



Royal College of  
Obstetricians &  
Gynaecologists

# Guidance for maternal medicine in the evolving coronavirus (COVID-19) pandemic

**Information for healthcare professionals**

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# I. Introduction

The UK Government has identified pregnant women as being at higher risk of severe illness if they become infected with coronavirus and develop COVID-19. Pregnant women are advised to be stringent with public health measures such as social distancing and self-isolation to lower their risk of COVID-19 exposure.<sup>1</sup>

This has led to the rapid implementation of remote access to antenatal care throughout the UK, ensuring women receive high-quality care and regular access to essential services while minimising the need for travel to antenatal clinics and face-to-face contact with healthcare staff.

Some pregnant women have co-morbidities that require additional antenatal monitoring in order to optimise pregnancy outcomes. This guideline seeks to offer pragmatic advice to clinicians on the management of common medical disorders in pregnancy, during the COVID-19 pandemic. It recognises that antenatal care is essential, and balances the need to provide appropriate care to ensure the best possible pregnancy outcomes for women and their babies against the need to protect particularly vulnerable women from the risk of COVID-19.

This guidance has been written to provide specific recommendations during the COVID-19 pandemic on:

- Ideas for adaptation of maternal medicine services to safely reduce face-to-face contact during the evolving coronavirus pandemic, for example by offering virtual consultations where appropriate, ensuring women are seen in one-stop clinics that cover all medical and obstetric needs in the same visit, avoiding unnecessary hospital admissions and offering new innovations, such as home monitoring of blood pressure, where it is safe to do so.
- Specific advice for healthcare professionals caring for pregnant women with co-existing medical co-morbidities and suspected/confirmed COVID-19. These recommendations are made in addition to those that apply to non-pregnant adults with the same co-morbidities.

It does not replace existing guidance produced by NICE, SIGN, the RCOG or specialist medical societies on the care of women with medical co-morbidities in pregnancy, except where suggested modifications are described which are required to support social distancing measures and respond to staffing changes during the COVID-19 pandemic.

General considerations for the modification of antenatal care services during the COVID-19 pandemic can be found in the [RCOG guidance](#).

## 2. General advice for the adaptation of maternal medicine services during the COVID-19 pandemic

A senior obstetrician with a specialist interest in maternal medicine, or an obstetric physician should assess all new referrals of pregnant women with medical disorders. Particular consideration should be made to combine additional blood tests with those taken at the booking appointment. This will facilitate planning for one-stop booking clinics, preventing the need for the woman to reattend the hospital for additional tests when requested by her maternal medicine team.

Routine obstetric checks (e.g. measurement of fundal height, urine dip, blood pressure) conducted at midwifery appointments need not be repeated in maternal medicine clinics. Maternal medicine clinics can therefore be run effectively using telephone or video consultations instead of face-to-face encounters. This should be the default position. Remote consulting reduces the need for women to travel, enter a hospital, and be within two metres of others, and thus reduces their risk of infection. It also reduces footfall in the clinic and therefore makes social distancing within the clinical area more achievable, reducing the risk of infection to staff and other vulnerable patients there.

Records should be made electronically, making them accessible for future care.

A minority of maternal medicine clinic appointments will need to be face-to-face, primarily when the woman is having a physical interaction such as an obstetric scan, an echocardiogram, or an exchange transfusion. Face-to-face interactions should be limited by reviewing the purpose of the appointment in advance (ideally one week earlier) and ensuring that the relevant tests/treatments can all be done in a single visit. For many non-pregnant patients this is already happening as medical specialties adapt to pandemic risk reduction. A good basic principle is to 'piggy-back' obstetric care onto medical care.

In a joint clinic, social distancing rules need to be observed in the consulting room and by using appropriate

technology, the obstetrician and physician need not be in same room. This will help if one or both is self-isolating. Physicians are rapidly being redeployed into acute or intensive care medicine and their availability will be increasingly limited. Obstetricians are much less likely to be redeployed and will have to secure physician input as best they can.

At the end of each appointment, question whether the next appointment is medically necessary, whether it can be conducted remotely, and whether it can be tied up with other necessary appointments.

For first or repeat prescriptions, every effort should be made to promote remote prescription collection or delivery using available national services.

Referral for fetal growth scans is an important component of antenatal care for women with medical co-morbidities. In response to the current COVID-19 pandemic and potential effect on service capacity in sonography and fetal medicine departments, the following documents have been published by the RCOG and NHS England on how to prioritise ultrasound referrals:

[RCOG guidance](#) for the COVID-19 pandemic which is relevant to the modification of maternal medicine services includes: service configurations for antenatal and postnatal care in low risk women, antenatal screening and ultrasound, fetal medicine and self-monitoring of blood pressure in pregnancy. NHS-England have written [guidance](#) on fetal growth surveillance during the COVID-19 pandemic.

The above adjustments will inevitably cause considerable anxiety among women and caregivers. With the burden of responsibility on maternal medicine obstetricians, it is essential that this group established pathways for clinical and pastoral support and guidance from their clinical leaders and, if needed, the medical director.

### 3. Specific considerations for the care of pregnant women with pre-existing co-morbidities during the COVID-19 pandemic

The UK Government has identified a [list of medical co-morbidities](#), individuals with which are considered vulnerable to severe COVID-19 disease.<sup>1</sup> Adults with these co-morbidities are advised to be particularly stringent with social distancing measures. Adults with some co-morbidities have been identified as 'extremely vulnerable' to the severe effects of COVID-19 and should be 'shielded'.<sup>2</sup>

'Shielding' refers to the advice by the UK Government that adults with these co-morbidities stay at home at all times and should be supported to do so by family, friends and the local community. Individuals who fall into this group are advised to attend only those GP and hospital appointments which are absolutely essential.<sup>2</sup>

The following sections contain body-system and disease specific recommendations outlining:

- The elements of routine maternal medical-antenatal care which are essential.
- The elements of care which could be modified to support national recommendations for social distancing of all pregnant women and the more stringent 'shielding'.
- Additional antenatal or labour and birth considerations for women with co-morbidities and co-existing COVID-19 infection.

For many of these co-morbidities, there is no evidence to date to inform whether pregnant women are at higher risk of COVID-19 complications than those who are not pregnant. We have however identified the co-morbidities that render adults more vulnerable to the consequences of infection. In making these recommendations, we have attempted to balance the risk of unrecognised maternal and fetal complications due to pre-existing co-morbidities against the potential risks of COVID-19. We have also considered the potential resource constraints faced by hospitals during this pandemic.

## 3.1 Hypertension

**Authors:** Shakila Thangaratinam, Lucy Chappell

### 3.1.1 Chronic hypertension

Send blood for urea & electrolytes (U&E) and urine for protein: creatinine ratio (urinary PCR) with the booking bloods.

The obstetric team should first review the woman at 10-14 weeks by remote consultation (or in person if aligned with an 11-13 weeks' scan). This review should assess the risk status, plan care and ensure that the woman is aware of how to access prescriptions for antihypertensive medication and low-dose aspirin.

Arrange for the woman to self-monitor her blood pressure where possible and, if indicated, to check urine dipstick for proteinuria.

Arrange obstetric reviews at the same visit as ultrasound scans. For all other antenatal reviews, plan for remote review as much as possible.

### 3.1.2 Pre-eclampsia

A face-to-face encounter is necessary to assess a woman with suspected pre-eclampsia. As well as the usual examination and investigations, a measure of [placental growth factor \(PIGF\)](#), if available, may guide the decisions for diagnosis, hospital admission or timing of birth. The PIGF test is validated for use between 20<sup>+0</sup> and 34<sup>+6</sup> gestational weeks.<sup>3</sup>

If a woman is diagnosed with pre-eclampsia, arrange a face-to-face visit with an obstetrician at the hospital for assessment of disease severity and fetal wellbeing.

In women with early onset pre-eclampsia (<34 weeks), consider using the [NICE recommended risk calculators](#) to determine the risk of complications. The use of the [PREP-S risk calculator](#) should be considered to determine the risk of serious maternal complications or early preterm birth (<34 weeks) at various time points from diagnosis of pre-eclampsia. Offer admission to a woman predicted to be at high risk by the risk model and consider whether in utero transfer to a tertiary unit is required. Consider using the [fullPIERS model](#) for predicting the risk of maternal complications in women with any pre-eclampsia and to help plan care.<sup>3</sup>

If a woman with pre-eclampsia is managed as an outpatient:

- Arrange for her to self-monitor her blood pressure every 2 days and have blood tests for pre-eclampsia according to the NICE recommended schedule.<sup>3</sup>
- Increase the intensity of monitoring depending on the predicted risk status and clinical findings.
- Arrange for a healthcare professional review twice a week, at the time of the blood tests or fetal growth scans, for women managed as outpatients.

### 3.1.3 Gestational hypertension

If a woman is diagnosed with gestational hypertension, arrange for her to self-monitor her blood pressure where possible and, if indicated, to check urine dipstick for proteinuria.

### 3.1.4 Antenatal corticosteroids for fetal lung maturation

With regard to the administration of maternal corticosteroids for fetal lung maturation, NICE guidance is as follows:

- 24 – 33+<sup>6</sup> weeks: offer steroids
- 34 – 35+<sup>6</sup> weeks: consider steroids. <sup>4</sup>

This advice still stands. In circumstances where steroids would normally be given, do not withhold them in a woman with COVID-19; as yet, there is no evidence from the COVID-19, SARS or MERS outbreaks that a course of steroids for fetal lung maturation causes any clinically significant adverse effect on the mother's illness.

However, if birth is planned after 34+<sup>0</sup> weeks' gestation, where the administration of steroids would require additional hospital visits, steroids should be withheld (on the basis that the benefit to the baby at this gestation

would not justify the risk to the mother associated with two additional hospital visits). For the same reason, this recommendation also applies to term elective caesarean birth. Women who are already hospital inpatients can be given steroids for fetal lung maturation in accordance with current local policy.

### 3.1.5 Postnatal care

For all women with hypertensive disorders in pregnancy, review postnatal anti-hypertensive medication with senior input to optimise blood pressure control and minimise the length of postnatal stay in the hospital. Advise women to self-monitor their blood pressure at least 2-3 times in the first week after discharge home.

## 3.2 Diabetes and Endocrine

**Authors:** Shakila Thangaratinam, Ponnusamy Saravanan, Mohammed SB Huda, Catherine Williamson

Sources of information which pregnant women with diabetes might find useful during the COVID-19 pandemic have been listed in Appendix I.

### 3.2.1 Pre-existing diabetes

Adults with pre-existing diabetes have been identified as being more vulnerable to the severe effects of COVID-19. They have been advised to stringently follow social distancing measures.

Additional tests at the booking appointment for pregnant women with pre-existing diabetes should include HbA1c, renal and thyroid function, and urinary PCR.

A clear referral pathway should be in place for women with pre-existing diabetes to be contacted by the diabetes antenatal team and an early face-to-face review organised. If early face-to-face review is needed, this should coincide with the 11-14 week scan and booking bloods. This review should cover:

- Blood glucose monitoring (continuous monitoring or sensor or finger prick) and the process for remote review of blood glucose control.



- Appropriate prescriptions for blood glucose and/or ketone monitoring, and medications which should be obtained by repeat prescription through primary care.
- Provision of additional materials to support [blood glucose monitoring](#), diet and sick day rules (written and/or [online](#)).
- Information on hypoglycaemia avoidance and awareness for women using insulin.
- Prescription for folic acid and low dose aspirin.
- Home blood pressure monitoring / urinalysis if available.
- Plans for additional bloods to monitor diabetic control, aiming to keep HbA1c < 48mmol/mol.
- Care planning which involves the diabetic specialist nurse or midwife.<sup>5</sup>

To reduce the number of hospital visits, consider recommending retinal screening only to women with known retinal changes prior to pregnancy.

Consultations by the diabetes team for the purpose of reviewing home capillary blood sugar levels should be done remotely, wherever possible.

All women should continue to have routine antenatal care with their midwifery team (e.g. to include blood pressure and urinalysis), where possible.

The obstetric team should otherwise aim to review the woman as a minimum as follows:

- Remotely at 28 and 32 weeks. If face-to-face reviews are required, these visits should coincide with planned ultrasound appointments.
- At 34-36 weeks' gestation, an obstetric review is recommended to comprehensively assess maternal and fetal condition, and plan timing and mode of birth. If feasible and appropriate, this can be done remotely.

Close and regular phone or email communication between obstetric, diabetic, and community midwife teams is essential to plan care and follow-up.<sup>6</sup>

With regard to routine antenatal corticosteroids for fetal lung maturation, the NICE guidelines should be followed with the exception of the provisos discussed in Section 3.1.4 above.

Women affected by COVID-19 and who are symptomatic should be aware of the potential effects of infection on blood sugar control and should be advised that they will need more frequent review of home capillary blood sugars and ketones (where appropriate), which can be arranged remotely by the diabetes team.

## 3.2.2 Gestational diabetes

### 3.2.2.1 Screening for gestational diabetes

A suggested screening pathway for gestational diabetes (GDM) has been included in the flowchart in Appendix 2. The rationale behind the screening pathway is detailed in Appendix 3.

In view of the prolonged waiting period in large groups at the hospital, and resource constraints, we do not recommend a 2-hour oral glucose tolerance test (OGTT). For women considered to be at high risk of GDM as per the [NICE guideline](#),<sup>5</sup> the following modifications could be used as alternatives to OGTT:

- Women with HbA1c  $\geq 48$  mmol/mol or a random plasma glucose  $\geq 11.1$  mmol/L at booking should be managed as having type 2 diabetes
- Women with borderline HbA1c 41-47 mmol/mol at booking with a history of previous GDM should be managed as having GDM

At 28 weeks' gestation, all remaining high-risk women should have repeat HbA1c and fasting or random blood glucose alongside their 28-week routine antenatal bloods. Fasting glucose is preferable where feasible.

- Women with either HbA1c  $\geq 39$  mmol/mol OR fasting plasma glucose  $\geq 5.3$  mmol/l OR random plasma glucose  $\geq 9$  mmol/l will be diagnosed to have GDM

Additionally, at any time in pregnancy, women with heavy glycosuria (2+ or above), high clinical suspicion of

diabetes (symptoms – nocturia, thirst, polydipsia), or large for gestational age (LGA) / polyhydramnios on ultrasound should be tested for GDM.

Healthcare professionals may consider using [risk calculators for predicting GDM](#), based on routine clinical information available at the time of booking.<sup>7</sup>

### 3.2.2.2 Antenatal care for women diagnosed with gestational diabetes

A flowchart detailing the suggested care for women with GDM is included in Appendix 4.

All women diagnosed with GDM should have an appointment with the diabetes midwife/nurse, who will provide training in the use of a glucose meter. Where feasible, this should be done remotely via video call. This visit should also be used as an opportunity to provide women with dietetic information and contact details of the dietician, where one is available.

Women should be followed-up remotely in the week after the meter training by the diabetes midwife/nurse and for all appointments where home capillary blood sugar levels are to be checked by the diabetes team.

Routine antenatal care (e.g. measurement of fundal height where indicated, blood pressure and urinalysis) can otherwise continue as normal, ideally with the midwifery team.

#### GDM on diet

In women who have GDM that is diet-controlled, with blood glucose levels consistently in the target range (as per the [NICE guideline](#)),<sup>5</sup> no further hospital visits or ultrasound scans for fetal growth are needed.

Women should be provided with clear guidance on who to contact if they have >3 abnormal blood glucose levels in a week or >10-15% of all readings – this will usually be the diabetes antenatal team. It is possible that services may not be able to contact all women with GDM who are self-monitoring. It is therefore essential that women understand the responsibility of contacting the diabetes team if their readings are outside of the specified targets.

Although community midwives are not expected to routinely check the mother's blood glucose readings, they should be provided with information on target blood glucose levels to help inform and support the mother, if

needed.

### **GDM on metformin and / or insulin**

In women who have GDM and are taking metformin and/or insulin, offer obstetric review remotely at 28 and 32 weeks' gestation to reassess the risk status. If face-to-face obstetric reviews are needed, for example in women with additional risk factors or poorly controlled blood sugars, ensure that these reviews coincide with any planned ultrasound appointments.

Offer obstetric review at 36 weeks, remotely if possible, to comprehensively assess maternal and fetal condition, plan timing and mode of birth, and plan follow-up care until birth.

As for women with pre-existing diabetes, antenatal corticosteroids for fetal lung maturation should be given in line with NICE guidelines, with the exception of the provisos discussed in Section 3.1.4 above.

Postnatally, women with GDM can be offered HbA1c screening at 3-6 months after birth instead of the current recommendation of 3 months.

### **3.2.3 Hypothyroidism**

Most women with hypothyroidism can be managed as an outpatient.

Thyroid function tests (TFTs) should be sent with the booking bloods and/or taken at the time of the 20-week scan.

- If TFTs are within the normal range for pregnancy, stay on current dose of thyroxine and re-check at 28-week with routine bloods.
- If mild elevation of TSH (e.g. up to 7.5 mIU/L), increase thyroxine dose by 25-50 µg/day and take blood for TSH and free T4 at next face-to-face antenatal review.
- If more marked elevation of TSH (>7.5 mIU/L), increase thyroxine dose by 50 µg/day and take blood for TSH and free T4 in 4 weeks or at next face-to-face antenatal review (whichever occurs first). Arrange telephone consultation with obstetric medicine.

- If low TSH or elevated free T4 and the woman has symptoms consistent with hyperthyroidism, reduce the dose of thyroxine by 25-50 µg/day and take blood for TSH and free T4 at next antenatal review.

### 3.2.4 Other endocrine disorders

For the remaining endocrine disorders, e.g. hyperthyroidism, hypoadrenalism, hypercalcemia and prolactinoma, care should continue as normal but using remote consultation where possible.

Send specific blood tests at the time of the booking bloods. For hyperthyroidism, TFTs should ideally only be sent once per trimester.

If using glucocorticoid treatment, this should be doubled if a woman is unwell with COVID-19.

## 3.3 Cardiac

**Authors:** Rehan Khan, Kate von Klemperer, Catherine Nelson-Piercy

Maternal cardiac disease represents a significant challenge during the pandemic because:

- It is a risk factor for maternal death and requires careful multidisciplinary care.<sup>8</sup>
- COVID-19 infection appears to carry a significantly greater risk of death in patients with cardiovascular disease.<sup>9</sup>
- Public health measures such as shielding, distancing and isolation aim to lower the risk of COVID-19 exposure but increase the risk of women not receiving adequate pregnancy cardiac care.

Pregnant women with significant congenital, or acquired, heart disease have been identified by the CMO as being extremely vulnerable to the effects of COVID-19 and should be 'shielded'.<sup>2</sup> A list of cardiovascular conditions which constitute significant heart disease in pregnancy has been defined by the [UK Maternal Cardiology Society](#).<sup>10</sup>

Women with a well-functioning mechanical heart valve (MHV) are at higher risk in pregnancy because of

thromboembolic complication and the need for management of their anticoagulation; they are not in the shielding group, but need very frequent encounters for anti-Factor Xa levels or INR.<sup>11</sup> The latter can be performed by self-monitoring using a Coagulocheck or similar commercially available device. Pregnant women with a MHV should be prioritised to be supplied with these monitors and the strips.

These groups of high-risk women specified above need care as follows:

- Local databases should be used to identify these women.
- All women in this group should be contacted to explain that, although social-distancing and shielding are very important, limited face-to-face clinic visits will be necessary to keep them safe from complications in pregnancy.
- Plan face-to-face care around essential investigations, e.g. echocardiogram, and 'piggy-back' obstetric care (e.g. scans) to minimise repeated hospital visits.
- Arrange telephone/telemedicine consultations when essential face-to-face investigations are not required.
- Provide women with a reliable contact number to call with any care queries.
- Involve anaesthetists as early as possible in birth planning. These plans are often difficult to make but easy to execute, and anaesthetists will be under huge pressure to look after ventilated COVID-19 patients elsewhere.

For women with MHV, make careful arrangements (depending on local emergency planning) for blood tests, and do not assume that the results will be checked in the usual way. Do not change the anticoagulant regimen in response to the pandemic.

The remaining pregnant cardiac patients (the majority) can largely be managed remotely.

There is no current specific guidance for the management of pregnant cardiac patients with COVID-19, but inevitably the care must be multidisciplinary and individualised, with particular considerations given to fluid management and an assessment of cardiac function with echocardiography.

### COVID-19 comment:

Adults with COVID-19 who become unwell with severe acute respiratory distress syndrome (SARS) develop high Troponin and high D-dimer levels. In this clinical setting, elevation of these biomarkers is not associated with myocardial infarction or thromboembolic disease. It is unknown how these biomarkers change in pregnant women with SARS-CoV-2. However, it is well known that D-dimer levels are elevated in healthy pregnancy, whereas cardiac troponin levels should remain within normal ranges throughout normotensive pregnancy.

## 3.4 Respiratory

**Author:** Rehan Khan

Adults with chronic long term respiratory diseases such as asthma or restrictive lung disease are more vulnerable to the severe effects of COVID-19 and have been advised to make extra efforts with social distancing measures.<sup>1</sup>

Adults with severe respiratory diseases such as asthma or restrictive lung disease are more vulnerable to the severe effects of COVID-19 and should be 'shielded'.<sup>2</sup>

Where possible, pregnant women with all other respiratory conditions should be offered remote consultation.

Pregnant women with underlying respiratory conditions who develop fever or cough should initially be reviewed remotely to assess the severity of their illness. Those considered to not be coping at home should be assessed in hospital for COVID-19 and other common differential diagnoses (See section 4).

## 3.5 Haematological

**Authors:** Jahnvi Daru, Sue Pavord, Beverley Hunt, Susan Robinson

Adults with hyposplenism are more vulnerable to the severe effects of COVID-19 and have been advised to stringently follow social distancing measures.<sup>1</sup>

Adults with current cancers of the blood or bone marrow, bone marrow or stem cell transplants within the last 6 months, homozygous sickle cell disease or other inborn errors of metabolism (e.g. severe combined immunodeficiency) are most vulnerable to the severe effects of COVID-19 and should be 'shielded'.<sup>2</sup>

### 3.5.1 Anaemia

If possible, pregnant women should avoid hospital pharmacies and instead, self-purchase ferrous sulphate or fumarate at community pharmacies if they require treatment for mild-moderate anaemia.

Women with haemoglobinopathies require a serum ferritin test before starting iron.

### 3.5.2 Anti-coagulation

For women on low molecular weight heparin (LMWH), anti-Factor Xa monitoring is essential only in those with antithrombin deficiency and those who require treatment-dose LMWH for MHV. We suggest suspending anti-Factor Xa monitoring in all other areas.

Women on vitamin K antagonists (e.g. warfarin) in pregnancy are very rare. They should be offered home testing equipment, e.g. the Coagulocheck, and instructed in how to use it. Their dosing can be managed remotely by email, text or telephone.

### 3.5.3 Haemoglobinopathies

When face-to-face appointments are necessary, these should be timed with other hospital attendances (e.g. transfusion sessions, blood tests, growth scans).

Teams should consider setting up mechanisms for communication between centres to ensure clinical advice is continued in the event of staff absence.



If women with sickle cell disease have suspected/confirmed COVID-19:

- An urgent clinical review should be conducted, remotely where possible. Clinicians should remember common differential diagnoses as well as possible COVID-19 (See section 4)
- Usual care teams should maintain daily contact with the woman via telephone/videophone.
- The symptoms of acute chest syndrome (ACS) and COVID-19 overlap, and COVID-19 infection will increase the risk of ACS, so clinicians should be extra vigilant for this complication.

Women should be encouraged to attend the Emergency Department or call 999 if any of the following occur:

- Uncontrolled pain, scoring  $>7/10$ , despite usual home analgesia.
- Respiratory distress (new shortness of breath or increased breathlessness compared to baseline, particularly at rest or on minimal exertion)  $\pm$  chest pain.
- Persistent fever  $>38^{\circ}\text{C}$ .
- Severe headache, confusion or neurological changes.

### 3.5.4 Suspected venous-thromboembolism (VTE)

Social distancing at home is likely to cause a significant reduction in daily mobility, which will likely increase the risk of VTE in all pregnant women.<sup>12</sup>

Decisions on thromboprophylaxis and imaging for confirmation of VTE should be made on a case-by-case basis, involving senior obstetricians, physicians and radiologists.

3.5 Renal disorders

Authors: Maggie Blott, Rehan Khan, David Williams

## 3.5 Renal disorders

**Authors:** Maggie Blott, Rehan Khan, David Williams

Adults with chronic kidney disease (CKD) have been identified as more vulnerable to the severe effects of COVID-19 and have been advised to stringently follow social distancing measures.<sup>1</sup> Pregnant women with CKD stage 4-5 (GFR <30 ml/min or serum creatinine >180 micromol/L) are at high-risk of adverse pregnancy outcome.

Around 12 weeks, women with CKD should have a joint consultation with the renal team and consultant obstetrician to plan antenatal care. Ideally, this should be done on the same day as a booking appointment. Thereafter, renal and obstetric assessment should be combined and ideally conducted remotely.

Where possible, women should be enabled to monitor their blood pressure and urine dip at home and to have a remote consultation to discuss results. According to CKD type and severity, serial monitoring of maternal renal function, BP and urinalysis, as well as fetal growth, will be necessary and some hospital visits will be unavoidable.

Generally speaking, there is no need for frequent visits in early pregnancy (up to 20 weeks' gestation) as long as blood pressure and urine testing is undertaken and reviewed remotely, but antenatal care will need to be bespoke depending on complexity.

The [Renal Association has published guidance](#) on pregnant women with chronic kidney disease during the COVID-19 pandemic.<sup>13</sup>

### 3.6.1 Women with a renal transplant

Adults who have received a renal transplant and who take immunosuppressive therapy are particularly vulnerable to the effects of COVID-19 and should be 'shielded'.<sup>2</sup>

This group of patients are extremely vulnerable to the risks of COVID-19 but still require the same amount of monitoring in pregnancy for signs of deterioration of graft function, tacrolimus /cyclosporin levels and maternal/fetal complications. As these women should be shielded, and their numbers are small, they should attend at the start of the clinic or be seen outside of regular clinics to minimise risk of infection.

The British Transplantation Society and the Renal Association have published [joint guidance](#) on the management of transplant recipients diagnosed with COVID-19.<sup>14</sup>

## 3.7 Neurological

**Authors:** Shakila Thangaratinam, Dougall McCorry

### 3.7.1 Epilepsy

Epilepsy is not thought to increase the risk to women of the severe effects of COVID-19, but pregnant women with epilepsy are still affected by the advice to pregnant women to stringently engage with social distancing measures.

Women considered to be at significant risk of seizures should have a joint obstetric and neurology plan made for care in pregnancy, intrapartum and the postnatal period. This plan should be documented and communicated to all care providers. The [EMPIRE calculator](#) can help to provide risk estimates of having seizures in pregnancy to women not on sodium valproate.<sup>15</sup> These multidisciplinary team (MDT) meetings can be held remotely.

Where possible all consultations with the epilepsy specialist teams should be offered as a remote consultation.

Blood levels for anti-epileptic drugs are unlikely to alter clinical management and should be considered only if they would inform the assessment of drug toxicity or adherence to treatment.

During the COVID-19 pandemic, fetal growth scans in women with epilepsy should be performed only if there are concerns about the size of the baby following fundal height measurement. A detailed scan for fetal cardiac abnormalities could be combined with the 20-week anomaly scan.

Healthcare professionals should be aware that women with epilepsy are at high risk of depression during the postpartum period. This has the potential to be worse in the pandemic situation, and so should be screened for appropriately.

## 3.7.2 Neurological diseases which are most vulnerable to COVID-19 effects

Adults with motor neurone disease, multiple sclerosis (MS), a learning disability or cerebral palsy have been identified as being more vulnerable to the severe effects of COVID-19 and have been advised to stringently follow social distancing measures.<sup>1</sup>

The Association of British Neurologists has clarified this advice with [guidance on COVID-19 for people with neurological conditions](#).<sup>16</sup>

Where possible, all neurology consultations should be conducted remotely.

## 3.8 Gastrointestinal

**Authors:** Rehan Khan, Bel Kok, Lucy Chappell

### 3.8.1 Chronic liver disease

Adults with chronic liver disease have been identified as being more vulnerable to the severe effects of COVID-19 and have been advised to stringently follow social distancing measures.<sup>1</sup>

Antenatal appointments with obstetricians and physicians should be offered as remote consultations by default.

Women should be stratified into those with stable autoimmune disease versus those with a risk of portal hypertension. Where there is a risk of portal hypertension, seek advice from the local liver MDT. During the COVID-19 pandemic, endoscopy services may not be available as normal. Where varices cannot be ruled out, consider commencing carvedilol and request an experienced surgeon to attend a caesarean birth, and anticipate the risk of bleeding (in case of undiagnosed abdominal varices).

### 3.8.2 Inflammatory bowel disease (IBD)

The British Society of Gastroenterology (BSG) has specified that women who meet the following criteria should be included in the government's 'shielded' group of adults who are extremely vulnerable to the severe effects of COVID-19:

- IBD patients who have a co-morbidity (respiratory, cardiac, hypertension or diabetes) and are on disease-modifying therapy excluding 5ASA, budesonide, beclomethasone or rectal therapies.
- IBD patients regardless of comorbidity who meet one or more of the following criteria:
  - On 20mg or more of daily oral prednisolone (only when on this dose),
  - Moderate to severe active disease despite treatment with immunosuppression or biologics,
  - Short gut syndrome needing nutritional support,
  - Requirement for parenteral nutrition.<sup>17</sup>

It is expected that routine IBD services will be significantly affected by the emergency reorganisation of hospital and general practice services to deal with the pandemic.

The BSG has issued an [IBD COVID-19 plan](#), from which the following recommendations for pregnant women with IBD can be extrapolated.<sup>18</sup>

All adult gastroenterology clinics are moving to a telephone or telemedicine model. This lends itself well to the antenatal management of women with IBD, which by default should be done remotely and not face-to-face.

Women should continue taking their usual IBD therapy. If medications are stopped without first discussing it with their clinical team, there is a risk of disease flare. Active disease is associated with an increased risk of infection, exposure to steroids (increased risk from infection), fetal growth restriction, preterm labour, hospitalisation and major surgery, all of which would be of more serious consequence than if the woman had COVID-19.

Serial growth scans are not indicated unless there is a periconception flare or more than one antenatal flare.

Access to faecal calprotectin (FC) testing may be compromised.

### 3.8.3 Obstetric cholestasis

*The following guidance has been adapted from the peer-reviewed but unpublished update to the RCOG Green-top Guideline on Obstetric Cholestasis (OC).*

If a pregnant woman presents with itching, and no other red flag symptoms or signs, offer a non-fasting blood sample for liver transaminases and bile acids, which could be done in the community. Assess fetal wellbeing by asking the woman about fetal movements. Additional fetal scans or cardiotocographs (CTGs) are not indicated by OC alone.

If serum bile acids are in the normal range, reassure the woman that itch is not caused by OC at the next antenatal appointment (which may be by telephone/videoconference).

If serum bile acids are above the normal range, explain the diagnosis of OC (this can be done by telephone/videoconference):

- Advise that no treatments are currently proven to reduce adverse perinatal outcomes, but that aqueous cream (with or without menthol) and chlorphenamine (both available over the counter) may provide some symptomatic relief.
- Offer review in 1-2 weeks by telephone/videoconference, with safety netting that if symptoms worsen, the woman should contact the maternity unit sooner for telephone advice.
- Women should be advised to report dark urine, pale stools, yellow conjunctivae, reduced fetal movements, or any other causes for concern.

If bile acids are  $<100$   $\mu\text{mol/litre}$ , offer repeat blood test for alanine aminotransferase (ALT) and serum bile acids at 34 and 37 weeks' gestation only. If bile acids remain  $<100$   $\mu\text{mol/litre}$ , consider planned birth at 39 weeks.

If bile acids are  $\geq 100$   $\mu\text{mol/litre}$ , offer a repeat blood test for ALT and serum bile acids at 34 weeks' gestation. If they remain raised, discuss the benefits and risks of planned birth at 35-36 weeks' gestation.

If bile acid concentrations rise and then fall (without treatment), explain that it is uncertain whether any further intervention is needed.

### 3.8.4 Hyperemesis gravidarum

Women will continue to need hyperemesis gravidarum care, but in a pandemic situation the usual liaison with emergency medicine is not achievable.

Change hyperemesis pathways so that, in the first instance, women call the early pregnancy unit to report concerns regarding nausea and vomiting in pregnancy. Try to eliminate the emergency department from the pathway.

Gynaecology nurses and doctors should use the PUQE scoring system to stratify women into those with mild, moderate and severe symptoms, and to guide management either through prescription of oral anti-emetics, or at the early pregnancy unit.<sup>19</sup> Think carefully about how a patient will receive a prescription following a telephone consultation.

Services should plan how to best configure their local protocols during the pandemic for women who require parenteral rehydration. This might include hospital at home, day-case or inpatient admission services.

## 3.9 Rheumatology

**Author:** Rehan Khan

NHS guidance for rheumatological diseases acknowledges that immunosuppression is a risk factor for COVID-19.<sup>1</sup> However, the British Society of Rheumatology (BSR) advises that all patients should continue to take their medication unless directed otherwise by their rheumatology team or GP.<sup>20</sup>

The BSR interpretation of which patients require 'shielding' can be found on their [website](#).<sup>20</sup>

Routine bloods tests should be deferred until the end of the social distancing/shielding period.

If patients develop symptoms of any infection, established practice should be followed and immunosuppressive therapy paused for the duration of the infection and until they feel well, in consultation with their rheumatology team. For those on glucocorticoids, or biologics treatment should not be stopped abruptly and advice should be sought from the woman's treating team.

## 3.10 Immunodeficiency

**Authors:** Liat Sarner, Matthew Hogg, Rehan Khan

Adults with a weakened immune system as a result of conditions such as HIV or medicines such as corticosteroids or chemotherapy are vulnerable to the severe effects of COVID-19 and have been advised to stringently follow social distancing measures.<sup>1</sup>

Pregnant women taking immunosuppressive medicines should continue to take them if medically indicated and not be stopped due to the COVID-19 pandemic.

### 3.10.1 HIV

The British HIV Association has produced a [separate guidance document](#) for women living with HIV while pregnant during the COVID-19 pandemic.<sup>21</sup>

Care should be delivered remotely. Frequency of monitoring may be reduced based on clinician assessment of HIV treatment and its efficacy but, as a minimum, the following should still be done:

- One initial contact (virtual or in person), combined with booking and dating scan, if possible.
- Blood tests as per usual practice should be added to the booking sample.
- One second trimester contact (virtual or in person), combined with anomaly scan, if possible.
- One final visit in person at 36 weeks' gestation for blood tests and confirmation of the birth plan.
- Should further support be required antenatally and/or postnatally, virtual follow-up by telephone/ videoconferencing is encouraged.

Breastfeeding should be discouraged as it requires monthly maternal and infant viral load follow-up for the duration of breastfeeding and for 2 months post-cessation.



## 3.11 Obesity

**Author:** Shakila Thangaratinam

Adults with body mass index  $>40$  kg/m<sup>2</sup> have been identified as being more vulnerable to the severe effects of COVID-19 and have been advised to stringently follow social distancing measures.<sup>1</sup>

- An initial obstetric review can be planned as normal but should be conducted remotely if possible.
- Further care should be combined between remotely held obstetric appointments and routine antenatal appointments with midwives.
- Anaesthetic assessment for women with obesity should be offered as per local protocols. Face-to-face assessments should be planned to coincide with planned hospital appointments for other indications such as ultrasound scan.

## 3.12 Other

**Author:** Rehan Khan

### 3.12.1 Cancer

Adults with cancer who are receiving the following medical treatments have been identified as being extremely vulnerable to the effects of COVID-19 and should be 'shielded':

- Active chemotherapy or radical radiotherapy for lung cancer.
- Immunotherapy or other continuing antibody treatments.
- Other targeted cancer treatments which can affect the immune system, such as protein kinase inhibitors or PARP inhibitors.<sup>2</sup>

Cancer in pregnancy is rare, and the above considerations are complex. Please contact the authors via the RCOG if you have a patient on cancer treatment and would like specific advice during the COVID-19 pandemic. We will put you in touch with a specialist.

### 3.12.2 Preconception counselling

Preconception counselling in a hospital setting, for women with medical problems, should be deferred during the pandemic and replaced with advice to delay pregnancy and use reliable contraception. Review should be arranged when system capacity returns.

## 4. Investigation of pregnant women presenting to acute services with symptoms which might be indicative of COVID-19

During the pandemic women will continue to present with symptoms warranting medical input, but medical teams may not be able to provide a prompt review.

The investigation of potential COVID-19 in a pregnant woman should follow [national guidelines for adults](#).<sup>22</sup> Women presenting with fever, cough, headache, shortness of breath or any other symptoms suggestive of COVID-19 should still be fully investigated according to the usual principles, considering all differential diagnoses.

The use of [RCP Acute Care Toolkit 15](#) is advised for both.<sup>23</sup>

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# Appendix I : Useful links available for pregnant women with diabetes

What is gestational diabetes?

<https://vimeo.com/showcase/6886676> (videos)

<https://www.diabetes.org.uk/resources-s3/2017-08/0302A-gestational-diabetes-guide-0915.pdf>

[http://www.perinatal.nhs.uk/diabetes/projects/leaflets/What\\_is\\_Gestational\\_Diabetes.pdf](http://www.perinatal.nhs.uk/diabetes/projects/leaflets/What_is_Gestational_Diabetes.pdf)

<https://www.uhb.nhs.uk/Downloads/pdf/PiGestationalDiabetes.pdf>

Blood glucose monitoring with glucose meter

<https://youtu.be/ldvtZia0EMQ>

<https://www.youtube.com/watch?v=uRcUBImosN4&feature=youtu.be> (Music only video)

<https://agamatrix.co.uk/support/videos/>

Dietary advice for women with gestational diabetes

<https://youtu.be/DdmpStqFvs>

<https://www.youtube.com/watch?v=TOITrQvNCKo>

[http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Healthy\\_Eating.pdf](http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Healthy_Eating.pdf)

<https://youtu.be/DdmpStqFvs>

[http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Healthy\\_Eating.pdf](http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Healthy_Eating.pdf)

## Gestational diabetes treatment

<https://www.nhs.uk/conditions/gestational-diabetes/treatment/>

## Type I diabetes in pregnancy

[http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Sick\\_Days\\_TypeI.pdf](http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Sick_Days_TypeI.pdf)

## Continuous glucose monitoring for women with Type I diabetes

<https://abcd.care/dtn/CGM>

## Avoiding hypoglycaemias in pregnancy

[http://www.perinatal.nhs.uk/diabetes/projects/leaflets/How\\_to\\_avoid\\_Hypoglycaemia\\_in\\_Pregnancy.pdf](http://www.perinatal.nhs.uk/diabetes/projects/leaflets/How_to_avoid_Hypoglycaemia_in_Pregnancy.pdf)

## Metformin treatment in pregnancy

[http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Metformin\\_Treatment\\_in\\_Pregnancy.pdf](http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Metformin_Treatment_in_Pregnancy.pdf)

## Postnatal care of women with diabetes

[http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Post\\_Natal\\_Care\\_for\\_Gestational\\_Diabetes.pdf](http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Post_Natal_Care_for_Gestational_Diabetes.pdf)

## Breastfeeding your baby and diabetes

<https://www.youtube.com/watch?v=gXYNj0pWCk0>

[http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Diabetes\\_Breastfeeding.pdf](http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Diabetes_Breastfeeding.pdf)



## Pre-conception advice for women with Type 1 or Type 2 diabetes

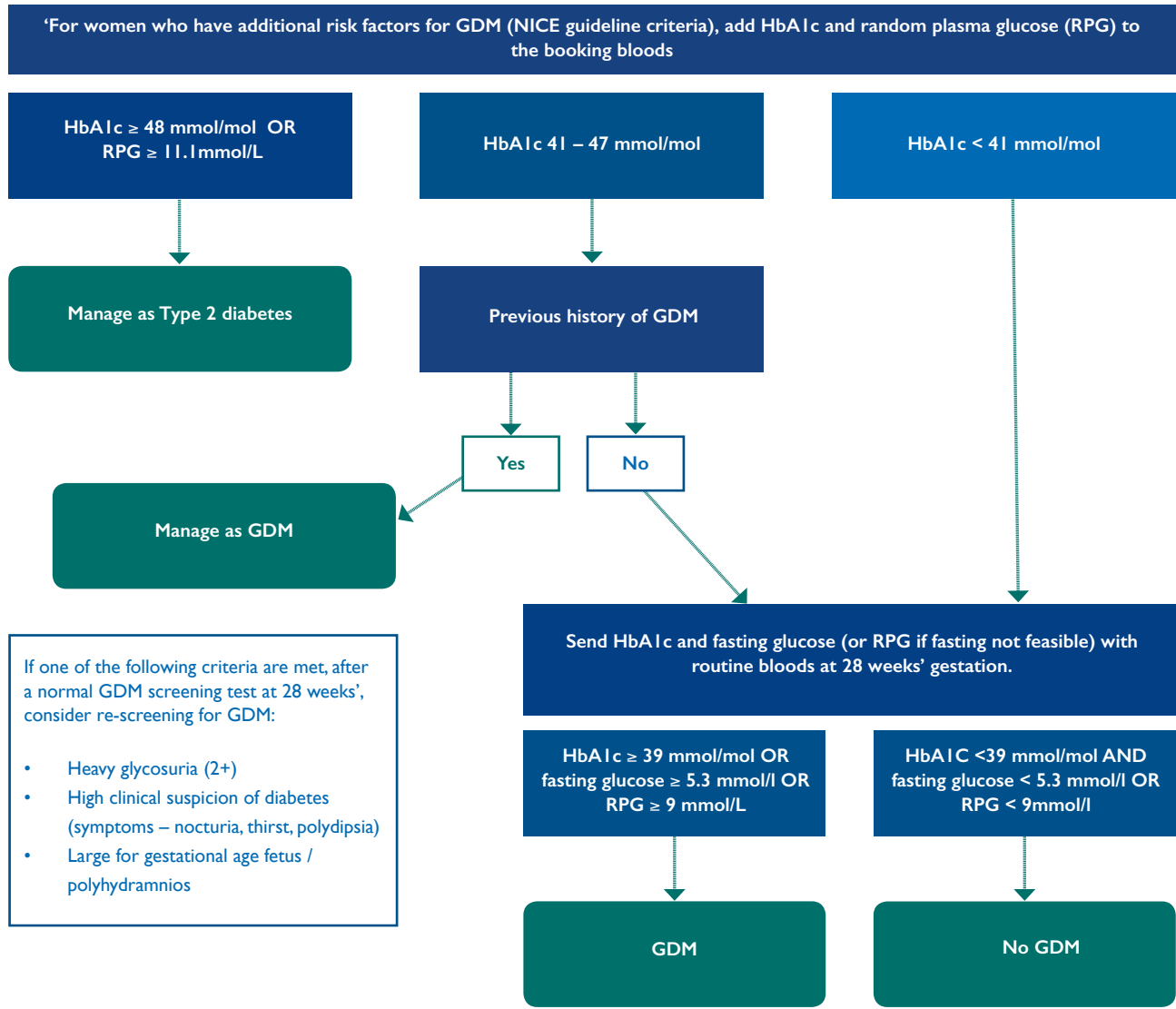
<https://www.tommys.org/pregnancy-information/planning-pregnancy/are-you-ready-conceive/planning-pregnancy-type-1-or-2-diabetes>

## Resources in non-English languages

Australian National Diabetes Services Scheme Initiative – 20 languages

<https://www.ndss.com.au/about-diabetes/information-in-your-language/>

# Appendix 2: Screening for women with risk factors for gestational diabetes (GDM)



## Appendix 3: Rationale behind the criteria to diagnose gestational diabetes (GDM) during the COVID-19 pandemic

In recommending the alternate thresholds to diagnose GDM, we have taken the following into consideration

- Any test should be feasible to do in a resource restricted environment, and minimise the number of visits and duration of stay in the hospital for the mother
- A test should ideally have high sensitivity (i.e. low false negative rate), which is often accompanied by low specificity. While this means a higher false positive rate (FPR), this could strain resources if the FPR is too high, as women will falsely be diagnosed with GDM.
- On the other hand, a test with high specificity (i.e. low FPR), which is usually accompanied by relatively low sensitivity, poses risk of high false negative rate i.e. missing the diagnosis of GDM. This is likely to have an impact of perinatal outcomes, as there is minimal safety net for these women, without serial growth scans, frequent urine test for glycosuria or frequent antenatal checks once they are diagnosed not to have GDM. In normal times, these safety checks usually provide an opportunity to diagnose women with GDM at a later gestation if missed earlier.

### Proposed Screening test

- I. At booking – HbA1c, random plasma glucose (RPG)
  - A cut off of  $\geq 48$  mmol/mol or RPG  $\geq 11.1$  mmol/l is diagnostic of type 2 diabetes and should be treated so in pregnancy
  - A cut off of 41-47 mmol/l, indicative of pre-diabetes is considered to be high-risk group and hence those in this range and a previous history of GDM should be managed as GDM in current pregnancy without further testing.

2. At 28 weeks – Fasting blood glucose, HbA1c, random plasma glucose (RPG)
- Fasting glucose  $\geq 5.3$  mmol/l or HbA1c  $\geq 39$  mmol/mol or RPG  $\geq 9$  mmol/l

## Rationale and evidence behind the proposal

**A.** In a meta-analysis of 17 studies, a second/third trimester HbA1c cut off of  $\geq 39$  mmol/l has specificity (0.90; 95% CI 0.79, 0.95), but poor sensitivity (0.36; 95% CI 0.23, 0.52). This cut off has a false negative rate of 64% i.e. for every 100 women who are currently diagnosed with GDM by NICE criteria OGTT (oral glucose tolerance test), 64 will not be diagnosed as GDM with this cut off.

To balance the poor sensitivity of HbA1c, we chose the fasting plasma glucose (FPG) threshold of  $\geq 5.3$  mmol/l to diagnose GDM, which is lower than the current fasting threshold of 5.6 mmol/l in NICE criteria OGTT.

- B.** In the MRC funded PRIDE observational study (4303 women), a combined approach of
- either HbA1c  $\geq 39$  mmol/l or FPG  $\geq 5.6$  mmol/l for diagnosing GDM correctly identified 41% (216/521) women diagnosed as GDM using NICE criteria; false positive rate 6%
  - either HbA1c  $\geq 39$  mmol/l OR FPG  $\geq 5.3$  mmol/l for diagnosing GDM correctly identified 45% (234/521) of women diagnosed as GDM using NICE criteria; false positive rate 8%

Lowering the FPG threshold in the PRIDE cohort further down to 5.1 mmol/l significantly increased the false positive rate to 12% (sensitivity 51%), which is not ideal in a Pandemic situation.

With our proposed criteria for diagnosing GDM, in the PRIDE cohort, we identified a similar proportion of women with complications (Large for gestational age LGA, Small for gestational age SGA, stillbirth, preterm birth and caesarean section) as per current NICE criteria diagnosed group (Table 1).

Table 1: Number of complications in women diagnosed with GDM according to the NICE criteria and the proposed criteria in the PRIDE cohort

Diagnosis of GDM	LGA	SGA	Stillbirth	Preterm birth	Caesarean section
NICE	115	50	1	50	88
Proposed Criteria HbA1c $\geq$ 39 mmol/l OR FPG $\geq$ 5.3 mmol/l	140	23	3	54	89

C. We also assessed if there was any gain in lowering rates of complications to baby and the mother if the FPG thresholds were lowered from 5.6 mmol/l to 5.3 or 5.1.

In a cohort of 2702 women with GDM (IADPSG criteria F  $\geq$  5.1, 1-h  $\geq$  10.0, 2-h  $\geq$  8.5 mmol/mol) in Australia, increasing the fasting threshold alone from 5.1 mmol/l to 5.3 mmol/l to diagnose GDM did not result in major increases in adverse outcomes. When the fasting threshold for diagnosis was increased from 5.3 mmol/l to 5.6 mmol/l, the proportion with perinatal, and neonatal death were doubled. There were also increase in the numbers of women with any adverse outcome when the fasting threshold was raised to 5.6 mmol/l (Table 2).

These figures are attributed to GDM that were treated. The estimates of adverse outcomes are likely to be higher in pandemic scenario where there are limited resources for routine antenatal monitoring in the women with missed GDM diagnosis.

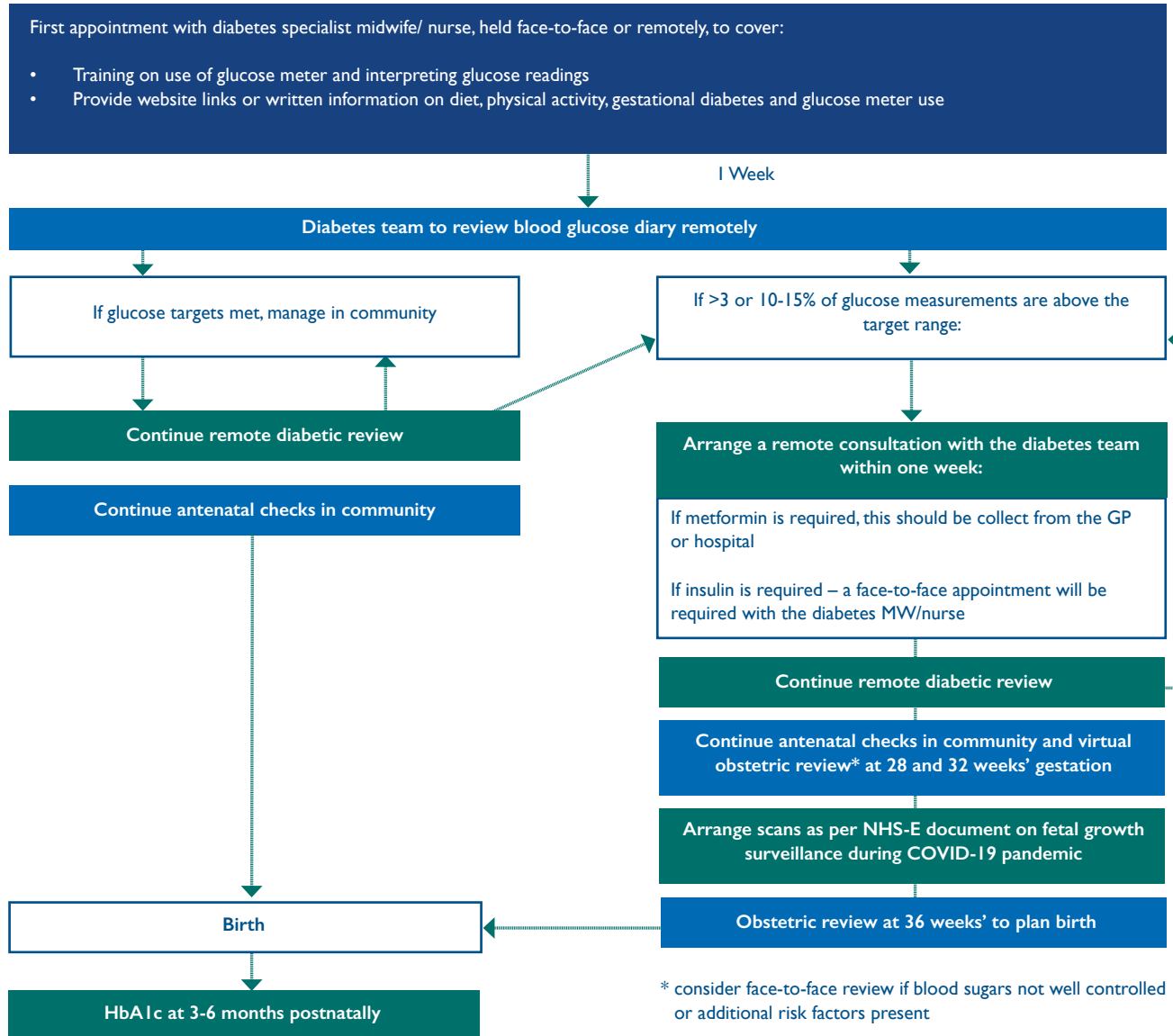
Table 2. Rates of maternal and offspring complications for various fasting thresholds used to diagnosed GDM

Fasting threshold to diagnose GDM mmol/l	Women diagnosed with GDM n (%)	Perinatal death n (%)	Neonatal death n (%)	LGA n (%)	Admission to NICU n (%)	Hypertensive disorders in pregnancy n (%)	Adverse pregnancy outcome* n (%)
$\geq$ 5.1	990 (37)	8 (0.81)	5 (0.51)	145 (15)	298 (30)	88 (9)	314 (32)
$\geq$ 5.3	766 (28)	7 (0.91)	4 (0.52)	116 (15)	228 (30)	71 (9)	252 (33)
$\geq$ 5.6	245 (9)	4 (1.63)	3 (1.22)	49 (20)	85 (35)	25 (10)	95 (39)

\*Adverse Pregnancy Outcome Composite consisting of LGA > 90th percentile, hypertensive disorders of pregnancy, neonatal hypoglycaemia requiring IV therapy, shoulder dystocia, neonatal fracture, neonatal nerve palsy or fetal or neonatal death; NICU Neonatal Intensive Care Unit

**D.** Additionally health care professionals are recommended to consider using the GDM risk calculator to determine the personalised risk of GDM for the woman <https://www.evidencio.com/models/show/2106>. The externally validated GDM risk model uses routine information collected in the first trimester and predicts the GDM with good discrimination (C-statistic 0.77; 95% CI 0.73-0.81) and calibration (slope 1.1). It also has good predictive accuracy in nulliparous women (C-statistic 0.75; 95% CI 0.68-0.82).

# Appendix 4: Antenatal care of pregnant women with gestational diabetes (GDM)



**DISCLAIMER:** The Royal College of Obstetricians and Gynaecologists (RCOG) has produced this guidance as an aid to good clinical practice and clinical decision-making. This guidance is based on the best evidence available at the time of writing, and the guidance will be kept under regular review as new evidence emerges. This guidance is not intended to replace clinical diagnostics, procedures or treatment plans made by a clinician or other healthcare professional and RCOG accepts no liability for the use of its guidance in a clinical setting. Please be aware that the evidence base for COVID-19 and its impact on pregnancy and related healthcare services is developing rapidly and the latest data or best practice may not yet be incorporated into the current version of this document. RCOG recommends that any departures from local clinical protocols or guidelines should be fully documented in the patient's case notes at the time the relevant decision is taken.

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