacity, provision of remote support, teamwork and facilitation of early discharge.
 - For outpatient services minimising investigations, utilising virtual clinics and conducting remote consultations. The models outline pathways of care for type 1 and type 2 diabetes and diabetes in pregnancy, according to clinical needs and risk factors.
- Evidence for telehealth application of diabetes in COVID-19 is emerging, including a case study of a new onset of type 1 diabetes via a combination of emails, Zoom and telephone calls during COVID-19. Telehealth has previously been demonstrated to be successful in delivery of diabetes services.
- Specialist guidance around managing diabetic foot clinics and diabetes in pregnancy screening is also available.

Limitations

Much of the available guidance is based on collective expert opinion focusing on diabetic patients in the context of COVID-19, and often uses the generic term diabetes, rather than explicitly referring to type 1, type 2 or gestational diabetes mellitus (GDM). The evidence check did not include services secondary to diabetes complications, e.g. renal or vascular disease. Findings from reviews and meta-analysis are included but primary publications included were not reviewed. Empirical evidence on the management of COVID-19 positive diabetic patients is emerging, however has not been explicitly searched in the evidence review.

Background

Diabetes is a chronic, metabolic disease that is characterised by elevated levels of blood glucose. Types of diabetes include type 1, type 2 and GDM. Diabetes is associated with increased mortality, severity and acute respiratory distress syndrome in COVID-19 as reported in a recent meta-analyses (1, 2) Some studies have suggested there may be increases in service use with social lockdown as a result of poorer glycaemic control and subsequent complications (3).

Methods (see Appendix 1)

Google and PubMed were searched on the 6 April and 3 May 2020.

Results (see Tables 1, 2 and 3)

Question 1 – The Centre for Evidence-Based Medicine (CEBM) published a rapid review on diabetes and risks from COVID-19 (4). They found:

- There is no evidence on whether people with diabetes are more likely to be diagnosed with COVID-19, however people with diabetes appear to be at increased risk of having a more severe COVID-19 infection.
- The extent to which clinical and demographic factors moderate this relationship is unclear.
 - A narrative review noted that in diabetes, co-existing heart disease, kidney disease, advanced age and frailty are likely to further increase the severity of COVID-19, but did not provide data to support this.
 - A retrospective cohort study found fasting blood glucose to be associated with COVID-19 fatality, after adjustment for confounders which were not described.

Question 2 – The CEBM published a rapid review on managing diabetes in the context of COVID-19. (5) Relevant to service delivery they found:

- Self-education/management- Increased frequency of blood glucose monitoring saw better HbA1c control.
- There is little information on what tools are effective specific to COVID-19.
- Text message-based interventions have shown a significant reduction in HbA1c in two systematic reviews.
- Smartphone-based applications showed mixed results with some improvement in self-efficacy.
- Web- and computer-based interventions showed mixed results with no improvement in depression or health-related quality of life, but some small benefits in HbA1c.
- Routine diabetes care
 - Much UK guidance has advised people with diabetes to access remote medical assistance wherever possible. NHS London Clinical Networks have developed an algorithm for outpatient prioritisation to assist with triage (Table 1).






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[*]COVID-19 potential impact in terms of local COVID transmission and/or impacts on local staffing and resource availability may differ across jurisdictions.</p> <div style="display: flex; justify-content: space-between; font-size: 0.8em;"> <div style="width: 30%;">  <p>TELEHEALTH Telehealth options may include telephone, store-and-forward clinical or radiological images, video call and other remote monitoring methods (e.g. foot temperature monitoring, step activity monitoring etc.). Telehealth can potentially be funded by Medicare, please refer to Medicare Telehealth items¹¹ HERE</p> </div> <div style="width: 30%;">  <p>HOME VISITS Clinician visits the patient's home to perform treatment. This can potentially be funded by under Medicare, please refer to Medicare Chronic Disease Management items¹² HERE</p> </div> <div style="width: 30%;">  <p>iHRFS Inter-disciplinary High Risk Foot Service (or equivalent multiple disciplines that include at a minimum a doctor, nurse and podiatrist with direct access to a surgeon, all of whom are experienced in diabetes-related foot disease care).</p> </div> </div> </div>	LIMB & OR LIFE THREATENING STATUS	FOOT DISEASE CONDITION(S)	MAINTAIN USUAL TRIAGE PLAN	BEST PRACTICE CLINICAL CARE IN NON COVID-19 CRISIS	COVID-19 POTENTIAL IMPACT ON CLINICAL CARE [*]	CRITICAL						<ul style="list-style-type: none"> Foot ulcer with systemic (severe) infection Acute limb-threatening ischaemia 	Refer immediately to Emergency Department including for urgent surgical review	<ul style="list-style-type: none"> Hospital inpatient care 	<ul style="list-style-type: none"> Hospital inpatient care 	HIGHLY SERIOUS						<ul style="list-style-type: none"> Foot ulcer with local (mild or moderate) infection (including osteomyelitis) Chronic limb-threatening ischaemia Acute or suspected Charcot foot 	Refer same day to Inter-disciplinary High Risk Foot Service (iHRFS) &/or if chronic limb-threatening ischaemia to a vascular specialist	<ul style="list-style-type: none"> Initial & follow-up consultations to occur face-to-face Frequency of consultation usually at least weekly 	<ul style="list-style-type: none"> Initial consultation to occur face-to-face Follow-up consultations may be mix of face-to-face & by telehealth^a Consultation frequency may be reduced 	SERIOUS						<ul style="list-style-type: none"> Foot ulcer without infection or ischaemia 	Refer to Inter-disciplinary High Risk Foot Service (iHRFS)	<ul style="list-style-type: none"> Initial & follow-up consultations to occur face-to-face Frequency of consultation usually each 1-2 weeks 	<ul style="list-style-type: none"> Initial and follow up consultations may be mix of face-to-face & telehealth^a Consultation frequency may be reduced 	STABLE						<ul style="list-style-type: none"> Healed foot ulcer Healed amputation Chronic Charcot foot 	Refer routinely to podiatrist (or to a similarly competent foot practitioner) for maintenance care	<ul style="list-style-type: none"> Initial & follow-up consultations to occur face-to-face Frequency of consultation varies from 1-6 months depending on the risk of acute foot disease and care 	<ul style="list-style-type: none"> Initial and follow up consultations may be mix of face-to-face & telehealth^a Consultation frequency may be reduced Home visits^b may be considered 	<p>Click here</p>
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Table 1: Triage algorithms					
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All Feet On Deck— The Role of Podiatry During the COVID-19 Pandemic: Preventing hospitalizations in an overburdened healthcare system, reducing amputation and death in people with diabetes (7)		Conditions	Site of Care	Urgency	Click here
	Critical (0.25% of patients with diabetes)	<ul style="list-style-type: none"> - IDSA Severe and some Moderate infections - Gas gangrene - SIRS/Sepsis - Acute limb-threatening ischemia 	Hospital	Priority 1 Urgent	
	Serious (0.75% of patients with diabetes)	<ul style="list-style-type: none"> - IDSA Mild and some Moderate infections (including osteomyelitis) - Chronic limb-threatening ischemia (CLTI) - Dry gangrene - Worsening foot ulcers - Active Charcot foot 	Outpatient Clinic Office-based Lab Surgery Center Podiatrist Office	Priority 2	
	Guarded (3% of patients with diabetes)	<ul style="list-style-type: none"> - Improving foot ulcer - Inactive Charcot foot (not yet in stable footwear) 	Podiatrist Office Home Telemedicine	Priority 3	
	Stable (94% of patients with diabetes)	<ul style="list-style-type: none"> - Uncomplicated venous leg ulcer - Recently healed foot ulcer - Inactive Charcot foot (in stable footwear) - Healed amputation - Diabetic foot risk assessments 	Home Telemedicine	Priority 4	


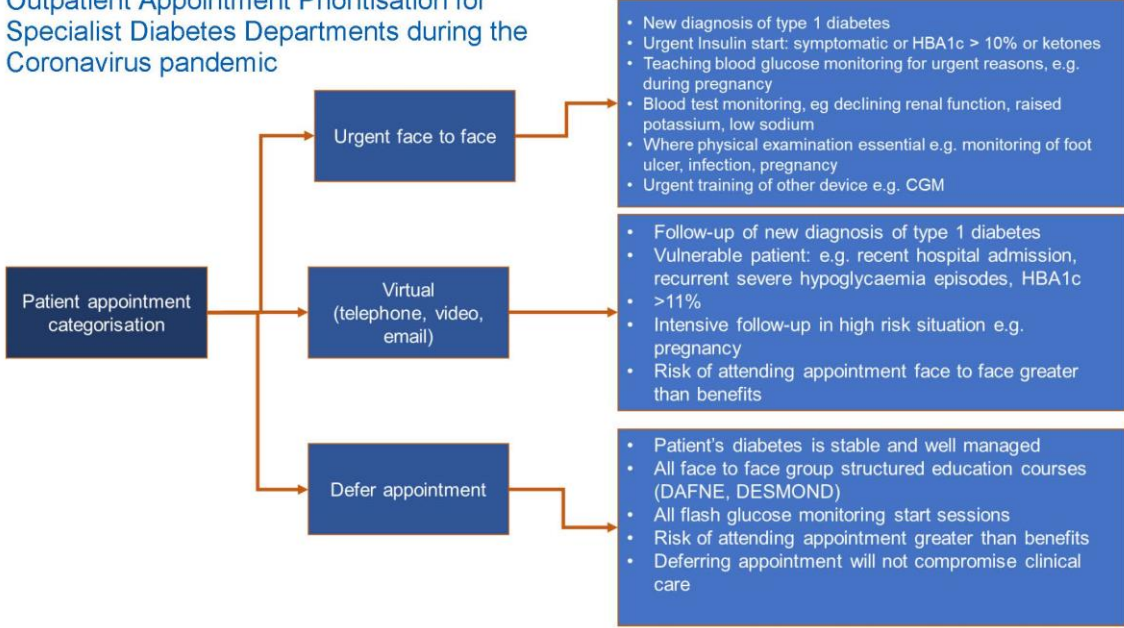
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<p>NHS London Clinical Networks Diabetes outpatient appointment prioritisation (8)</p>	<p style="text-align: right;"></p> <p>Outpatient Appointment Prioritisation for Specialist Diabetes Departments during the Coronavirus pandemic</p>  <pre> graph LR A[Patient appointment categorisation] --> B[Urgent face to face] A --> C[Virtual (telephone, video, email)] A --> D[Defer appointment] B --> E["• New diagnosis of type 1 diabetes • Urgent Insulin start: symptomatic or HBA1c > 10% or ketones • Teaching blood glucose monitoring for urgent reasons, e.g. during pregnancy • Blood test monitoring, eg declining renal function, raised potassium, low sodium • Where physical examination essential e.g. monitoring of foot ulcer, infection, pregnancy • Urgent training of other device e.g. CGM"] C --> F["• Follow-up of new diagnosis of type 1 diabetes • Vulnerable patient: e.g. recent hospital admission, recurrent severe hypoglycaemia episodes, HBA1c >11% • Intensive follow-up in high risk situation e.g. pregnancy • Risk of attending appointment face to face greater than benefits"] D --> G["• Patient's diabetes is stable and well managed • All face to face group structured education courses (DAFNE, DESMOND) • All flash glucose monitoring start sessions • Risk of attending appointment greater than benefits • Deferring appointment will not compromise clinical care"] </pre> <p>Date approved 26.03.20 1</p>	<p>Click here</p>

Table 2: Guidance on organising diabetes care during COVID-19		
Source title	Summary guidance (aims to summarise components of the guidance, it is not a complete summary of the full guidance)	Source link
<p>Diabetes Society Guidelines Guide for the management of diabetes during COVID-19 (9)</p>	<p>Provides guidance for diabetes management, which aims to minimise burden on the hospital system, ensure that long-term glycaemic control continues and complications are prevented.</p> <p>Emergency admissions and inpatient care People with diabetes are likely to have more severe complications with COVID-19. In response, the model of care during COVID-19 should focus on:</p> <ul style="list-style-type: none"> • increased staff capacity to support inpatients to minimise length of stay, including back-up if staff fall ill • providing remote support to avoid readmission • organising teams to include a core team on a rotating roster • designating a lead consultant who is relieved from other clinical duties to coordinate diabetes patient care from the time of presentation to the emergency department through to specialist care and discharge. <p>Outpatient clinical services Review lists in advance and select high-risk patients, who may still require face-to-face visits, based on individual risk factors and clinical needs. Suggested services include diabetic foot, insulin starts, insulin treatment, some pregnancy/diabetes services. If face-to-face visits are required, ensure risk of exposure to infection is minimised, otherwise consider using of telephone/telehealth delivered diabetes services.</p> <ul style="list-style-type: none"> • Postponing services is counterproductive, taking into account long-term chronic disease management and prioritisation. • Administration support is still required to ensure timeliness and delivery of care. • Services should minimise investigations to avoid patient travel to blood collection centres. • Services should use bulk-billing incentives. 	<p>Click here</p>

[Click here](#)

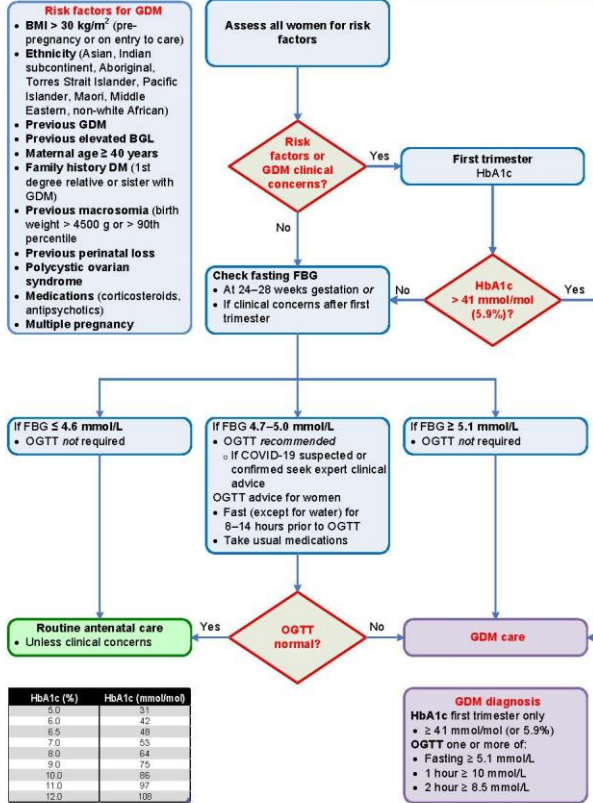
Diabetes Society Guidelines
 Diagnostic Testing for Gestational diabetes mellitus (GDM) during the COVID-19 pandemic: Antenatal and postnatal testing advice (10)

Screening and diagnosis of GDM during COVID-19 pandemic

Queensland Health

- COVID-19 pandemic**
- **Applies to:** Pregnant women regardless of COVID-19 status
 - **Rationale:** To support social distancing and minimise blood collection time (i.e not based on new evidence)
 - **Implementation:** Commence as practical and convenient. Seek expert advice as clinically appropriate

- Risk factors for GDM**
- BMI > 30 kg/m² (pre-pregnancy or on entry to care)
 - Ethnicity (Asian, Indian subcontinent, Aboriginal, Torres Strait Islander, Pacific Islander, Maori, Middle Eastern, non-white African)
 - Previous GDM
 - Previous elevated BGL
 - Maternal age ≥ 40 years
 - Family history DM (1st degree relative or sister with GDM)
 - Previous macrosomia (birth weight > 4500 g or > 90th percentile)
 - Previous perinatal loss
 - Polycystic ovarian syndrome
 - Medications (corticosteroids, antipsychotics)
 - Multiple pregnancy



HbA1c (%)	HbA1c (mmol/mol)
5.0	31
6.0	42
6.5	48
7.0	53
8.0	64
9.0	75
10.0	86
11.0	97
12.0	108

BGL: blood glucose level, BMI: body mass index, DM: diabetes mellitus, FBG: fasting blood glucose, GDM: gestational diabetes mellitus, HbA1c: glycated haemoglobin, OGTT: oral glucose tolerance test, ≥: greater than or equal to, >: greater than

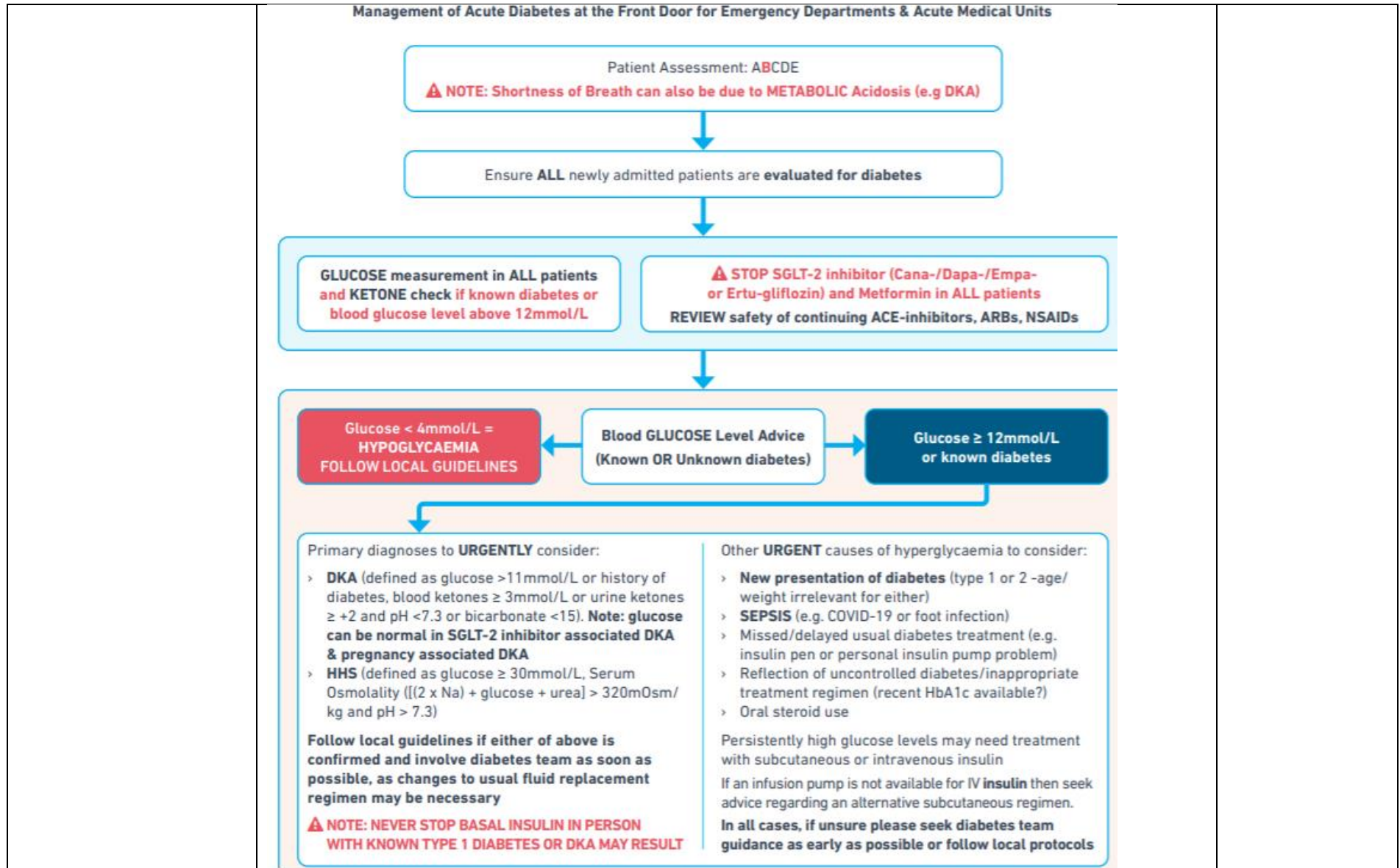
Queensland Clinical Guideline. Gestational diabetes mellitus Flowchart:F20.33-1-V2-R20

Queensland Clinical Guidelines
www.health.qld.gov.au/qcg



	<p>Updated 30th April: <i>Table 1: Three phase approach to testing for GDM during the COVID-19 pandemic.</i></p> <table border="1"> <thead> <tr> <th>Status</th> <th>Definition</th> <th>Early pregnancy strategy <i>For women at high risk of GDM as defined in Figure 1</i></th> <th>24-28 weeks strategy <i>For all women</i></th> <th>Postnatal strategy <i>For women diagnosed with GDM</i></th> </tr> </thead> <tbody> <tr> <td>Green</td> <td>Collection site able to social distance and contagion risk is low</td> <td> <ul style="list-style-type: none"> Usual practice </td> <td> <ul style="list-style-type: none"> OGTT </td> <td> <ul style="list-style-type: none"> Usual practice OR OGTT delayed 6 months post-partum </td> </tr> <tr> <td>Amber</td> <td>Collection site limited ability to social distance and/or contagion risk is moderate-high</td> <td> <ul style="list-style-type: none"> HbA1c and Random blood glucose (RBG). HbA1c \geq5.9% OR Random blood glucose (RBG) \geq9.0 mmol/L considered diagnostic of GDM. </td> <td> <ul style="list-style-type: none"> OGTT OR Alternative method of testing for GDM involving an initial fasting blood glucose (FBG) and subsequent OGTT for women with a fasting blood glucose (FBG) 4.7 – 5.0 mmol/L. Fasting blood glucose (FBG) \geq 5.1 mmol/L is diagnostic of GDM.* OR Immediate commencement of home blood glucose monitoring (HBGM) in women with GDM in a previous pregnancy. <p>Move to 'Red status' when pathology collection centres are unable to provide social distancing using the 'Amber status' testing strategy.</p> </td> <td> <ul style="list-style-type: none"> OGTT delayed 6 months post-partum </td> </tr> <tr> <td>Red</td> <td>Collection site unable to social distance and/or contagion risk is high</td> <td> <ul style="list-style-type: none"> HbA1c and Random blood glucose (RBG). HbA1c \geq5.9% OR Random blood glucose (RBG) \geq9.0 mmol/L considered diagnostic of GDM. </td> <td> <ul style="list-style-type: none"> Fasting blood glucose (FBG) only. Fasting blood glucose (FBG) \geq 5.1 mmol/l is diagnostic of GDM. </td> <td> <ul style="list-style-type: none"> OGTT delayed 6 months post-partum </td> </tr> </tbody> </table> <p><small>*The alternative method of testing for GDM during the 'Amber status' is outlined in detail in Appendix 1.</small></p>	Status	Definition	Early pregnancy strategy <i>For women at high risk of GDM as defined in Figure 1</i>	24-28 weeks strategy <i>For all women</i>	Postnatal strategy <i>For women diagnosed with GDM</i>	Green	Collection site able to social distance and contagion risk is low	<ul style="list-style-type: none"> Usual practice 	<ul style="list-style-type: none"> OGTT 	<ul style="list-style-type: none"> Usual practice OR OGTT delayed 6 months post-partum 	Amber	Collection site limited ability to social distance and/or contagion risk is moderate-high	<ul style="list-style-type: none"> HbA1c and Random blood glucose (RBG). HbA1c \geq5.9% OR Random blood glucose (RBG) \geq9.0 mmol/L considered diagnostic of GDM. 	<ul style="list-style-type: none"> OGTT OR Alternative method of testing for GDM involving an initial fasting blood glucose (FBG) and subsequent OGTT for women with a fasting blood glucose (FBG) 4.7 – 5.0 mmol/L. Fasting blood glucose (FBG) \geq 5.1 mmol/L is diagnostic of GDM.* OR Immediate commencement of home blood glucose monitoring (HBGM) in women with GDM in a previous pregnancy. <p>Move to 'Red status' when pathology collection centres are unable to provide social distancing using the 'Amber status' testing strategy.</p>	<ul style="list-style-type: none"> OGTT delayed 6 months post-partum 	Red	Collection site unable to social distance and/or contagion risk is high	<ul style="list-style-type: none"> HbA1c and Random blood glucose (RBG). HbA1c \geq5.9% OR Random blood glucose (RBG) \geq9.0 mmol/L considered diagnostic of GDM. 	<ul style="list-style-type: none"> Fasting blood glucose (FBG) only. Fasting blood glucose (FBG) \geq 5.1 mmol/l is diagnostic of GDM. 	<ul style="list-style-type: none"> OGTT delayed 6 months post-partum 	
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<p>NHS Clinical guide for the management of people with diabetes during the coronavirus pandemic (11)</p>	<p>Focus on seeking the best local solutions to continue the proper management of people with diabetes while protecting resources for the response to coronavirus. General considerations for delivery of services are outlined for the following three groups:</p> <ul style="list-style-type: none"> Obligatory admissions and inpatients – continue to require admission and medical management, e.g. diabetic ketoacidosis (DKA). Expedite treatment to avoid delay and expedite discharge to minimise length of stay. Secondary care services – outpatient attendances should be kept to the safe minimum. Consider using virtual clinics and remote consultations. Primary care delivered diabetes services – implications for routine diabetes care should be considered in the context of broader long-term condition management and prioritisation, taking into account individual risk factors and clinical needs. 	<p>Click here</p>																				

<p>Association of British Diabetologists Maintaining Acute Diabetes Services in response to COVID-19 (12)</p>	<p>Prepared by the National Diabetes Inpatient COVID Response Team from Diabetes UK and Association of British Diabetologists, the aim of this document is to provide detail on how specialist diabetes services can achieve maintenance of patient flow through the system with a focus on inpatient areas and maintenance of patient safety, with a particular focus on which services should be seen as essential for workforce planning. Includes recommended service provision as outlined in new COVID-19 and diabetes guidelines.</p>	<p>Click here</p>															
<p>Association of British Diabetologists Template for defining diabetes services during COVID-19 Pandemic (13)</p>	<p>A template to plan localised solutions for:</p> <ol style="list-style-type: none"> 1. support care of inpatients with diabetes and COVID-19 2. support other inpatients with diabetes to facilitate early discharge, maximising inpatient bed capacity 3. provide remote support if necessary for those discharged to prevent readmission. 	<p>Click here</p>															
<p>Association of British Diabetologists COncise adVICE on Inpatient Diabetes (COVID:Diabetes): Front door guidance (14)</p>	<p>Being acutely unwell with suspected or confirmed COVID-19 requires adjustment to standard approaches to diabetes management (see table below).</p> <table border="1" data-bbox="560 683 1489 1324"> <thead> <tr> <th>WHERE CHANGE SEEN</th> <th>KEY DIFFERENCE WITH COVID-19</th> <th>SUGGESTED ACTION</th> </tr> </thead> <tbody> <tr> <td>Early in admission</td> <td> <p>People with COVID-19 infection appear to have a greater risk of hyperglycaemia with ketones including:</p> <ul style="list-style-type: none"> > People with type 2 diabetes (risk even greater if on a SGLT-2 inhibitor) > People with newly diagnosed diabetes <p>COVID-19 disease precipitates atypical presentations of diabetes emergencies (eg, mixed DKA and hyperosmolar states)</p> </td> <td> <ul style="list-style-type: none"> > Check blood glucose in everybody on admission > Check ketones in: <ul style="list-style-type: none"> » everybody with diabetes being admitted » everybody with an admission glucose over 12 mmol/L > Stop SGLT-2 inhibitors in all people admitted to hospital > Consider using 10-20% glucose where ketosis persists despite treatment in line with usual protocols </td> </tr> <tr> <td>Severe illness on admission</td> <td> <p>Fluid requirements may differ in those with DKA/HHS and evidence of "lung leak" or myocarditis</p> </td> <td> <ul style="list-style-type: none"> > After restoring the circulating volume the rate of fluid replacement regimen may need to be adjusted where evidence of "lung leak" or myocarditis > Contact the diabetes specialist team early > Early involvement of the critical care team </td> </tr> <tr> <td>All inpatient areas</td> <td> <p>Infusion pumps may not be available to manage hyperglycaemia using intravenous insulin as these are required elsewhere (eg for sedation in ICU)</p> </td> <td> <ul style="list-style-type: none"> > Use alternative s/c regimens to manage <ul style="list-style-type: none"> » Hyperglycaemia » Mild DKA > Contact the diabetes specialist team for support </td> </tr> <tr> <td>ICU</td> <td> <p>Significant insulin resistance seen in people with type 2 diabetes in ICU settings</p> </td> <td> <ul style="list-style-type: none"> > IV insulin protocols may need amending (people seen requiring up to 20 units/hr) > Patients often nursed prone so feeding may be accidentally interrupted – paradoxical risk of hypoglycaemia </td> </tr> </tbody> </table>	WHERE CHANGE SEEN	KEY DIFFERENCE WITH COVID-19	SUGGESTED ACTION	Early in admission	<p>People with COVID-19 infection appear to have a greater risk of hyperglycaemia with ketones including:</p> <ul style="list-style-type: none"> > People with type 2 diabetes (risk even greater if on a SGLT-2 inhibitor) > People with newly diagnosed diabetes <p>COVID-19 disease precipitates atypical presentations of diabetes emergencies (eg, mixed DKA and hyperosmolar states)</p>	<ul style="list-style-type: none"> > Check blood glucose in everybody on admission > Check ketones in: <ul style="list-style-type: none"> » everybody with diabetes being admitted » everybody with an admission glucose over 12 mmol/L > Stop SGLT-2 inhibitors in all people admitted to hospital > Consider using 10-20% glucose where ketosis persists despite treatment in line with usual protocols 	Severe illness on admission	<p>Fluid requirements may differ in those with DKA/HHS and evidence of "lung leak" or myocarditis</p>	<ul style="list-style-type: none"> > After restoring the circulating volume the rate of fluid replacement regimen may need to be adjusted where evidence of "lung leak" or myocarditis > Contact the diabetes specialist team early > Early involvement of the critical care team 	All inpatient areas	<p>Infusion pumps may not be available to manage hyperglycaemia using intravenous insulin as these are required elsewhere (eg for sedation in ICU)</p>	<ul style="list-style-type: none"> > Use alternative s/c regimens to manage <ul style="list-style-type: none"> » Hyperglycaemia » Mild DKA > Contact the diabetes specialist team for support 	ICU	<p>Significant insulin resistance seen in people with type 2 diabetes in ICU settings</p>	<ul style="list-style-type: none"> > IV insulin protocols may need amending (people seen requiring up to 20 units/hr) > Patients often nursed prone so feeding may be accidentally interrupted – paradoxical risk of hypoglycaemia 	<p>Click here</p>
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<p>Centre for Evidence Based Medicine Managing diabetes during the COVID-19 pandemic (4)</p>	<p>Alongside general COVID-19 guidance to reduce risk, people with diabetes have been advised to aim for tighter glucose control where appropriate and feasible, even though the evidence behind this recommendation has not been identified. Routine care of diabetes will be significantly disrupted during the current pandemic. Stress levels and disruptions to diet and physical activity may also contribute to worsening outcomes during and following the pandemic. Interventions to improve self-management of or self-education for diabetes may be limited in their generalisability, but text-message interventions and self-monitoring of blood glucose are the most promising strategies.</p>	<p>Click here</p>
<p>Centre for Evidence Based Medicine Supporting people with long-term conditions (LTCs) during national emergencies (15)</p>	<ul style="list-style-type: none"> • The limited evidence available does suggest that LTC management is at risk of neglect during national emergencies. • Indirect drivers of suboptimal care during national emergencies include, diversion of health care resources, interruption to routine care, interruption to medication supply, increased stress, changes in food supply, changes in activity levels and disruptions in transport. • Lack of access to routine healthcare is a leading cause of mortality after disasters, as are exacerbations caused by conditions introduced by these disasters (e.g. lack of food, physical and mental stress). A number of individual studies and reviews have identified diabetes as a condition of particular risk during emergencies and effect on blood pressure, HbA1c and insulin requirements. • Successful ‘planning stage’ strategies based on the available literature are: disaster preparedness incorporated into primary healthcare management, pre-emptive identification and contingency planning for patients at risk for decompensation, integration of community-based organisations in the planning process and designation of regionalised specialty centres to handle the most complex patients. • Strategies suggested include, triage and resource allocation, transfer of care to speciality centres, communication between different agencies, business continuity plans for pharmacies and consideration of 30-day supplies from pharmacists, access to appropriate foods, dedicated patient transportation or mobile clinics for patients requiring in-person care who may be affected by transport difficulties. 	<p>Click here</p>
<p>Centre for Evidence Based Medicine Should we prescribe longer repeat prescriptions for patients with long-term</p>	<ul style="list-style-type: none"> • The evidence base on this is very limited and there is no definitive answer on this issue. • Evidence on duration of repeat prescriptions is necessary, particularly on health outcomes, to facilitate best practice. • Local guidance may dictate practice. For example, in the UK, NHS England have currently advised against longer prescriptions. 	<p>Click here</p>

<p>conditions during a pandemic? (16)</p>		
<p>World Health Organization Operational considerations for case management of COVID-19 in health facility and community (17)</p>	<ul style="list-style-type: none"> • A technical report on clinical modalities and pathways for COVID-19 patients as a responsive and stepwise approach to health facility preparedness. This may be a useful adjunct in the context of implementing diabetes and the release of COVID-19 clinical guidelines. • Guides the care of COVID-19 patients as the response capacity of health systems is challenged, to ensure that COVID-19 patients can access lifesaving treatment, without compromising public health objectives and safety of health workers. 	<p>Click here</p>
<p>Australian Diabetes Society Communique for Diabetes Health Professionals regarding COVID-19 pandemic (18)</p>	<p>Medication usage advice:</p> <ul style="list-style-type: none"> • All patients with diabetes should have a sick day management plan. • Use of SGLT2 inhibitors – if clinically well, even with positive COVID-19, continue use unless advised by treating physician. Cease if unable to eat and maintain normal fluid intake, have vomiting/diarrhoea or at increased risk for ketoacidosis. • ACE inhibitors and angiotensin receptors blockers (ARBs) – support of continued use if indicated. • Medical device technology supplies – there is no shortage of essential products in Australia such as insulin pump consumables and continuous glucose monitoring devices. All key manufacturers are fully operational and no interruptions to their supply chain are evident to date. 	<p>Click here</p>
<p>COVID-19 and endocrine diseases. A statement from the European Society of Endocrinology (19)</p>	<p>This peer reviewed guidance from the European Society of Endocrinology, outlines:</p> <ul style="list-style-type: none"> • symptoms • COVID-19 infection and diabetes and other endocrine and metabolic diseases • actions to be taken if infection by COVID-19 is suspected • management of confinement at home • general guidelines for endocrinologists in the COVID-19 pandemic. 	<p>Click here</p>
<p>International Diabetes Federation How to manage diabetes during an illness? (20)</p>	<p>The self-management protocol for any illness, including COVID-19, is to follow a pre-determined illness plan.</p>	<p>Click here</p>

Table 3: Peer reviewed journal articles									
Author, Year and Title	Information								
Scott et al 2020 (21)	Continuation of healthcare to at risk individuals is crucial throughout the pandemic. Telehealth is the key for the delivery of such care. It is important that people with diabetes are educated regarding the management of their condition during acute illness, including medication changes. It is also critical that there is not a deterioration in the medical management of glycaemia and other complications of diabetes, which if neglected, may result in increased morbidity and mortality independent of COVID-19.								
Bornstein et al 2020 (22)	<p style="text-align: center;"><small>Consensus recommendations for COVID-19 and metabolic disease</small></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> <p style="text-align: center;">Out-patient care</p> <p>Prevention of infection in diabetes</p> <ul style="list-style-type: none"> • Sensitisation of patients with diabetes for the importance of optimal metabolic control • Optimisation of current therapy if appropriate • Caution with premature discontinuation of established therapy • Utilisation of Telemedicine and Connected Health models if possible to maintain maximal self containment </td> <td style="width: 50%; padding: 5px;"> <p style="text-align: center;">In-patient or intensive care unit</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; padding: 2px;">Monitor for new onset diabetes in infected patients (in-patient care)</td> <td style="width: 50%; padding: 2px;">Management of infected patients with diabetes (intensive care unit)</td> </tr> <tr> <td style="padding: 2px;"> <ul style="list-style-type: none"> • Plasma glucose monitoring, electrolytes, pH, blood ketones, or β-hydroxybutyrate </td> <td style="padding: 2px;"> <ul style="list-style-type: none"> • Liberal indication for early intravenous insulin therapy in severe courses (ARDS, hyperinflammation) for exact titration, avoiding variable subcutaneous resorption, and management of commonly seen very high insulin consumption </td> </tr> </table> </td> </tr> <tr> <td colspan="2" style="padding: 5px; text-align: center;"> <p>Therapeutic aims</p> <ul style="list-style-type: none"> <li style="width: 50%;">• Plasma glucose concentration: 4–8 mmol/L (72–144 mg/dL)* <li style="width: 50%;">• Plasma glucose concentration: 4–10 mmol/L (72–180 mg/dL)* <li style="width: 50%;">• HbA_{1c}: \leq less than 53 mmol/mol (7%) <li style="width: 50%;">• CGM/FGM targets <li style="width: 50%;">• TIR (3.9–10 mmol/L): more than 70% (>50% in frail and older people) <li style="width: 50%;">• Hypoglycaemia (<3.9 mmol/L): less than 4% (<1% in frail and older people) </td> </tr> </table> <p>A simple flowchart for the metabolic screening and management of patients with COVID-19 and diabetes or at risk for metabolic disease. This includes recommendations regarding both the need for primary prevention of diabetes as well as the avoidance of severe sequelae of diabetes triggered by unidentified or poorly managed diabetes (figure). Furthermore, special considerations on anti-diabetes drugs commonly used in patients with type 2 diabetes in view of COVID-19 are presented in the panel.</p>	<p style="text-align: center;">Out-patient care</p> <p>Prevention of infection in diabetes</p> <ul style="list-style-type: none"> • Sensitisation of patients with diabetes for the importance of optimal metabolic control • Optimisation of current therapy if appropriate • Caution with premature discontinuation of established therapy • Utilisation of Telemedicine and Connected Health models if possible to maintain maximal self containment 	<p style="text-align: center;">In-patient or intensive care unit</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; padding: 2px;">Monitor for new onset diabetes in infected patients (in-patient care)</td> <td style="width: 50%; padding: 2px;">Management of infected patients with diabetes (intensive care unit)</td> </tr> <tr> <td style="padding: 2px;"> <ul style="list-style-type: none"> • Plasma glucose monitoring, electrolytes, pH, blood ketones, or β-hydroxybutyrate </td> <td style="padding: 2px;"> <ul style="list-style-type: none"> • Liberal indication for early intravenous insulin therapy in severe courses (ARDS, hyperinflammation) for exact titration, avoiding variable subcutaneous resorption, and management of commonly seen very high insulin consumption </td> </tr> </table>	Monitor for new onset diabetes in infected patients (in-patient care)	Management of infected patients with diabetes (intensive care unit)	<ul style="list-style-type: none"> • Plasma glucose monitoring, electrolytes, pH, blood ketones, or β-hydroxybutyrate 	<ul style="list-style-type: none"> • Liberal indication for early intravenous insulin therapy in severe courses (ARDS, hyperinflammation) for exact titration, avoiding variable subcutaneous resorption, and management of commonly seen very high insulin consumption 	<p>Therapeutic aims</p> <ul style="list-style-type: none"> <li style="width: 50%;">• Plasma glucose concentration: 4–8 mmol/L (72–144 mg/dL)* <li style="width: 50%;">• Plasma glucose concentration: 4–10 mmol/L (72–180 mg/dL)* <li style="width: 50%;">• HbA_{1c}: \leq less than 53 mmol/mol (7%) <li style="width: 50%;">• CGM/FGM targets <li style="width: 50%;">• TIR (3.9–10 mmol/L): more than 70% (>50% in frail and older people) <li style="width: 50%;">• Hypoglycaemia (<3.9 mmol/L): less than 4% (<1% in frail and older people) 	
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Ghosh et al 2020 (23)	A review looking at evidence and general guidelines regarding the role of telemedicine in patients with diabetes, along with its utility and limitations. There is paucity of data on the effectiveness of telemedicine to manage diabetes and other chronic diseases, however telemedicine provides an opportunity to judiciously manage patients with diabetes during the lockdown period in COVID-19 pandemic.								
Garg et al 2020 (24)	Two case reports are presented where telemedicine was used effectively and safely after day 1 in person patient education. These aspects of the management of new-onset T1D patients (adult and paediatric) included ongoing diabetes education of the patient and family digitally. The patients used continuous glucose monitoring with commercially available analysis software to generate ambulatory glucose profiles and interpretive summary reports. The adult subject used multiple daily insulin injections, while the								

	pediatric patient used an insulin pump. The subjects were managed using a combination of email, video consultation via Zoom and telephone calls.
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Table 4: Emerging perspectives/modalities for diabetes management		
Source title	Advice	Source link
British Medical Journal Covid-19: diabetes clinicians set up social media account to help alleviate patients' fears (25)	A group of diabetes doctors and other clinicians set up a social media account to help alleviate patients' fears around COVID-19 and provide them with 'a secure base' of information.	Click here
Medscape Top 10 Tips for Diabetes Telehealth Prophetic in Face of COVID-19 (26)	Emerging telehealth practice points from the US implementing patient-to-clinic video encounters may be a useful reference, as remote support is recognised to be relied upon heavily for diabetes care during this period, despite the limited evidence of effectiveness or generalisability of previous studies.	Click here

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Appendix 1

Search Terms Google: 'Diabetes management and COVID-19' and 'guidelines for Diabetes and COVID-19'

Only guidance from colleges, societies and key organisations were included. Single centre guidelines were excluded.

Databases searched

- Centre for Evidence-Based Medicine <https://www.cebm.net/covid-19/>
- The evidence aid website <https://www.evidenceaid.org/coronavirus-covid-19-evidence-collection/>
- TRIP database: 'Diabetes and COVID-19'

PubMed searches:

((2019-nCoV[title/abstract] or nCoV*[title/abstract] or covid-19[title/abstract] or covid19[title/abstract] OR "covid 19"[title/abstract] OR "coronavirus"[MeSH Terms] OR "coronavirus"[title/abstract] OR sars-cov-2[title/abstract] OR "severe acute respiratory syndrome coronavirus 2"[Supplementary Concept]) AND (diabetes mellitus[MeSH Terms] OR diabet* OR "metabolic disease"))