Elsevier has created a Monkeypox Information Center in response to the declared public health emergency of international concern, with free information in English on the monkeypox virus. The Monkeypox Information Center is hosted on Elsevier Connect, the company's public news and information website.

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Guidelines for pregnant individuals with monkeypox virus exposure

On May 21, 2022, WHO reported an emerging global outbreak of monkeypox virus infection, with documented community transmission among people in contact with symptomatic cases in non-endemic countries.

The likelihood of infection in pregnant women is high because of post-COVID-19 border reopening and travel among countries presently experiencing an outbreak.

Human infections with monkeypox and smallpox (a closely related orthopoxvirus) can carry a high risk of severe congenital infection, pregnancy loss, and maternal morbidity and mortality.[1] Of four pregnant women from the Democratic Republic of the Congo infected with monkeypox virus (probably with the central African clade of the virus) between 2007 and 2011, two had spontaneous early miscarriages, and one had a second-trimester loss at 18 weeks' gestation.[2] The stillborn fetus had a generalised skin rash, and monkeypox virus DNA detected in fetal tissue, umbilical cord, and placenta, confirming vertical transmission of monkeypox virus. Genomic sequencing data suggest the west African clade of monkeypox virus is responsible for the current outbreak; although it is associated with milder disease and a lower case fatality rate in

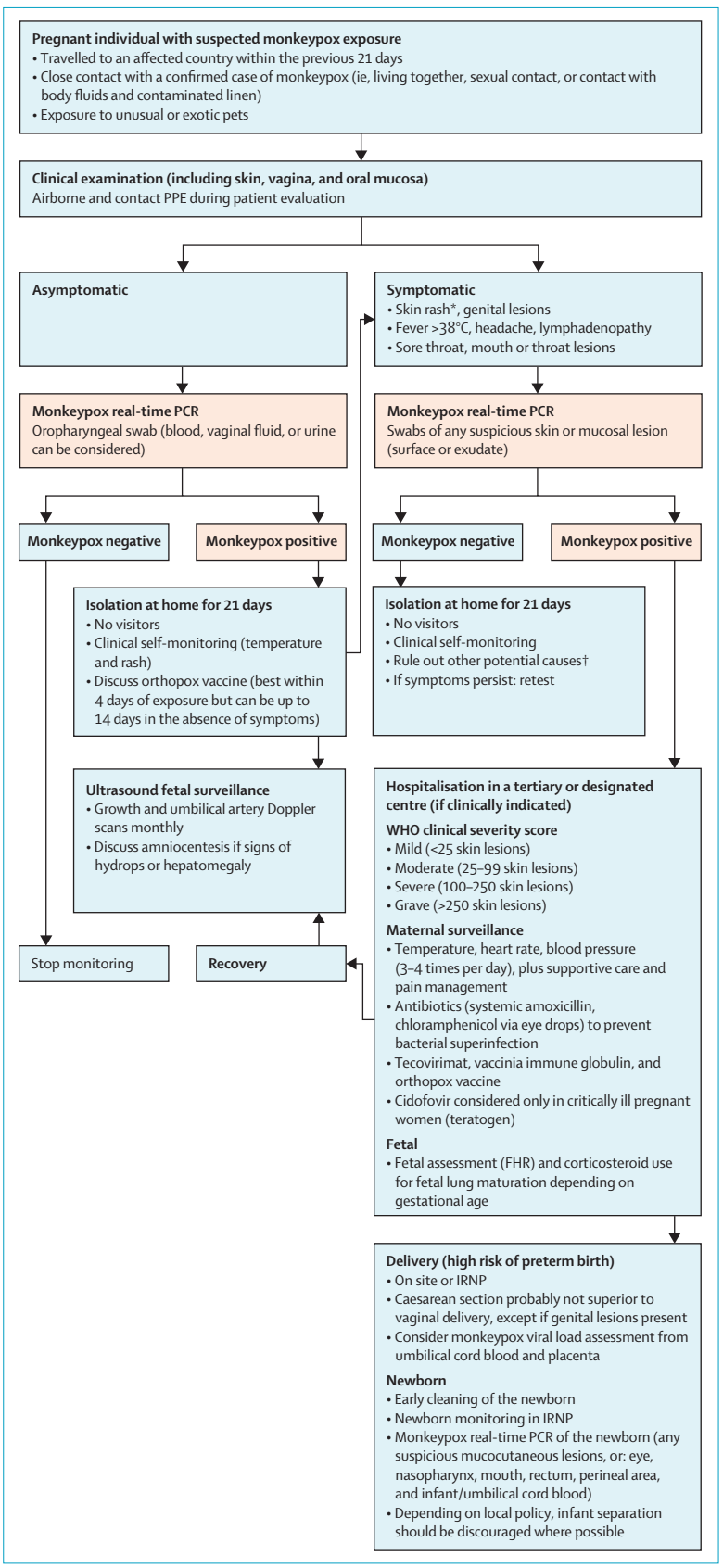

Figure: **Clinical management algorithm for suspected monkeypox virus exposure during pregnancy**
FHR=fetal heart rate. IRNP=isolation room with negative pressure. PPE=personal protective equipment. *Higher suspicion if skin rash is concentrated over the genitals, face, and extremities. †PCR should be done from a vesicle or genital lesion. We also suggest PCR for herpes simplex virus, varicella zoster virus, and syphilis to rule out other causes of vesiculopustular rash in pregnancy.

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For more on the **2022 monkeypox outbreak** see https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON385

non-pregnant people, the effects of this clade in pregnancy are unknown.

Here, we propose a clinical management algorithm for pregnant women with suspected monkeypox virus exposure (figure). Clinicians must maintain a high index of suspicion for monkeypox virus in any pregnant woman presenting with lymphadenopathy and vesiculopustular rash—including rash localised to the genital or perianal region—even if there are no apparent epidemiological links. Diagnosis is confirmed by nucleic acid amplification testing with real-time or conventional PCR for monkeypox virus from vesicles or genital lesions; additionally, we advise ruling out varicella, herpes simplex, and syphilis, as these might resemble monkeypox in pregnancy. Fetal ultrasound monitoring is required in cases of maternal monkeypox virus infection, and subsequent management should be based on the presence of ultrasound anomalies such as fetal hepatomegaly or hydrops. Monkeypox can have considerable risks to the fetus, so we also suggest testing asymptomatic pregnant women with significant monkeypox virus exposure to identify those who require fetal ultrasound follow-up. The sensitivity of molecular detection of monkeypox virus in the amniotic fluid is unknown. By analogy with cytomegalovirus, toxoplasmosis, and Zika virus infections, it is likely that monkeypox virus is shed in the amniotic fluid only once the fetal kidneys produce sufficient urine (ie, after 18–21 weeks' gestation).[3] At delivery, we recommend assessing viral load in umbilical cord blood and placenta and real-time PCR analysis of specimens obtained from the neonate.

For treatment, tecovirimat and vaccinia immune globulin can be considered for pregnant women who are severely ill. Tecovirimat is an inhibitor of the orthopoxvirus VP37 envelope wrapping protein. The European Medicines Agency has approved tecovirimat for monkeypox, and tecovirimat can be used in the USA under an expanded access Investigational New Drug protocol for the empirical treatment of non-variola orthopoxvirus infections, including monkeypox. The US Food and Drug Administration (FDA) prescribing information for tecovirimat confirms that no embryotoxic and teratogenic effects have been detected in animal studies. Furthermore, the US Centers for Disease Control and Prevention[4] permits the emergency use of the live smallpox vaccine ACAM2000, which confers 85% cross-protective immunity against monkeypox, if high-risk exposure to monkeypox virus occurs in pregnancy. Patients must, however, be counselled on the rare risk of fetal vaccinia from ACAM2000, which can result in preterm delivery, stillbirth, neonatal death, and potential adverse maternal reactions. MVA-BN, a third-generation smallpox vaccine recently approved in the USA, Canada, and the EU, is possibly safer because it contains non-replicating virus and has not demonstrated adverse pregnancy outcomes.[5] Finally, we encourage the reporting of all cases of monkeypox virus in pregnancy to WHO and an international registry for emerging pathogens.[6]

These recommendations should be adapted to local guidelines and updated as more information arises.

For **WHO's monkeypox outbreak situation update** see https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON393

We declare no competing interests.

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Monkeypox genomic surveillance will challenge lessons learned from SARS-CoV-2

The emergence of a series of epidemiologically connected monkeypox virus infections around the world, with ongoing human-to-human transmission (as of June 15, 2022, 2103 confirmed cases, one probable case, and one death have been reported to WHO from 42 countries), raises concerns of a long-apprehended comeback of a human-adapted orthopoxvirus related to variola virus, the aetiological agent of smallpox. Since variola virus had no natural reservoir other than humans, the eradication of the virus by use of highly effective vaccines against orthopoxviruses was irreversible.[1] However, other orthopoxviruses have reservoirs in wildlife, such as cowpox virus (in voles), taterapox virus (in African gerbils), and monkeypox virus (in small mammals), do have the potential to spill into the human population and facilitate a restart of the genetic adaptation of the virus to