Royal College of Obstetricians & Gynaecologists

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

Information for healthcare professionals

Version 2.1: Published Friday 24 April 2020

Summary of updates

Version	Date	Summary of changes
1.1	3.4.20	**3.1:** Change from recommendation to screen for pre-eclampsia using a PlGF- test to PlGF-based testing, in response to feedback from unit who currently use sFlt-1:PlGF ratio.
1.1	3.4.20	**3.2:** Change to the fasting plasma glucose threshold when screening for GDM. Units are now advised to use a threshold of 5.6, but to consider a threshold of 5.3 if they have capacity to do so. Supportive guidance available in appendix 4.
1.1	3.4.20	**Authors:** Helen Murphy added as section author for guidance on diabetes in pregnancy.
1.1	3.4.20	**Appendix 3:** Modified with further details on the rationale for additional tests to diagnose GDM, if oral glucose tolerance test is not performed.
2	9.4.20	**Section 2:** Clarification that women attending maternal medicine clinics should continue to receive midwifery-led care, as per the RCOG guidance on antenatal and postnatal care during the COVID-19 pandemic, when they are not being seen by their maternal medicine team.
2	9.4.20	**3.4 and 3.9** Addition of links to NICE rapid guidance on the care of individuals with severe asthma and rheumatological autoimmune conditions.
2	9.4.20	**3.5.3:** Further advice on shielding women with homozygous sickle cell disease who must attend hospital.
2	9.4.20	**3.5.4:** Clarity that assessment of risk for venous thromboembolism should continue to follow existing guidance.
2	9.4.20	**3.5.5:** Guidance for maternal medicine teams on women with inherited bleeding disorders.
2	9.4.20	**3.8.4:** Recommendations regarding the mental wellbeing of women with hyperemesis gravidarum.

Summary of updates

2	9.4.20	**3.10.1** Rephrasing of advice regarding risks of breastfeeding for women with HIV.
2	9.4.20	**3.12:** Section changed to recommendations on women with cancer in pregnancy. New advice inserted.
2	9.4.20	**3.13** Recommendations on pre-conception care moved to section 3.13. This includes a new statement on the provision of pre-conception care which cannot be delayed.
2.1	24.4.20	**3.2.1** Change to the recommendation regarding retinal screening in pregnancy for women with pre-existing diabetes following notification from Public Health England that they have sent a letter to all public health commissioners recommending that all screening continue, but with prioritisation for those at highest risk.
2.1	24.4.20	**Appendix 1** Addition of links for NHS or MHRA approved apps for home glucose monitoring.

1. Introduction

The UK Government has, as a precautionary measure, currently 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.[1]

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 other women, vulnerable patients and hospital staff 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 essential 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 antenatal screening and ultrasound in pregnancy in the evolving coronavirus (COVID-19) pandemic.
- RCOG guidance for fetal medicine units (FMUs) in the evolving coronavirus (COVID-19) pandemic.
- Advice on self-monitoring of blood pressure in pregnancy.
- NHS-England guidance for Maternal Services regarding fetal growth surveillance and management during the coronavirus (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.[1] Individuals with these co-morbidities are advised to be particularly stringent with social distancing measures. Individuals with some co-morbidities have been identified as 'extremely vulnerable' to the severe effects of COVID-19 and should be 'shielded'.[2]

'Shielding' refers to the advice by the UK Government that individuals 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.[2]

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 individuals 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.

All women should continue to have routine antenatal care with their midwifery team (e.g. to include blood pressure and urinalysis), when they are not seeing their maternal medicine team, where possible. Further guidance on this is available in the RCOG guidance on antenatal and postnatal services in the evolving coronavirus (COVID-19) 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 using placental growth factor (PlGF)-based testing, if available, may guide the decisions for diagnosis, hospital admission or timing of birth. The PlGF-based test is validated for use between $20+^{0}$ and $34+^{6}$ gestational weeks.[3]

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.[3]

If a woman with pre-eclampsia is cared for 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.[3]
- 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 cared for 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 – $33+^{6}$ weeks: offer steroids
- 34 – $35+^{6}$ weeks: consider steroids. [4]

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 woman's illness.

However, if birth is planned after $34+^{0}$ 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 woman associated with two additional hospital visits). For the same reason, this recommendation also applies to term elective (planned) 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, Helen Murphy, Catherine Williamson

Sources of information which pregnant women with diabetes might find useful during the COVID-19 pandemic have been listed in Appendix 1, this includes a list of mobile apps which could be considered to assist women in glucose monitoring at home.

3.2.1 Pre-existing diabetes

Individuals 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.[5]

PHE have issued guidance to public health commissioners which recommends pregnant women with diabetes should continue to be invited for retinal screening where possible, with the highest risk individuals being invited first, as detailed below:

1. Proliferative retinopathy
2. Pre-proliferative retinopathy in previous screening
3. Previously treated stable proliferative retinopathy
4. Background retinopathy and maculopathy in previous screening
5. Background retinopathy in previous screening
6. No previous screening within the last 2 years
7. No retinopathy within last 2 years of screening

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

All women with pre-existing diabetes 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, in place of a midwifery appointment, at a minimum as follows:

- 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 health, 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.[6]

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,[5] the following modifications could be used as alternatives to OGTT:

- Women with HbA1c ≥48 mmol/mol or a random plasma glucose≥11.1mmol/L at booking should be cared for as having type 2 diabetes.

- Women with borderline HbA1c 41-47 mmol/mol, or random plasma glucose 9-11 mmol/L at booking should be cared for 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 ≥39 mmol/mol or fasting plasma glucose ≥5.6 mmol/L or random plasma glucose ≥9 mmol/l will be diagnosed to have GDM. Based on resources, clinical capacity and population characteristics, services may offer an alternative fasting plasma glucose threshold of ≥5.3 mmol/L.

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.[7]

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),[5] 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 cared for 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 it typically would, 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.[8]
- COVID-19 infection appears to carry a significantly greater risk of death of individuals with cardiovascular disease.[9]
- 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'.[2] A list of cardiovascular conditions which constitute significant heart disease in pregnancy has been defined by the UK Maternal Cardiology Society.[10]

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.[11] 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 cared for remotely.

There is no current specific guidance for the care 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:

Individuals 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

Individuals with chronic 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.[1]

Individuals 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'.[2]

NICE have published a rapid guideline on severe asthma during the COVID-19 pandemic which outlines ways in which risk can be minimised, including specific considerations for investigation and treatment of adults with severe asthma during the pandemic.

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: Jahnavi Daru, Sue Pavord, Beverley Hunt, Susan Robinson

Individuals with hyposplenia are more vulnerable to the severe effects of COVID-19 and have been advised to stringently follow social distancing measures.[1]

Individuals 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'.[2]

3.5.1 Anaemia

If possible, pregnant women should avoid hospital pharmacies and instead, obtain 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).

Where women with homozygous sickle cell disease must attend hospital, clinicians (including paramedics where emergency attendance is required) should make arrangements to keep them shielded from other individuals, as far as possible.

Haematology and specialist obstetric multi-disciplinary 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, having a low threshold for face-to-face review with suspected COVID-19, given that individuals with homozygous sickle cell are considered extremely vulnerable to its severe consequences.
- 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) ± chest pain.
- Persistent fever >38°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.[12]

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

3.5.5 Inherited bleeding disorders

The management of inherited bleeding disorders is unchanged from the existing RCOG guidance. If care for women with these rare conditions is managed across multiple sites, please ensure a clear plan is in place for management of bleeding antenatally, intrapartum and postpartum, ensuring availability of appropriate products at centres.

3.6 Renal disorders

Authors: Maggie Blott, Rehan Khan, David Williams

Individuals 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.[1] Pregnant women with CKD stage 4-5 (GFR <30 ml/min or serum creatinine >180 micmol/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.[13]

3.6.1 Women with a renal transplant

Individuals who have received a renal transplant and who take immunosuppressive therapy are particularly vulnerable to the effects of COVID-19 and should be 'shielded'.[2]

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 /ciclosporin 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, and isolated on attendance, 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.[14]

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.[15] 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.

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

Individuals 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.[1]

The Association of British Neurologists has clarified this advice with guidance on COVID-19 for people with neurological conditions.[16]

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

Individuals 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.[1]

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 individuals 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.[17]

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.[18]

All adult gastroenterology clinics are moving to a telephone or telemedicine model. This lends itself well to the antenatal care 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 µmol/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 µmol/litre, discuss and consider planned birth at 39 weeks with the woman.

If bile acids are ≥100 µmol/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 with the woman.

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.[19] Think carefully about how a woman 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.

Hyperemesis can impact on a woman's mental health, which could be heightened during the pandemic, so mental wellbeing should be screened/acknowledged during all reviews, including those conducted remotely.

3.9 Rheumatology

Author: Rehan Khan

NHS guidance for rheumatological diseases acknowledges that immunosuppression is a risk factor for COVID-19.[1] 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.[20]

The BSR interpretation of which patients require 'shielding' can be found on their website.[20]

NICE have published a rapid guideline for adults with rheumatological autoimmune, inflammatory and metabolic bone disorders during the COVID-19 pandemic. This makes specific recommendations on how to minimise risk, manage medications (including immunosuppressants) in individuals with or without COVID-19 and monitor drug treatment.

If pregnant women 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 those caring for women.

3.10 Immunodeficiency

Authors: Liat Sarner, Matthew Hogg, Rehan Khan

Indviduals 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.[1]

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.[21]

Care should be delivered remotely by the HIV in pregnancy MDT (HIV specialist physician, HIV nurse, HIV midwife, obstetrician with a specialist interest in HIV). 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 with a member of the HIV MDT (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.

The risks of breastfeeding in this group of women should be discussed with the woman. This should require a discussion of the risks involved in attending for monthly maternal and infant viral load follow-up for the duration of breastfeeding and for 2 months' post-cessation, during the COVID-19 pandemic.

3.11 Obesity

Author: Shakila Thangaratinam

Individuals with body mass index >40 kg/m2 have been identified as being more vulnerable to the severe effects of COVID-19 and have been advised to stringently follow social distancing measures.[1]

- 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.

3.12.1 Cancer

Author: David Williams

During the COVID-19 pandemic, pregnant women with cancer are categorised as vulnerable on account of both their pregnancy and their cancer. These women have voiced concerns about their need to attend hospital for antenatal and oncology care. They are particularly concerned that the management of their cancer may be neglected as clinicians turn to the management of the corona virus.

The management of cancer in pregnancy should be tailored to the individual. During the COVID-19 pandemic a plan for antenatal care should be agreed between the woman, her lead obstetrician and oncology team. This plan should consider the woman's state of health, gestation of pregnancy, timing of childbirth and the type, stage and treatment of her cancer. This plan should aim to minimise the number of routine visits to hospital. Where possible investigations should be planned to coincide with a single hospital visit.

Most pregnant women with a history of successfully treated cancer require routine antenatal care. This should be offered with a reference to RCOG guidance on antenatal and postnatal care during the COVID-19 pandemic.

Fetal scans, blood tests and physical examinations are a necessary part of antenatal care and require attendance at hospital. These tests may need to be more frequent as a consequence of the underlying cancer.

Chemotherapy may need to be delayed until a woman has recovered from COVID-19. Otherwise the treatment of her cancer should not change as a consequence of the COVID-19 pandemic.

Breastfeeding should be supported in women who are well enough to feed their new-born and not taking a contraindicated chemotherapy agent. UNICEF, Academy of Breastfeeding Medicine, WHO and CDC consider the benefits of breastfeeding to outweigh the unlikely transmission of virus through breast milk. It is more likely that a newborn will be infected by respiratory droplets from an infected family member. For this reason, anyone feeding, holding or changing the baby should wear a mask and wash their hands before any close contact with the baby.

3.13 Preconception counselling

Author: Rehan Khan

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.

If preconception counselling cannot be delayed, it should be offered remotely if possible.

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.[22] 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.[23]

References

1. COVID-19: guidance on social distancing and for vulnerable people 2020 [Available from: https://www.gov.uk/government/publications/covid-19-guidance-on-social-distancing-and-for-vulnerable-people accessed 17 March 2020.
2. Major new measures to protect people at highest risk from coronavirus 2020 [updated 21 March. Available from: https://www.gov.uk/government/news/major-new-measures-to-protect-people-at-highest-risk-from-coronavirus.
3. Hypertension in pregnancy: diagnosis and management. In: National Institute for Health and Care Excellence, ed., 2019.
4. Preterm labour and birth. In: National Institute for Health and Care Excellence, ed., 2019.
5. National Institute for Health and Care Excellence. Diabetes in pregnancy: management from preconception to the postnatal period, 2015.
6. Covid-19 Information Governance advice for health and care professionals 2020 [Available from: https://www.nhsx.nhs.uk/key-information-and-tools/information-governance-guidance/health-care-professionals accessed 28 March 2020.
7. Lamain-de Ruiter M, Kwee A, Naaktgeboren CA, et al. External validation of prognostic models to predict risk of gestational diabetes mellitus in one Dutch cohort: prospective multicentre cohort study. BMJ 2016;354:i4338. doi: 10.1136/bmj.i4338
8. Knight M, Bunch K, Tuffnell D, et al. Saving Lives, Improving Mothers' Care. In: MBRRACE-UK, ed., 2019.
9. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. The Lancet 2020;395(10229):1054-62. doi: 10.1016/S0140-6736(20)30566-3
10. Statement on the risk assessment of pregnant women with heart disease during the COVID 19 pandemic 2020 [Available from: https://www.britishcardiovascularsociety.org/__data/assets/pdf_file/0028/9559/UKMCS-Statement-COVID19.pdf accessed 28 March 2020.
11. Regitz-Zagrosek V, Roos-Hesselink JW, Bauersachs J, et al. 2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy: The Task Force for the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC). European Heart Journal 2018;39(34):3165-241. doi: 10.1093/eurheartj/ehy340
12. The Royal College of Obstetricians & Gynaecologists. Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium. Green-top Guideline. 2015
13. Hall M, Bramham K, Lipkin G, et al. Recommendations for women with kidney disease who are currently pregnant, or considering pregnancy, during the COVID-19 pandemic. In: Association TR, ed., 2020.

14. Guidance on the management of transplant recipients diagnosed with or suspected of having COVID19 2020 [updated 25 March. Available from: https://bts.org.uk/wp-content/uploads/2020/03/Clinical_management_transplant_recipients.pdf.
15. Allotey J, Fernandez-Felix BM, Zamora J, et al. Predicting seizures in pregnant women with epilepsy: Development and external validation of a prognostic model. PLOS Medicine 2019;16(5):e1002802. doi: 10.1371/journal.pmed.1002802
16. Association of British Neurologists Guidance on COVID-19 for people with neurological conditions, their doctors and carers 2020 [updated 22 March. Available from: https://cdn.ymaws.com/www.theabn.org/resource/collection/6750BAE6-4CBC-4DDB-A684-116E03BFE634/ABN_Neurology_COVID-19_Guidance_22.3.20.pdf accessed 28 March 2020.
17. BSG COVID-19 Guidance on IBD patient risk groups: updated 23.3.20 2020 [Available from: https://www.bsg.org.uk/covid-19-advice/bsg-advice-on-ibd-patient-risk-groups/ accessed 28 March 2020.
18. BSG expanded consensus advice for the management of IBD during the COVID-19 pandemic 2020 [Available from: https://www.bsg.org.uk/covid-19-advice/bsg-advice-for-management-of-inflammatory-bowel-diseases-during-the-covid-19-pandemic/ accessed 28 March 2020.
19. Koren G, Boskovic R, Hard M, et al. Motherisk-PUQE (pregnancy-unique quantification of emesis and nausea) scoring system for nausea and vomiting of pregnancy. Am J Obstet Gynecol 2002;186(5 Suppl Understanding):S228-31. doi: 10.1067/mob.2002.123054 [published Online First: 2002/05/16]
20. Covid-19 (Coronavirus) - update for members 2020 [Available from: https://www.rheumatology.org.uk/News-Policy/Details/Covid19-Coronavirus-update-members accessed 28 March 2020.
21. BHIVA statement on management of a pregnant woman living with HIV and infant testing during Coronavirus (COVID-19) 2020 [Available from: https://www.bhiva.org/management-of-a-woman-living-with-HIV-while-pregnant-during-Coronavirus-COVID-19 accessed 28 March 2020.
22. COVID-19: investigation and initial clinical management of possible cases 2020 [Available from: https://www.gov.uk/government/publications/wuhan-novel-coronavirus-initial-investigation-of-possible-cases/investigation-and-initial-clinical-management-of-possible-cases-of-wuhan-novel-coronavirus-wn-cov-infection accessed 05 March 2020.
23. Acute care toolkit 15: Managing acute medical problems in pregnancy 2019 [Available from: https://www.rcplondon.ac.uk/guidelines-policy/acute-care-toolkit-15-managing-acute-medical-problems-pregnancy accessed 28 March 2020.

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Appendix 1 : 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

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=uRcUB1mosN4&feature=youtu.be (Music only video)

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

Mobile apps for home blood glucose monitoring

https://www.nhs.uk/apps-library/mumoactive/

https://www.nhs.uk/apps-library/gdm-health/

https://www.nhs.uk/apps-library/onetouch-reveal/

https://mywaydigitalhealth.co.uk/products-2/

Dietary advice for women with gestational diabetes

https://youtu.be/DdmrpStqFvs

https://www.youtube.com/watch?v=TOlTrQvNCKo

http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Healthy_Eating.pdf

https://youtu.be/DdmrpStqFvs

http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Healthy_Eating.pdf

Dietary advice for women with gestational diabetes

https://youtu.be/DdmrpStqFvs

https://www.youtube.com/watch?v=TOlTrQvNCKo

Gestational diabetes treatment

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

Type 1 diabetes in pregnancy

http://www.perinatal.nhs.uk/diabetes/projects/leaflets/Sick_Days_Type1.pdf

Continuous glucose monitoring for women with Type 1 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

Metformin treatment in pregnancy

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

Breastfeeding your baby and diabetes

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

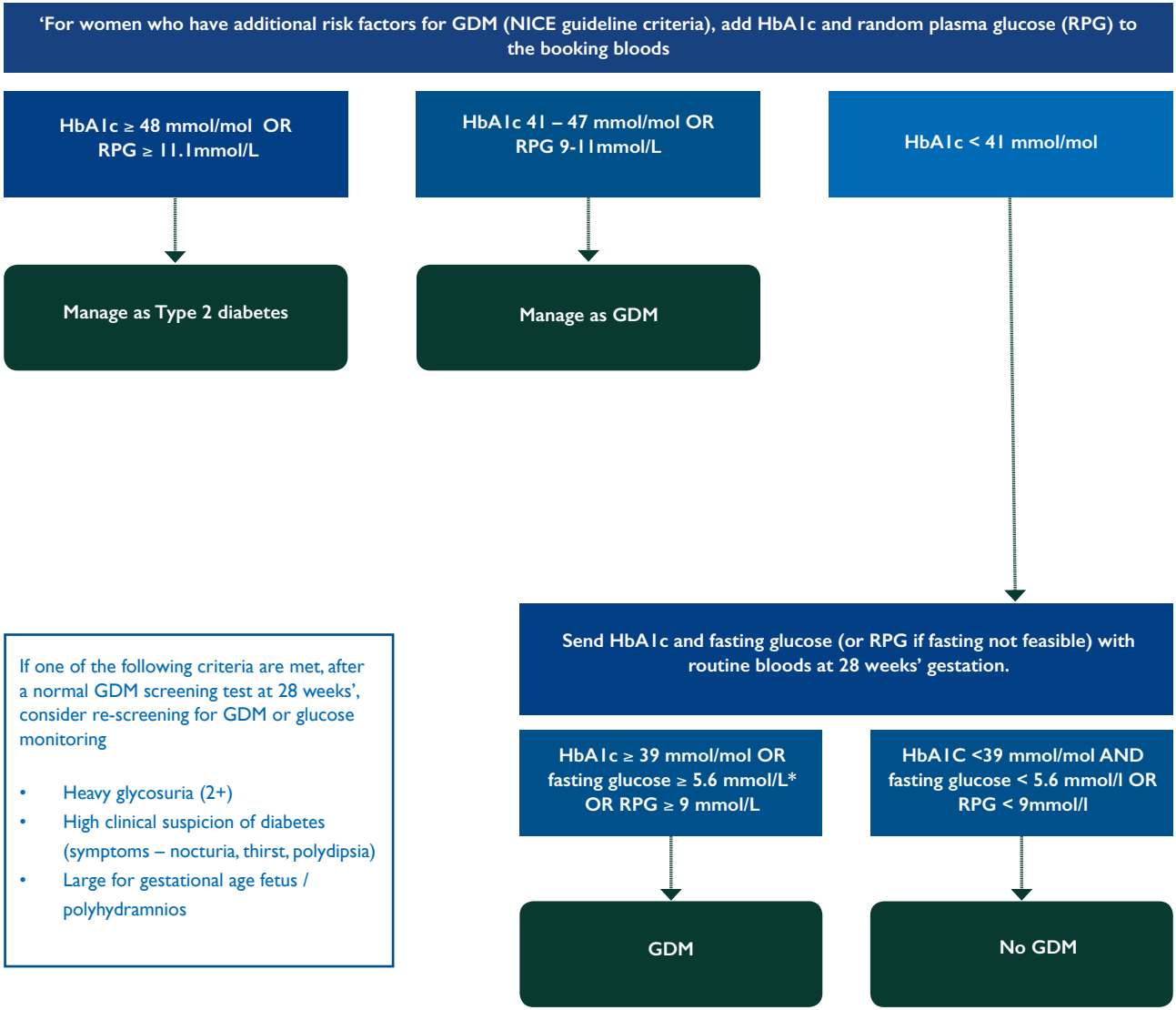
Pre-conception advice for women with Type 1 or Type 2 diabetes

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)



If one of the following criteria are met, after a normal GDM screening test at 28 weeks', consider re-screening for GDM or glucose monitoring

- Heavy glycosuria (2+)
- High clinical suspicion of diabetes (symptoms – nocturia, thirst, polydipsia)
- Large for gestational age fetus / polyhydramnios

* Based on resources, clinical capacity and population characteristics considerusing lower FPG threshold = 5.3 mmol/L to diagnose GDM.
Consider using risk calculators to obtain individualised risk estimates of GDM

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

1. Background

In normal times, screening for GDM is offered to women considered to be at high-risk as per NICE criteria using a 2-hr oral glucose tolerance test (OGTT). GDM is diagnosed using the following thresholds: fasting plasma glucose (FPG) ≥ 5.6 mmol/L or 2-hr postprandial (PP) ≥ 7.8 mmol/L.

However, OGTT requires prolonged waiting in the hospital for pregnant women, and usually many women wait together over a long period while the test is done. It also requires resources to run a dedicated phlebotomy service for OGTT. In pandemic conditions where it is neither sustainable nor safe to perform an OGTT, there is a need for alternate ways to test for GDM, and minimise the risks to the woman from COVID-19 and GDM complications.

2. Key considerations behind recommendations for alternate tests to diagnose GDM in a pandemic

Our recommendations are only for the duration of the pandemic, and services should return back to usual NICE recommended screening when safe and feasible to do so.

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 should minimise the number of visits and duration of stay in the hospital for the mother.
- Screening tests are chosen for their high sensitivity (i.e. low false negative rate). But these are often accompanied by low specificity with high false positive rate. Resources could be strained if high numbers of women access the services with a false diagnosis of GDM.
- Tests with high specificity (i.e. low false positive rate) are often accompanied by relatively low sensitivity and risk missing the diagnosis of GDM. Safety nets are required to minimise missing the diagnosis in women with GDM, particularly those at high risk of complications.

3. RCOG guidance for diagnosing GDM during pandemic

No single test can replace OGTT in diagnosing GDM. Hence in our guidance, we have proposed additional safety-nets to maximise the detection of GDM, without unduly overburdening the services. We have looked at the impact of new criteria on both diagnosis of GDM and other complications. In the absence of OGTT, the safety-nets proposed include:

- Additional blood tests (HbA1C and random plasma glucose) alongside routine booking bloods.
- Additional blood tests at 28 weeks (HbA1C and fasting or random plasma glucose).
- Clinical suspicion criteria for GDM testing.
- Personalised risk calculator for GDM.
- Real-time evaluation of the impact of alternate tests on services and outcomes.

3.1. Blood tests at booking

At booking, HbA1c and random plasma glucose (RPG) are additionally done

- HbA1c ≥ 48 mmol/mol or RPG ≥ 11.1mmol/L, treat as type 2 diabetes
- HbA1c ≥ 41-47 mmol/mol or RPG 9-11 mmol/L manage as GDM

We expect the highest risk groups to be detected at booking using the above strategy.

3.2. Blood tests at 28 weeks' gestation

At 28 weeks, HbA1c, fasting plasma glucose (FPG) or RBG (if fasting not available) are done.

- FPG ≥ 5.6 mmol/L* or HbA1c ≥ 39 mmol/mol or RBG ≥ 9 mmol/L, treat as GDM.

* Consider FPG ≥ 5.3 mmol/L to improve detection rate if resources and capacity allow, as there is a potential for increased number of women accessing services with a diagnosis of GDM.

Clinicians will need to be aware that while the specificity of the above HbA1c and FPG thresholds are high (i.e. low false positive rate) for diagnosing GDM, the detection rate is low.

In a meta-analysis of 17 studies**, a second/third trimester HbA1c cut off of ≥ 39 mmol/mol has high specificity (0.90; 95% CI 0.79, 0.95), with a detection rate of 36% (sensitivity 0.36; 95% CI 0.23, 0.52). ** findings not peer-reviewed

In the MRC funded PRiDE cohort (4303 women)**, a combined approach of HbA1c ≥ 39 mmol/mol or

- FPG ≥ 5.6 mmol/L had a detection rate of 41% (216/521) for GDM using NICE criteria; false positive rate of 6%
- FPG ≥ 5.3 mmol/L had a detection rate of 45% (234/521) for GDM using NICE criteria; false positive rate of 8%
- FPG ≥ 5.1 mmol/L increased detection to 51%, but with a 12% false positive rate, which is not ideal in a Pandemic situation.

In the PRiDE cohort, the rates of complications (large for gestational age LGA, Small for gestational age SGA, stillbirth, preterm birth and caesarean section) in women diagnosed with GDM by various criteria were broadly similar except for SGA (Table 1).

Table 1: Rates of complications in women diagnosed with GDM according to the NICE criteria and the proposed criteria in the PRiDE cohort**

Diagnosis of GDM (No. of women)	LGA n(%)	SGA n(%)	Stillbirth n(%)	Preterm birth n(%)	Caesarean section n(%)
NICE criteria (521)	115(22)	50(10)	1(0.2)	50(10)	88(17)
HbA1c ≥ 39 mmol/mol or FPG ≥ 5.6 mmol/L (439)	107(24)	18(4)	1(0.2)	45(10)	70(16)
HbA1c ≥ 39 mmol/mol or FPG ≥ 5.3 mmol/L (546)	140(26)	23(4)	2(0.4)	54(10)	89(16)

** findings not peer-reviewed

In a cohort of 2702 women with GDM (IADPSG criteria) in Australia, the rates of adverse outcomes for

various fasting thresholds to diagnose GDM is given in Table 2. There were no differences between FPG thresholds of 5.1 and 5.3 mmol/L, with minimal increase in composite adverse outcomes at 5.6 mmol/L. The rates of perinatal and neonatal deaths were increased at 5.6 mmol/L, but the numbers are small (Table 2).

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 (%)
≥ 5.1	990 (37)	8 (0.81)	5 (0.51)	145 (15)	298 (30)	88 (9)	314 (32)
≥ 5.3	766 (28)	7 (0.91)	4 (0.52)	116 (15)	228 (30)	71 (9)	252 (33)
≥ 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 ** findings not peer-reviewed

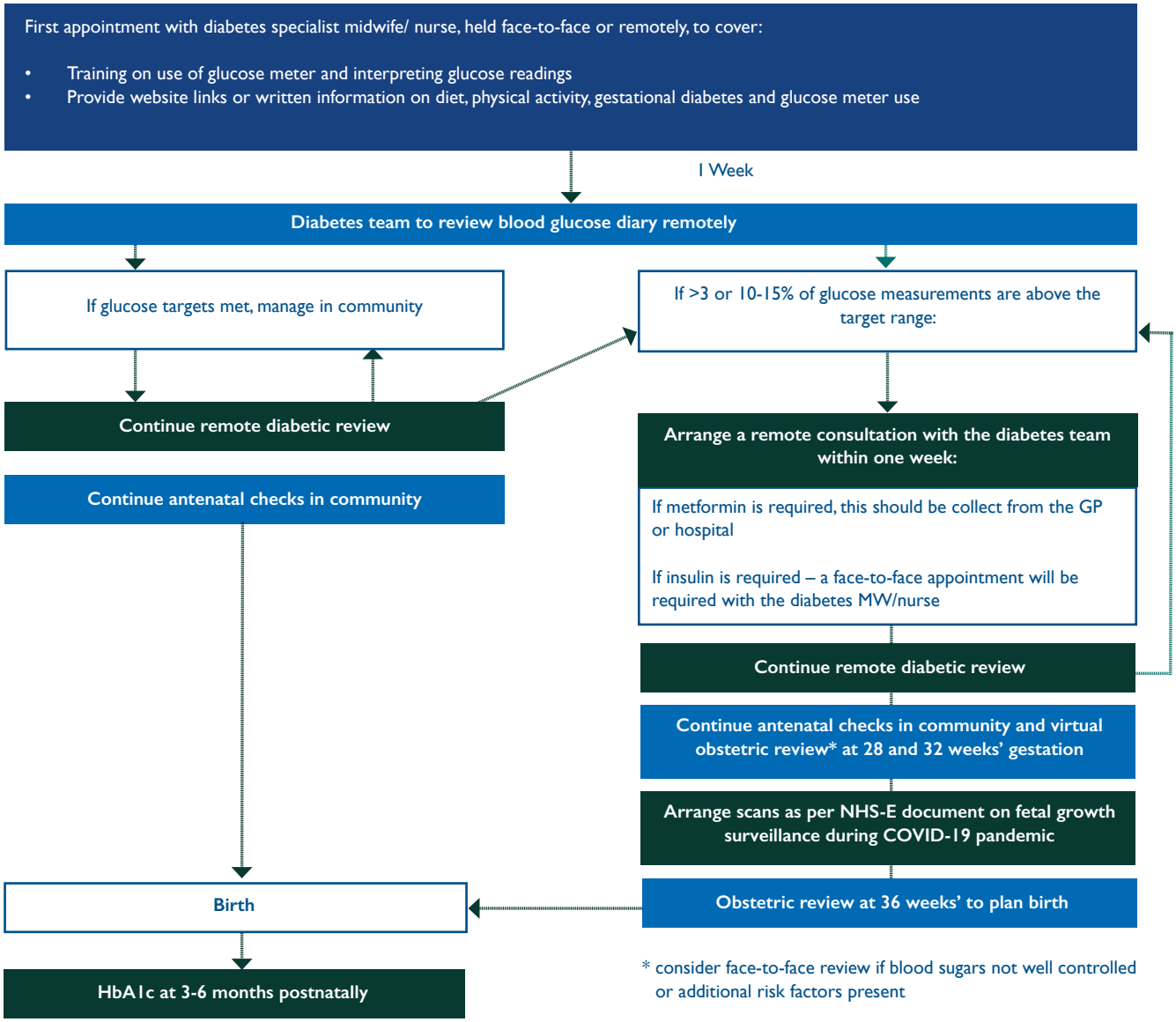
3.3. Clinical suspicion of GDM

Heavy glycosuria (2+ or above), symptomatic (nocturia, thirst, polydipsia) or large for gestational age (LGA) or polyhydramnios should be tested for GDM. If there is strong clinical suspicion despite negative blood tests for GDM, consider additionally using the risk calculator (Section 3.4) or commence glucose monitoring.

3.4. Risk calculator

Health care professionals are recommended to use the GDM risk calculator to determine the personalised risk of GDM for the woman. The externally validated GDM risk model uses routine information (age, height, weight, ethnicity, previous history of GDM, family history of diabetes) collected in the first trimester and predicts GDM risk 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). Use of the risk calculator can help to improve the detection rate of GDM.

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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