The following information resources have been selected by the National Health Library and Knowledge Service Evidence Virtual Team in response to your question. The resources are listed in our estimated order of relevance to practicing healthcare professionals confronted with this scenario in an Irish context. In respect of the evolving global situation and rapidly changing evidence base, it is advised to use hyperlinked sources in this document to ensure that the information you are disseminating to the public or applying in clinical practice is the most current, valid and accurate.

YOUR QUESTION

In pregnant women who have tested positive for COVID-19 is there any evidence in relation to the safest mode of delivery — caesarean or vaginal — for the woman, her baby and those caring for her?

IN A NUTSHELL

The RCPI Institute of Obstetricians and Gynaecologists confirms in recent guidance[1] that there is as yet limited evidence to support changing routine care practices in labour and at delivery. There is currently no evidence from the published literature to favour one mode of birth over another: cesarean vs vaginal [1,6]. The mode of delivery is directed by obstetric factors and clinical urgency[10]. The RCPI notes however that caesarean delivery involves significantly more staff input and potential for exposure to SARS-CoV2[1]. The RCOG agrees that obstetric management of elective caesarean birth should be according to usual practice, with no obstetric contraindication to any method except water[2].

BMJ Best Practice[4] states that choice of delivery and timing should be individualised based on gestational age, as well as maternal, fetal and delivery conditions. Induction of labour and vaginal delivery is preferred in pregnant women with confirmed COVID-19 infection to avoid unnecessary surgical complications; however, an emergency caesarean delivery may be required if medically justified: eg in patients with complications such as sepsis or if there is fetal distress. UpToDate[5] reiterates that COVID-19 positive is not an indication to alter the route of delivery. Cesarean delivery is performed for standard obstetric indications.

IRISH AND INTERNATIONAL GUIDANCE

What does the RCPI say?

RCPI Institute of Obstetricians and Gynaecologists (3 April 2020). COVID-19 Infection: Guidance for Maternity Services[1]

COVID-19 infection is a new disease and the impact on pregnancy remains uncertain. The published literature thus far contains only one report from outside China and it is clear that there is also duplication in the published cases. Cases are also clustered in the third trimester and around delivery and the majority feature delivery by caesarean section. There is as yet limited evidence to support changing routine care practices in labour and at delivery. There is currently no evidence from the published literature to favour one mode of birth over another. Almost all reported cases in the literature feature pregnancies delivered by Caesarean section. At present, there are no recorded cases of vaginal secretions being tested positive for COVID-19. Given the rate of fetal compromise reported in the two original Chinese case series, the current recommendation is for continuous electronic fetal monitoring in labour. No maternal deaths from COVID-19 infection have been reported to date.

Caesarean delivery involves significantly more staff input and potential for exposure to SARS-CoV2.

What does the RCOG say?

RCOG (28 March 2020). Coronavirus (COVID-19) Infection in Pregnancy: Information for Healthcare Professionals. Version 5[2]

Where women with suspected or confirmed COVID-19 have scheduled appointments for pre-operative care and elective caesarean birth, an individual assessment should be made to determine whether it is safe to delay the appointment to minimise the risk of infectious transmission to other women, healthcare workers and, postnatally, to her infant. In cases where elective caesarean birth cannot safely be delayed, the general advice for services providing care to women admitted when affected by suspected/confirmed COVID-19 should be followed (see Section 4.1). Obstetric management of elective caesarean birth should be according to usual practice.

In addition to recommendations in Sections 4.8 and 4.9.1, for women with moderate/severe COVID-19 requiring intrapartum care it is also recommended that:

- The neonatal team should be informed of plans to deliver the baby of a woman affected by moderate to severe COVID-19 as far in advance as possible and should also be given sufficient notice at the time of birth to allow them to attend and don PPE before entering the room/theatre.
- With regard to mode of birth, an individualised decision should also be made, with no obstetric contraindication to any method except water. Cesarean section should be performed if indicated based on maternal and fetal condition as in normal practice.
- Given the association of COVID-19 with acute respiratory distress syndrome, women with moderate-severe symptoms of COVID-19 should be monitored using hourly fluid input-output charts and efforts targeted towards achieving neutral fluid balance in labour in order to avoid the risk of fluid overload.

What does the World Health Organization say?

World Health Organization. Q and A on COVID-19, pregnancy, childbirth and breastfeeding[3]

"Do pregnant women with suspected or confirmed COVID-19 need to give birth by caesarean section?"

No. WHO advice is that caesarean sections should only be performed when medically justified. The mode of birth should be individualized and based on a woman's preferences alongside obstetric indications.

POINT-OF-CARE TOOLS

What does BMJ Best Practice say?

BMJ Best Practice. COVID-19[4]

Choice of delivery and timing should be individualised based on gestational age, as well as maternal, fetal and delivery conditions. Induction of labour and vaginal delivery is preferred in pregnant women with confirmed COVID-19 infection to avoid unnecessary surgical complications; however, an emergency caesarean delivery may be required if medically justified: eg in patients with complications such as sepsis or if there is fetal distress.

What does UpToDate say?

Coronavirus Disease 2019 (COVID-19)[5]

ROUTE OF DELIVERY: COVID-19 is not an indication to alter the route of delivery. Cesarean delivery is performed for standard obstetric indications. Even if vertical transmission is confirmed as additional data are reported, this would not be an indication for cesarean delivery since it would increase maternal risk and would be unlikely to improve newborn outcome. Reports of COVID-19 infection in the neonate have generally described mild disease.
LABOUR MANAGEMENT: generally, management of labour is not altered in women giving birth during the COVID-19 pandemic or in women with confirmed or suspected COVID-19. Person-to-person contact and time in the labour unit and hospital should be limited, as safely feasible.

INTERNATIONAL LITERATURE

What does the international literature say?

Chen et al (20/03/2020). Expert Consensus for Managing Pregnant Women and Neonates Born to Mothers With Suspected or Confirmed Novel Coronavirus (COVID-19) Infection[6]

Currently, there is no clear evidence regarding optimal delivery timing, the safety of vaginal delivery or whether cesarean delivery prevents vertical transmission at the time of delivery; therefore, route of delivery and delivery timing should be individualized based on obstetrical indications and maternal-fetal status.

Mullins et al (17/03/2020). Coronavirus in Pregnancy and Delivery: Rapid Review[7]

Based on this review RCOG in consultation with RCPCH developed guidance for delivery and neonatal care in pregnancies affected by COVID-19 which recommends that delivery mode be determined primarily by obstetric indication and recommends against routine separation of affected mothers and their babies.

Qi et al (26/03/2020). Safe Delivery for COVID-19 Infected Pregnancies[8]

The determination of mode of delivery should be based on obstetric indications. However, the safety of vaginal birth, cesarean section or other methods in the context of COVID-19 infection has yet to be confirmed. Nevertheless, senior obstetricians in Wuhan suggest two recommendations:

1. During the current period of emergency, the indications for caesarean section for women with COVID-19 infection should be applied flexibly and the threshold for caesarean section lowered;
2. In particular, the threshold for caesarean section on the basis of delay in the first stage of labour should be lowered.

These suggestions are aimed at reducing maternal in-patient stays, minimizing the chance of cross-infection, reducing maternal physical exertion during delivery and ensuring the safety of other postnatal women, newborns and health care workers.

Khan et al (19/03/2020). Impact of COVID-19 infection on pregnancy outcomes and the risk of maternal-to-neonatal intrapartum transmission of COVID-19 during natural birth[9]

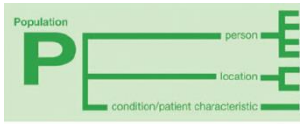
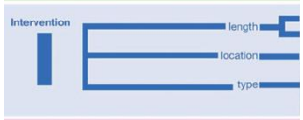
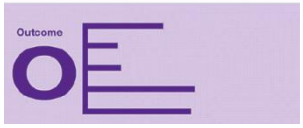
Little is known about the maternal-to-neonatal intrapartum transmission of COVID-19 via vaginal route. In this study, we report the adverse pregnancy outcomes in pregnant women infected with COVID-19 pneumonia and the risk of intrapartum transmission of COVID-19 via vaginal route. None of the three neonates were infected with COVID-19 delivered via natural birth.

Dashraath et al (23/03/2020). Coronavirus Disease 2019 (COVID-19) Pandemic and Pregnancy[10]

The mode of delivery is directed by obstetric factors and clinical urgency. As there is no convincing evidence of vertical transmission vaginal delivery is not contraindicated in patients with COVID-19. When emergent delivery is required in a critically ill parturient, a cesarean section is most appropriate – these indications include rapid maternal deterioration, difficulty with mechanical ventilation due to the gravid uterus, and fetal compromise. Delivery, including cesarean sections, should be carried out with respiratory precautions using full personal protective equipment (PPE) and in rooms with negative pressure ventilation.

Produced by the members of the National Health Library and Knowledge Service Evidence Team†. Current as at 16 April 2020.This evidence summary collates the best available evidence at the time of writing and **does not replace clinical judgement or guidance**. Emerging literature or subsequent developments in respect of COVID-19 may require amendment to the information or sources listed in the document. Although all reasonable care has been taken in the compilation of content, the National Health Library and Knowledge Service Evidence Team makes no representations or warranties expressed or implied as to the accuracy or suitability of the information or sources listed in the document. This evidence summary is the property of the National Health Library and Knowledge Service and subsequent re-use or distribution in whole or in part should include acknowledgement of the service.

The following PICO(T) was used as a basis for the evidence summary:

	PREGNANT WOMAN; COVID-19+
	CAESERIAN DELIVERY
	VAGINAL DELIVERY
	INFECTION CONTROL; OUTCOME FOR MOTHER AND NEWBORN

The following search strategy was used:

† Helen Clark, Librarian, Sligo University Hospital [Author]; Shauna Barrett, Librarian, Cork University Hospital [Author]; Gillian Corey, Clinical Research Unit, University of Limerick [Clinical Advisor]; Brendan Leen, Regional Librarian, HSE South, St. Luke's General Hospital, Kilkenny [Editor]

[1] RCPI Institute of Obstetricians and Gynaecologists (3 April 2020). COVID-19 Infection: Guidance for Maternity Services. https://rcpi-live-cdn.s3.amazonaws.com/wp-content/uploads/2020/04/COVID19-Infection-Guidance-for-Maternity-Services-03_04_2020.pdf

[2] RCOG Guidelines. Coronavirus (COVID-19) Infection in Pregnancy: Information for Healthcare Professionals https://www.rcog.org.uk/globalassets/documents/guidelines/2020-03-28-covid19-pregnancy-guidance.pdf

[3] World Health Organization. Q and A on COVID-19, pregnancy, childbirth and breastfeeding. https://www.who.int/news-room/q-a-detail/q-a-on-covid-19-pregnancy-childbirth-and-breastfeeding.

[4] BMJ Best Practice. COVID-19. https://bestpractice.bmj.com/topics/en-gb/3000168/management-approach

[5] UpToDate. Coronavirus Disease. https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19.

[6] Chen D, Yang H, Cao Y, et al. Expert consensus for managing pregnant women and neonates born to mothers with suspected or confirmed novel coronavirus (COVID-19) infection. *Int J Gynaecol Obstet*. 2020;149(2):130–136. doi:10.1002/ijgo.13146.

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[10] Dashraath P, Jing Lin Jeslyn W, Mei Xian Karen L, et al. Coronavirus Disease 2019 (COVID-19) Pandemic and Pregnancy [published online ahead of print, 2020 Mar 23]. *Am J Obstet Gynecol*. 2020;S0002-9378(20)30343-4. doi:10.1016/j.ajog.2020.03.021.