Royal College of Midwives

Royal College of Obstetricians & Gynaecologists

Mpox (Monkeypox) in Pregnancy

Information for healthcare professionals

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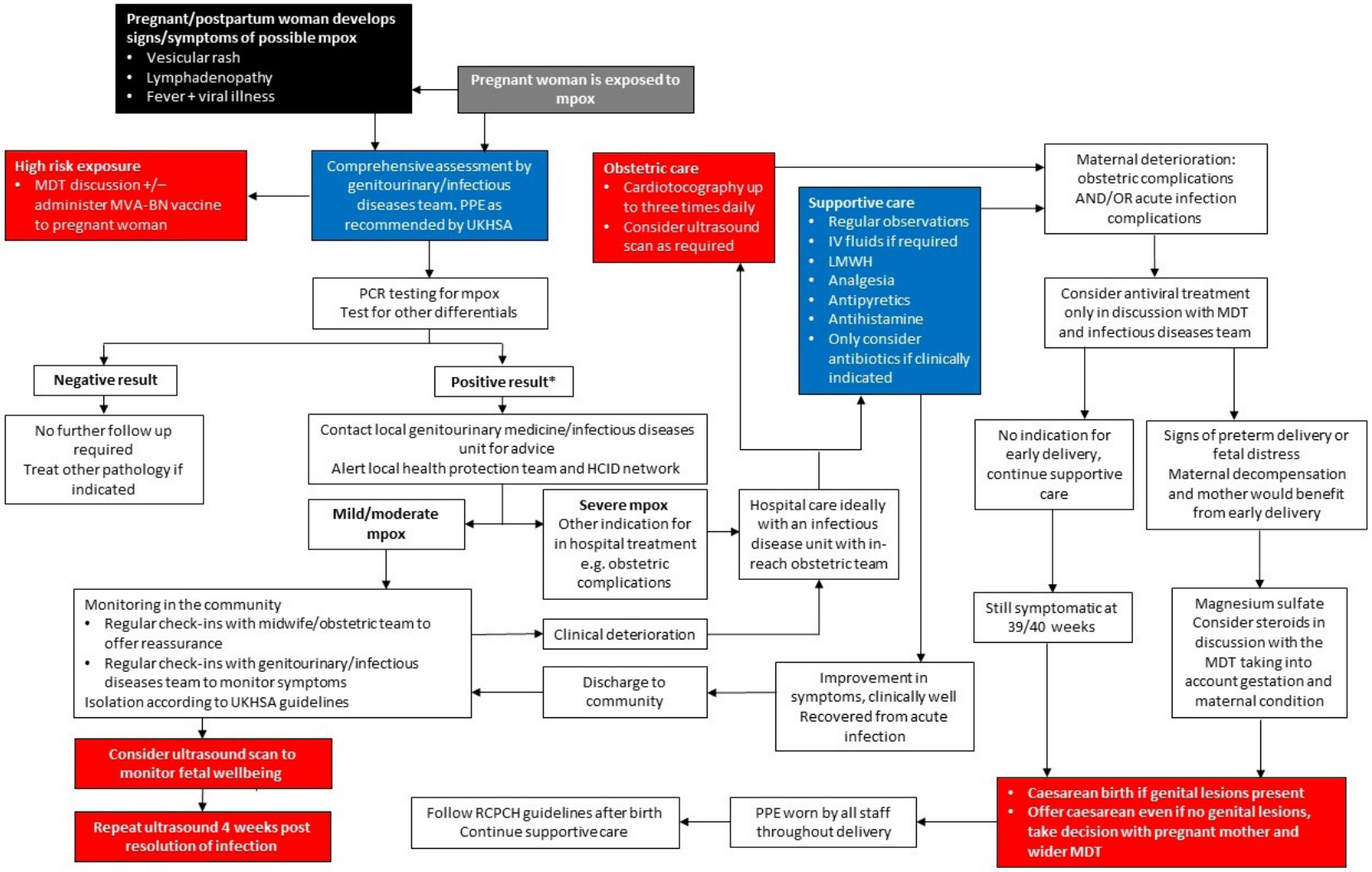
Contents

Quick reference summary for care of pregnant women with mpox infection



MDT, multidisciplinary team; MVA-BN, Modified Vaccinia Ankara – Bavarian Nordic; PPE, personal protective equipment; UKHSA, UK Health Security Agency; IV, intravenous; LMWH, low molecular weight heparin; PCR, polymerase chain reaction; HCID, high consequence infectious disease; RCPCH, Royal College of Paediatrics and Child Health.

*Clade II lineage outbreak cases are not considered as HCID. Clade I lineage cases are considered HCID and should be managed as severe disease.

1. Purpose and scope

This is the first edition of this guidance.

This document aims to provide guidance to healthcare professionals who care for people who are pregnant with suspected or confirmed mpox infection. It has been developed using available evidence, good practice and expert opinion and should be used as a resource for UK healthcare professionals to aid their decision making in the care of pregnant women with suspected or confirmed mpox.

This guidance may be relevant to other healthcare settings; however, it may need to be modified for the local environment.

The aims of this guidance are:

- To help healthcare professionals provide safe, personalised care to pregnant women with suspected or confirmed mpox infection during pregnancy, childbirth or the postpartum period.
- To reduce transmission of mpox to pregnant women, their families and healthcare workers.

This guidance will be reviewed regularly and updated as more information and evidence about mpox in pregnancy emerges. It is important to note that changes and influence on care should be proportionate to the prevalence of mpox infection and should be adapted as more information becomes available.

Within this document we use the terms woman and women's health. However, it is important to acknowledge that it is not only women for whom it is necessary to access women's health and reproductive services in order to maintain their health and reproductive wellbeing. Obstetric and gynaecological services and delivery of care must therefore be appropriate, inclusive, and sensitive to the needs of those individuals whose gender identity does not align with the sex they were assigned at birth.

2. Introduction and background epidemiology

The mpox virus was first identified in monkeys in 1958. It is a member of the orthopoxvirus genus along with the cowpox virus and variola virus that causes smallpox.[1] Mpox is a viral zoonosis with a range of animal hosts, mostly rodents and non-human primates.[2] The first case of mpox in a human was reported in 1970 in the Democratic Republic of Congo (DRC). The virus is endemic in several countries in Central and West Africa.[3]

In 2022, cases of mpox were noted in many non-endemic countries, leading to the World Health Organization (WHO) declaring a Public Health Incident of International Concern on 23 July 2022, with 3345 cases in the UK by 5 September 2022. The outbreak was due to mpox Clade II Strain B1 (endemic in some countries of West Africa). Clade II has historically had a case fatality rate of around 1%; however, evidence from the recent outbreak showed a much lower case fatality rate of approximately 0.04%. It is considered to be less severe than Clade I, which is endemic in some countries of Central Africa around the Congo Basin and has a reported case fatality rate up to 10%.[4]

Mpox cases with a history of travel or links to travellers to Central Africa, or those confirmed as being caused by, or with an epidemiological link to, Clade I virus are considered a high consequence infectious disease (HCID). According to the UK Health Security Agency (UKHSA), an HCID is defined as an acute infectious disease that typically has a high case fatality rate, may not have effective prophylaxis or treatment, can spread in the community and in healthcare settings, and requires an "enhanced individual, population and system response to ensure it is managed effectively, efficiently and safely".[5] Other cases of mpox, including those with epidemiological links to the 2022 UK outbreak and those linked to travel to West Africa, are not considered HCIDs.[4]

2.1 Transmission

Mpox is spread by:[6]

- close physical contact, such as skin-to-skin and sexual contact, with an infected person who has an active vesicular rash.
- contact with clothing or bedding used by an infected person.
- droplets in the air after an infected person has coughed or sneezed.
- contact with infected animals carrying mpox via bites or physical contact.
- eating the undercooked meat of an infected animal.

2.2 Effect of mpox on pregnant women

Many people with mpox infection have mild, self-limiting symptoms and do not require any intervention or therapy. However, people with underlying health conditions or those who are immunocompromised are at increased risk of severe infection. This may include pregnant women.[6,7]

At present, very little is known about mpox infection in pregnancy, labour and the postpartum period. Although mpox has been endemic in some West African countries for years, few data have been reported on mpox in pregnancy.[8] Owing to this, globally there is limited evidence on the treatment and health outcomes of mpox in pregnancy.[9] The 2022 WHO mpox global trends report[10] included only 55 pregnant and recently pregnant people. Of these, 12 people were treated in hospital but there were no reported admissions to intensive care or deaths. In Brazil, in the 2022 epidemiological bulletin,[11] there were 22 pregnant women with confirmed or suspected mpox of which two required admission to hospital. In pregnant or recently pregnant women in the USA, the US Centers for Disease Prevention and Control reported 17 cases of confirmed or probable mpox.[12] Although these case numbers are very small, the data are reassuring.

This guidance has been developed using available research and guidelines for mpox in non-pregnant people, the little research there is on mpox in pregnant people, and research on similar infections, such as smallpox, in pregnancy. Owing to the dearth of evidence on mpox in pregnancy and the postpartum period, decisions must be taken with expert advice from infectious diseases specialists.

Mpox has the potential to cause severe disease in pregnancy. A cohort study of 222 participants with mpox infection between 2001 and 2011 in the DRC included four pregnant women with mpox infection.[8] Of the four women, two had miscarriages in the first trimester, one had fetal death and the fourth had a healthy infant at term. The stillborn infant showed signs of maculopapular rash involving the skin on his trunk, arms, legs, head, hands and feet. Histological and virological evidence suggested the fetus had contracted mpox infection by vertical transmission in utero.[8] Given that 80% of miscarriages occur in the first trimester,[13] it is difficult to know if mpox infection in pregnancy was a causal factor.

Smallpox infection, which also belongs to the orthopoxvirus genus, was associated with poor maternal and neonatal health outcomes when infection occurred in pregnancy. Historical studies have shown a high fatality rate along with high miscarriage and premature labour rates in women who contracted smallpox infection during pregnancy.[14]

Although there is little evidence on mpox in pregnancy and the postpartum period, it seems reasonable to suggest that infection in pregnancy may be severe and cause poor maternal and neonatal health outcomes. The WHO has reported that transmission of mpox virus can occur both via the placenta and via close contact.[2] There has been one reported case of acquired mpox infection in a 10-day-old infant.[15] The infant's mother developed a rash on day 4 post birth and the infant developed a rash on day 9 post birth. The infant's father had developed a vesicular rash 9 days before birth, which had resolved by the time of birth.[15] In this case, transplacental transmission cannot be ruled out.

Based on poor quality evidence reported in the media on a limited number of cases in pregnancy, pregnant women have not been shown to have poorer outcomes than non-pregnant people. This could be because of the particular clade of mpox, differing access to healthcare in high-income countries, and treatment available.[16] As a result, it is important to proceed with extreme care and take any suspected case of mpox seriously.

3. Presentation and diagnosis of suspected cases of mpox in pregnant women

Case definitions of mpox

According to the UKHSA.[17]

Possible case:

- A febrile prodrome (fever ≥ 38°C, chills, headache, exhaustion, muscle aches (myalgia), joint pain (arthralgia), backache, and swollen lymph nodes (lymphadenopathy) compatible with mpox infection (but no rash), where there is known prior contact with a confirmed case in the 21 days before symptom onset.
- An illness where the clinician has a suspicion of mpox, such as unexplained lesions, including but not limited to:
  - genital, anogenital or oral lesion(s) – for example, ulcers, nodules
  - proctitis – for example, anorectal pain, bleeding.

Probable cause

A probable case is defined as anyone with an unexplained rash or lesion(s) on any part of their body (including genital/perianal, oral), or proctitis (for example anorectal pain, bleeding) and who:

- has an epidemiological link to a confirmed, probable or highly probable case of mpox in the 21 days before symptom onset

  or

- has had one or more new sexual partners in the 21 days before symptom onset.

Highly probable case

A highly probable case is defined as a person with an orthopox virus PCR positive result and where mpox remains the most likely diagnosis.

Confirmed case

A confirmed case is defined as a person with a laboratory-confirmed mpox infection (mpox PCR positive).

Unlikely case of mpox

- Pregnant women with no signs or symptoms of mpox, or no rash 5 days or more after onset of the prodromal phase and a negative PCR test.
- Pregnant women with an established alternative diagnosis that fully explains their symptoms.

Those at high risk following exposure to mpox

- People with underlying healthcare conditions or other conditions causing immunosuppression, such as pregnancy.
- People who have had close contact with a patient with confirmed mpox, for example sexual intercourse with an mpox-positive person or via household contacts.[18]

Those at high risk of exposure to mpox

- Healthcare workers caring for confirmed cases of mpox who have had a breach in personal protective equipment (PPE) usage.

Mild and moderate disease

- Presence of skin lesions with the absence of any features of severe disease.

Severe disease[18]

- Severe, refractory pain, commonly proctitis.
- Eye disease, ranging from mild to severe, including conjunctivitis, blepharitis, keratitis, corneal ulcer, corneal scarring, and rarely loss of vision.[19]
- Severe secondary bacterial infections or co-infection with a sexually transmitted infection.
- Numerous lesions (approximately more than 100) or those that require surgical intervention.
- Lesions associated with complications due to pain or swelling, e.g. constipation, urinary retention or inability to swallow.
- Encephalitis.
- Pneumonitis.

- In pregnancy, if someone is concerned they may have mpox, they should be referred to a local genitourinary medicine (GUM) or infectious diseases specialist for further advice and directions, according to local arrangements. This can be done by their GP, midwife or obstetrician.
- If the pregnant woman who is concerned they have mpox is in active labour, their midwife should alert the maternity unit at their local hospital.
- Pregnant women with suspected mpox should be reviewed by a healthcare professional who should liaise with an infectious diseases specialist or GUM clinician, with experience in assessing mpox if possible.
- PPE should be worn in line with UKHSA guidance.[20]
- Pregnant women should be advised to travel to hospital by private vehicle where possible and ensure any lesions are covered.[20]

3.1 Risk factors for mpox

- Mpox infection should be suspected in any pregnant person who has relevant symptoms and recent exposure to mpox, which includes:
  - Close contact with a known infected individual, e.g. household contact, sexual contact, occupational contact (without appropriate PPE).
  - Direct contact with contaminated materials such as bed linen.
  - Recent travel to a country where mpox is endemic.
  - Contact with animals that are known carriers of mpox (certain rodents, including rope squirrels, tree squirrels, Gambian pouched rats, dormice; and non-human primates).[21]

  Or in any pregnant women displaying signs and symptoms of mpox:

  - A new unexplained vesicular, nodular or ulcerative rash,[6] and one or more of:
    - lymphadenopathy, fever, sweats, headache, myalgia, fatigue.[3]

- Where herpes simplex virus type I and II (HSV-I and HSV-II), enterovirus, syphilis and Varicella zoster virus (VZV) have been actively excluded.

3.2 Symptoms of mpox

Clinicians should have up-to-date knowledge of the symptoms and signs of mpox and have a high index of suspicion if a pregnant woman presents with symptoms suggestive of mpox and relevant epidemiology.

- Mpox symptoms typically develop 5–13 days post exposure to the virus.[22]
- A prodromal phase may precede the characteristic rash, consisting of feeling generally unwell, myalgia, fatigue, fever and headache. Regional lymphadenopathy is common and may also precede the rash.[3] Absence of a prodromal phase does not exclude a diagnosis of mpox.[23]
- A vesicular rash, often with well circumscribed lesions (although they can coalesce) appears 1–4 days after the onset of fever. Lesions begin as macules and progress to pustules before crusting over. These lesions can appear anywhere on the body, including mucous membranes of the mouth, nose, anus and vagina.[3]
- The rash can last for up to 4 weeks and the lesions may be at different stages of disease in different areas of the body.[3]
- A person is considered infectious until all lesions have healed and the crusts have fallen off with intact skin remaining.[20]

3.3 Diagnosis of mpox

- Routine screening of asymptomatic pregnant women is not recommended.
- A full, comprehensive history must be taken with particular emphasis on possible methods of exposure as detailed above: recent travel, contact with people infected with mpox, sexual history, exposure to animals that are known carriers of mpox.
- Full examination of skin, oral and vaginal mucosa, and the perianal area should take place. Lymph nodes should also be examined.
- Advice on PPE for diagnostic assessment can be sought from the UKHSA.[20]
- Polymerase chain reaction (PCR) testing should take place in discussion with a multidisciplinary team (MDT).[23] The following samples should be taken:
  - Multiple swab samples should be taken from open sores or vesicles and placed in viral transport medium.
  - Viral throat swab for mpox PCR.[24]
- Exclude other conditions that present with similar symptoms:
  - HSV-1 and HSV-2 (PCR)
  - Enterovirus (PCR)
  - VZV (PCR)
  - Syphilis (serology or PCR).
- If indicated, full sexual health screen:
  - Serology for human immunodeficiency virus (HIV), hepatitis C virus (HCV) and hepatitis B virus (HBV).
  - PCR for *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, *Mycoplasma genitalium*.[24]
- For expert diagnostic (and clinical) support for severe or complicated cases, the Imported Fever Service offers a 24/7 service and can be contacted on 0844 778 8990.

- Visitors to pregnant women with suspected mpox should be discouraged until after the risk assessment has taken place and PCR results are confirmed.
- If a positive result is received, the virology lab should notify the local Health Protection Team as mpox is a notifiable disease.[24]

Multidisciplinary team

MDT discussions regarding mpox should include:

- Virologist/microbiologist
- Infectious diseases consultant
- Obstetrician
- Neonatologist/paediatrician
- Midwife
- +/– Anaesthetist

3.3.1 Isolation advice for those exposed to or confirmed with mpox

- Pregnant women **exposed** to mpox should follow UKHSA advice on self-isolation.[20] Isolation is not usually required for contacts of people with mpox caused by clade II.
- Exposed individuals should take measures to avoid repeated exposure and monitor themselves closely for symptoms.
- Pregnant women with **confirmed** mpox should isolate at home according to the UKHSA guidelines.[20,25,26]
- **Stage 1:**
  Clinical criteria
  - The patient has been assessed over the telephone or by video call and has been afebrile for 72 hours and is considered systemically well.

  Lesion criteria
  - No new lesions for 48 hours
  - No oral mucous membrane lesions
  - All lesions have crusted over
  - All lesions on exposed skin (including the face, arms and hands) have scabbed over, the scabs have dropped off and a fresh layer of skin has formed underneath.
  - Lesions in other areas should remain covered throughout the patient's time outside of their home or when in contact with other people.

  Once the above criteria are met, individuals should still avoid close contact with immunosuppressed people, other pregnant women and children under 12 until Stage 2 criteria have been met.

- **Stage 2:**
  Full de-isolation can take place with full resumption of normal activities when the above criteria have been met along with:
  - No new lesions for 48 hours
  - No mucous membrane lesions
  - All lesions for both exposed and unexposed areas have crusted over. All scabs have dropped off with intact skin remaining underneath.

- Pregnant women can seek advice from their treating clinician and local Health Protection Team for advice on when to end self-isolation.

Supporting text

As mpox in pregnancy is rare, when a pregnant or postpartum woman presents with a vesicular rash it is very important to rule out more likely potential diagnoses, such as HSV-1 and HSV-2, VZV, HIV, syphilis, HCV, HBV, enterovirus, *Neisseria gonorrhoeae*, *Chlamydia trachomatis* and *Mycoplasma genitalium*.[24]

The UKHSA has published guidance on the appropriate use of PPE in suspected mpox infection cases.[20] PPE acts as a physical barrier to transmission of infectious particles present in bodily fluids. There is also guidance on isolation of confirmed cases of mpox infection to minimise transmission outside of healthcare environments.

4. Vaccination following exposure to mpox in pregnancy

- The UKHSA currently recommends considering the Modified Vaccinia Ankara – Bavarian Nordic (MVA-BN) vaccine on a case-by-case basis. The possible risk should be weighed against the type of exposure and the trimester. For example, if high risk exposure (as defined above) has taken place in the first trimester, it may be beneficial to vaccinate owing to the potentially high risk to the fetus associated with infection in early pregnancy, as is seen with other infections.[27]
- The decision to vaccinate should be taken by the pregnant woman in discussion with the MDT.
- Further advice can be sought from the UKHSA Green Book.
- The MVA-BN vaccine should be given within 4 days of exposure, but if that is not possible it can be given within 14 days.[28]

Supporting text

The MVA-BN smallpox vaccine is a non-replicating vaccine so is theoretically safe in pregnancy.[29] It has been trialled in fewer than 300 pregnant women with no reported adverse events, and no fetal malformations have been noted in animal studies. As a result, this is the vaccine recommended by the UKHSA for consideration in pregnancy.

This guidance recommends the MVA-BN vaccine for consideration on a case-by-case basis. However, there is an alternative smallpox vaccine available for use in the general population. The smallpox (vaccinia) vaccine (ACAM2000) confers 85% cross-protective immunity but carries a small risk of fetal vaccinia. Fetal vaccinia can cause severe adverse neonatal and maternal outcomes including preterm birth and stillbirth.[30]

5. Antenatal care for pregnant women with confirmed mpox

5.1 Monitoring and treatment

- Pregnant women with mild to moderate mpox (clade II) and no other concerning signs/symptoms (see section 3.3.1), including absence of any obstetric complications secondary to mpox, do not need hospital admission.
- Pregnant women with confirmed mpox should be assessed regularly by an infectious diseases or GUM specialist to monitor for deterioration and possible need for treatment.
- Pregnant women should have regular check-ins with their community midwife or obstetric team for advice in relation to their pregnancy.
- These check-ins can take place virtually unless there is clinical concern. If obstetric concerns are raised or noted, midwives should liaise with the obstetric team and a local infectious diseases or GUM specialist.
- Contacts of pregnant women with mpox should be assessed for the need for vaccination by the health protection team.[18]

- Pregnant women should be advised how to manage their symptoms with antipyretics, analgesics and to ensure they remain hydrated.
- Pregnant women should be counselled on the risks specific to their trimester of pregnancy (see Table 1).[7]
- Ultrasound scan should be offered as clinically indicated; however, if the pregnant woman has mild disease it may be appropriate to defer ultrasound until they are no longer infectious.
- Care of the mpox rash
  - Advice on safe use of analgesia in pregnancy should be given.
  - Nails should be kept short to avoid damage when itching.
  - Topical anaesthetic, such as topical lidocaine, can be used on vesicles.
  - Mouthwash containing lidocaine 1% is recommended for oral lesions.
  - If any markers of severe disease, consider hospital admission.

Table 1. Trimester-specific risks and monitoring advice

Trimester	Risks	Advice
First	Miscarriage	Counsel on symptoms of miscarriage: • Vaginal bleeding • Pelvic pain
	Vertical transmission	To provide reassurance with regards to vertical transmission, **consider** ultrasound scan to assess progression and viability of pregnancy
Second	Miscarriage	Amniocentesis (mpox PCR of sample)*
	Preterm birth Vertical transmission	Obstetric ultrasound as clinically indicated:** • Estimated fetal weight • Amniotic fluid volume • Presence of fetal signs of infection (e.g. hydrops)
Third	Preterm birth	Counsel women regarding reduced fetal movements
	Intrauterine death	Weekly evaluation with ultrasound Doppler

* At present, there is no conclusion regarding the value of amniocentesis because of limited evidence on the risk of vertical transmission – it is possible that the risk of vertical transmission is very low and therefore amniocentesis would not be of benefit. This should be made clear when offering amniocentesis to pregnant women, including open discussion explaining the risks and benefits and highlighting the limited evidence.

** Follow local infection prevention and control practices.

5.2 Secondary care

5.2.1 Admission

Pregnant women with severe mpox infection or complex obstetric conditions should be admitted to hospital. This should ideally be in a centre that provides infectious diseases medicine, fetal medicine and obstetrics. It is recommended that they are cared for in a single room with ensuite facilities. In the absence of an obstetric complication, admission should be to an appropriate medical ward under the care of an infectious diseases team with joint obstetric and infection MDT input.

5.2.2 Hospital monitoring and treatment

There is limited knowledge on the treatment of mpox. Treatment involves best supportive care; antivirals may be considered in severe disease in discussion with the MDT.[20]

Maternal and obstetric monitoring requirements

- Maternal observations including blood pressure, heart rate, oxygen saturation and temperature should be performed regularly (at least four times a day).
- If more than 26 weeks of gestation or the woman is unwell, fetal wellbeing should be regularly monitored with cardiotocography as determined by a fetal medicine specialist.[7]
- During acute infection, regular ultrasound assessment should take place as clinically indicated for example, if the pregnant woman clinically deteriorates or there are signs of fetal distress.[7] Owing to limited evidence on the optimum frequency of ultrasound assessment, frequency should be determined by a fetal medicine specialist taking into account the latest available evidence.
- Once acute infection has resolved, 4-weekly ultrasound scan checking fetal growth and anatomy, amniotic fluid measurement and Doppler should be performed.[7]

Treatment options

- Venous thromboembolism prophylaxis with low molecular weight heparin (LMWH). This should be adjusted by weight according to existing hospital guidelines for LMWH in pregnancy.
- Depending on the woman's ability to ingest fluid, intravenous (IV) fluids may be required based on their fluid status.
- Supportive treatment with oxygen (if saturations are less than 95% in room air), analgesia, antipyretics, and antihistamines, as required.
- Routine antibiotic prophylaxis is not necessary, unless clinically indicated.
  - Antiviral treatment may be considered in unwell pregnant women, in conjunction with an appropriate infection expert, for example specialist at an HCID unit.
- Regular monitoring of full blood count, C-reactive protein, renal function and liver function is recommended for those with severe infection.

As above, for expert clinical 24/7 support for severe or complicated cases, the Imported Fever Service can be contacted on 0844 778 8990.

Appendix III provides a care plan summary for pregnant women with PCR confirmed mpox.

6. Labour and birth

6.1 Mode of birth

- Mpox infection alone is not an indication for iatrogenic preterm delivery.
- If there is any evidence of maternal or fetal compromise, delivery of the baby should be considered. This decision should take into account:
  - gestational age
  - estimated fetal weight
  - whether the woman will benefit or whether it may further compromise maternal wellbeing.[7]
- Magnesium sulfate should be given for neonatal neuroprotection in line with the unit guideline, if early birth is contemplated.

- Corticosteroids can be administered for fetal lung maturation depending on the gestational age if early birth is contemplated.[31] This should be in discussion with the MDT and take into account the woman's wellbeing, recognising that steroids may cause deterioration in the maternal condition because of their immunosuppressive mechanism of action.
- At present the optimal mode of birth in pregnant women with mpox is unknown. In cases where genital lesions are present, caesarean birth is advised in order to try and minimise the risk of transmission during labour. In cases without genital lesions, the woman should be counselled on the absence of data on optimal mode of birth. Vertical transmission may have already occurred prior to birth, in which case caesarean birth will not offer any additional protection to the baby. However, there is also a risk of painless, unidentified vaginal lesions. While acknowledging the absence of evidence, in all cases the woman should be given the opportunity to discuss modes of birth to make an informed choice.[7,31]
- If required, review by an obstetric anaesthetist should take place. This is to provide advice and input regarding lesions close to the site of spinal anaesthetic insertion and oropharyngeal lesions that may complicate intubation.
- During the birth, maternity and neonatal staff should use PPE as advised by the UKHSA.[20]
- The continuous presence of a chosen birth partner should be allowed throughout maternity admission including induction of labour, labour, birth and postnatal inpatient period. PPE can be provided to the birth partner. Advice should be provided to the woman on avoiding choosing a clinically vulnerable person.
- Delayed cord clamping is recommended (caesarean or vaginal birth). There is no evidence of increased transmission risk with delayed cord clamping and there are well recognised neonatal benefits.[9,32]
- Infection prevention and control (IPC) measures should be followed for the disposal of placenta and pregnancy-related fluids or tissues according to individual trust protocol for potentially infectious material.

7. Post birth neonatal and maternal care

- The Royal College of Paediatrics and Child Health (RCPCH) has released guidance on care of a newborn baby when the mother has suspected or confirmed mpox – Mpox outbreak 2022: Guidance Part C.[33] In summary:
  - Specialist advice should be sought from the UKHSA and paediatric infectious diseases teams at HCID units (Imperial College Healthcare, London; Evelina Children's Hospital, London; Alder Hey Hospital, Liverpool; and Royal Victoria Infirmary – Great North Children's Hospital, Newcastle upon Tyne).
  - A baby born to a woman with confirmed or suspected mpox should be considered infectious until a negative PCR test excludes infection.
  - Neonates should be tested for mpox infection; PCR of throat swab, blood, urine and swabs of any vesicular rash.
  - If the baby is not infected and to reduce the risk of this occurring, the RCPCH advises that mother and baby should ideally be separated at birth (close contact such as skin-to-skin should be avoided). Discussion with national experts, such as the Imported Fever Service or paediatric infectious disease teams at HCID units (both of these services are available 24/7), is strongly advised. The baby should also be isolated from other babies in a side room. If there is significant objection to this, a decision should be made with the woman ensuring all risks (including severe infection, admission to intensive care, mechanical ventilation and death[15]) have been fully explained and understood by the woman. Measures should be put in place to mitigate the risk of transmission, taking advice from IPC professionals. If separation is refused, multidisciplinary team discussion should take place to consider the most appropriate way to provide continued care. Mother and baby can be reunited if both receive positive PCR tests or both receive negative PCR tests.
  - Given this separation may be extremely distressing for the woman, awareness of the potential need for mental health support is important and should be offered where appropriate.
  - If the mother is confirmed positive for mpox infection, and the baby is confirmed negative following PCR testing, it is advised to give the baby MVA-BN vaccine as soon as possible as post-exposure prophylaxis.

  - Breastfeeding is not recommended unless both mother and child are infected. If the mother is infected, she should express milk to initiate and maintain supply; however, this milk should be considered infected and disposed of. Breastfeeding can be commenced once the mother is no longer considered infectious, in accordance with isolation guidance as outlined above (see section 3.3.1).
  - Donor milk and/or formula feeding can be considered.
  - Asymptomatic contacts of people with mpox should not donate breastmilk within 21 days of exposure to ensure they are not infected.
- A postpartum woman with mpox should be treated with best supportive care as outlined above. Postpartum, given there is no longer a risk to the fetus, if the woman is severely unwell, antiviral treatments can be considered as advised and guided by local infectious diseases specialists in conjunction with advice from national experts (led by the HCID network).
- A postpartum woman who has had mpox in pregnancy should be advised there is currently no evidence of any risk to future pregnancies, once recovered.
- Post birth, contraception should be offered to postpartum women as part of routine postnatal care.

Supporting text

As above, there is very little evidence for treatment of mpox in pregnancy and the postpartum period. This evidence has been written based on advice for supportive care for non-pregnant people and discussion with expert healthcare professionals.

Antiviral treatment may be considered in unwell pregnant women, in conjunction with discussion with national experts. Currently, there is no specific treatment for mpox. However, tecovirimat, brincidofovir and cidofovir are possible treatment options in non-pregnant people according to the US Centers for Disease Control and Prevention.[34] Tecovirimat has been approved by the European Medicines Agency for use in non-pregnant individuals.[35] No teratogenic or embryotoxic effects have been detected in animal studies according to the US Food and Drug Administration (FDA), although the data from existing studies are insufficient.[35] The Summary of Product Characteristics for tecovirimat lists pregnancy and breastfeeding as a caution and states that tecovirimat is not recommended in pregnancy unless the benefits are considered to outweigh the risks.[36]

Breastfeeding should be discontinued with tecovirimat use. It is not known whether tecovirimat is excreted in human breastmilk; however, data from animal studies have shown excretion in milk. Consequently, the risk to neonates cannot be excluded.[33]

The US FDA advises that brincidofovir should be avoided in pregnancy if possible.[37] Cidofovir has caused teratogenic and embryotoxic effects in animal studies and therefore should not be considered in pregnancy unless there is very severe maternal illness, and only after discussion with national experts and infectious diseases specialists.[34]

This guidance has referenced the RCPCH guidance for post birth and maternal care. There has been one reported case of mpox in a neonate in the UK.[15] The neonate developed a rash on day 9 of life and developed hypoxaemic respiratory failure, requiring admission to intensive care, invasive ventilation and antiviral treatment with tecovirimat and cidofovir. The infant was discharged after a 4-week admission in intensive care. The infant's mother developed symptoms of mpox on day 4 post birth and the infant's father had developed a vesicular rash 9 days before birth, which had resolved by the time of birth. Adenovirus was also isolated in the infant's samples. It is impossible to draw conclusions from a single case in the UK, or to know when the neonate contracted the virus (transplacentally or after birth). However, given the seriousness of the infant's illness it is important to proceed with caution and minimise risk of transmission where possible. As a result, the RCPCH advises that mother and neonate are ideally isolated at birth if there is concern that the mother is infected.

8. Early pregnancy loss or termination in mpox

- Suspicion or confirmation of mpox should not prevent or delay access to abortion care in women choosing to end a pregnancy. If further guidance or advice is required to help the pregnant woman access abortion services, healthcare professionals can seek help from general practitioners, sexual health clinics or Early Pregnancy Units.
- Similarly, there should be no delay in management of early pregnancy loss in women with mpox. Early pregnancy loss should be cared for as in women without a diagnosis of mpox.
- Extra IPC precautions should be taken – the woman should be cared for in a single room and staff should wear PPE as advised by UKHSA.
- As above, women should be counselled that there is no evidence to date to suggest that future pregnancies will be affected, once recovered from mpox.

9. Psychological and social considerations

- Healthcare professionals should be aware of the psychological and social impact that a diagnosis or exposure to mpox may have on pregnant women.
- Support should be offered to pregnant women who are isolating with mpox infection. This should be extended to any vulnerable adults or children in the household if required.
- Healthcare professionals should also be offered support from occupational health if they have concerns or questions.

10. Organisational considerations

10.1 Personal protective equipment

- PPE should be worn for any in-person care of a pregnant woman with mpox. This should be in line with recommendations from the UKHSA.[20]
- For community visits, PPE should be worn and disposed of according to trust IPC guidelines.

10.2 Visiting guidance

Visitors to pregnant women with suspected mpox should be discouraged until after the risk assessment has taken place and PCR results are confirmed.

10.3 Assessment rooms

- Assessment of a pregnant woman with suspected mpox should take place in a well-ventilated side room.
- In-patients with mpox should be cared for in a well-ventilated side room, ideally with ensuite bathroom facilities and negative pressure ventilation.

10.4 Staff exposure

- If a staff member is exposed to a pregnant woman with mpox without wearing appropriate PPE, they should inform their line manager and occupational health, and follow UKHSA guidance.[20]
- Pregnant staff members should not care for women with suspected or confirmed mpox.

10.5 Infection prevention and control considerations

All laundry, equipment and rooms should be cleaned according to individual trust IPC guidelines.

Supporting text

The UKHSA has released guidance on PPE as a barrier to prevent transmission of mpox infection via infected droplets or fluid. The recommendations include use of facemasks and visors, which can lead to communication difficulties, especially for those with hearing impairment. Strategies to aid communication with hearing impaired individuals in this context are available from the Royal National Institute for Deaf People.

Individual hospital trusts have their own guidance and occupational health departments that can advise on staff exposure to mpox infection.

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RCOG Mpox Development Group:

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Appendix I: Development method of this guidance

This guidance has been developed by a multidisciplinary group listed in the Acknowledgements using the best available evidence.

Owing to the relatively recent outbreak of mpox in non-endemic countries and the evolving nature of its spread, highest level evidence is especially lacking, specifically for the pregnant population. Using a conventional grading system for guideline development, such as SIGN,[1] the studies would be classed as level 3 or 4 (non-analytical studies, e.g. case series/reports), with a grade D (good practice points based on expert opinion).

Furthermore, where case control, cohort studies, systematic reviews or randomised trials have been undertaken, trial participants were not pregnant.

For this guidance, good practice points are based on expert consensus of the multidisciplinary guidance group comprising healthcare providers across a variety of disciplines reviewing the available evidence and from their own expertise and experience within clinical practice. Appreciating the paucity of high-quality evidence in this area, and limited experience of most UK clinicians with mpox, this guidance will be reviewed regularly to ensure the advice remains up-to-date and relevant.

Healthcare providers, women and their families are advised to be aware of the low-quality evidence on which the advice is given when using this guidance to assist decision making.

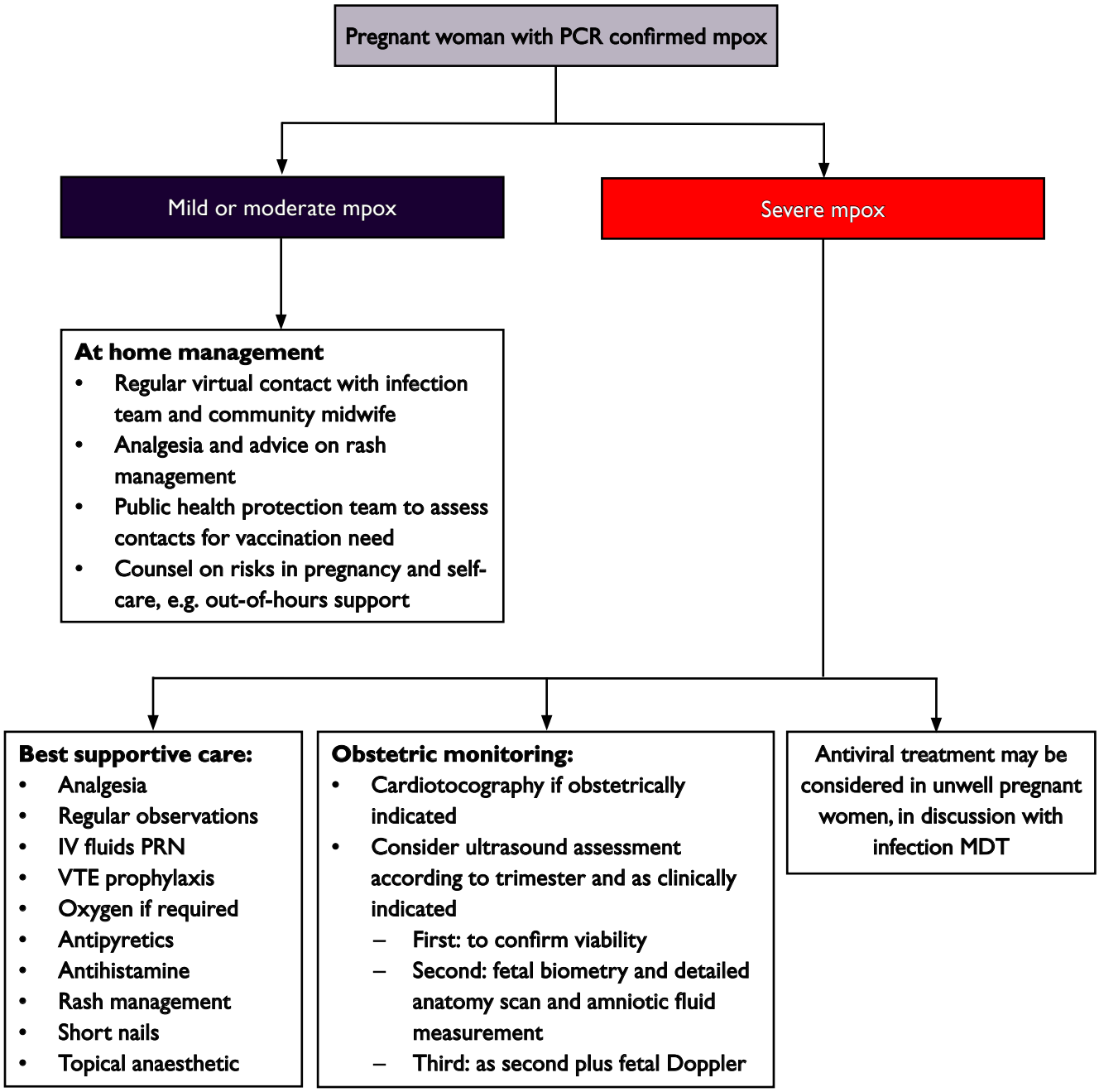
While this document has not been subject to an open peer review or formal stakeholder consultation process, specific individuals and groups were asked to review its content prior to publication. These are listed in the Acknowledgements and include a wide range of external stakeholders including lay representatives, other Royal Colleges and professional associations and representatives from the governments across England and the devolved nations.

No external funding was received in order to develop this guidance.

Appendix II: Glossary of abbreviations and acronyms

FDA	US Food and Drug Administration
GUM	Genitourinary medicine
HBV	Hepatitis B virus
HCID	High consequence infectious disease
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
HSV	Herpes simplex virus
IPC	Infection prevention and control
IV	Intravenous
LMWH	Low molecular weight heparin
MDT	Multidisciplinary team
MVA-BN	Modified Vaccinia Ankara – Bavarian Nordic
PCR	Polymerase chain reaction
PPE	Personal protective equipment
RCM	Royal College of Midwives
RCOG	Royal College of Obstetricians and Gynaecologists
RCPCH	Royal College of Paediatrics and Child Health
UKHSA	UK Health Security Agency
VZV	Varicella zoster virus
WHO	World Health Organization

Appendix III: Care for pregnant women with PCR confirmed mpox



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