

Wales COVID-19 Evidence Centre (WCEC)

Rapid Evidence Summary

What is the evidence of direct harm from COVID-19 infection and COVID-19 vaccine in pregnant/post-partum women and the unborn child?

Report number: RES00024 (October 2021)

TOPLINE SUMMARY

What is a Rapid Evidence Summary?

An interim evidence briefing to inform further work and provide early access to key findings. The report is based on a limited search of key resources and the assessment of abstracts. Priority is given to studies representing robust evidence synthesis. No quality appraisal or evidence synthesis are conducted, and findings should be interpreted with caution.

Background / Aim of Rapid Review

In July 2021, guidance from the Royal College of Obstetricians and Gynaecologists changed to recommend that **all pregnant women are vaccinated against COVID-19**. However, there is concern in Wales that **COVID-19 vaccine uptake in pregnant women is low**, contributing to **increased hospital admissions** in this population group. The aim of this rapid evidence summary was to summarise evidence for the extent of direct harm from **COVID-19 infection** and **COVID-19 vaccination** to **pregnant women**, those that had **recently given birth** (post-partum) and the **unborn child**. This work was **conducted in seven days to inform a Welsh Government communication strategy** aimed at pregnant women and health professionals involved in their care.

Key Findings

Extent of the evidence base

Guidance from **six organisations** (from 23 resources searched) were identified as the most robust and relevant to the vaccination schedule for people living in Wales.

Best quality evidence

Guidance from the Royal College of Obstetricians and Gynaecologists [Coronavirus \(COVID-19\) Infection in Pregnancy, Version 14](#) uses weekly literature review updates and is developed by a multidisciplinary team, incorporating published [“Questions and Answers”](#) for patients.

Recency of the evidence base

- Information published since **August 2021**

Evidence of harm to pregnant/post-partum women and the unborn child from COVID-19 infection

- **Pregnant women** have same risk of getting COVID-19 as other healthy adults. If they do catch COVID-19, they are at slightly **increased risk of becoming severely unwell**, particularly in **third trimester** or if they have an **identified risk factor** and are more likely to have pregnancy complications like **preterm birth or stillbirth**.
- Risk factors for becoming severely unwell include: **ethnic minority backgrounds**, having a **BMI above 25 kg/m²**, having a **pre-pregnancy co-morbidity**, (e.g. diabetes or hypertension), a **maternal age of 35 years or older**, **living in increased socioeconomic deprivation** and **working in healthcare or other public-facing occupations**.
- Owing to the relatively recent emergence of COVID-19 and the rapidly evolving nature of the pandemic, **highest quality evidence is lacking**.

Evidence of harm to pregnant/post-partum women and the unborn child from COVID-19 vaccination

- **More than 200,000 women in the UK and USA have had a COVID-19 vaccine in pregnancy, with no concerning safety signals and excellent real-world evidence of efficacy.**
- **There has been no evidence to suggest foetal harm following vaccination against COVID-19.**
- **Vaccination against COVID-19 at any time during pregnancy and whilst breastfeeding is recommended, and preference is to offer the Pfizer-BioNTech or Moderna vaccines.**
- **There is no evidence to suggest that COVID-19 vaccines affect fertility.**
- **Women planning a pregnancy or fertility treatment can also receive a COVID-19 vaccine and do not need to delay conception.**

Policy Implications

- **Health professionals should recommend** pregnant women receive the COVID-19 vaccination
- This is particularly relevant for pregnant women in an **at risk group** for becoming severely unwell, **including women working in healthcare or other public facing occupations.**

Strength of Evidence

- There is **growing evidence** that pregnant women may be at **increased risk of severe illness from COVID-19** but high quality evidence is lacking. However, data and evidence are constantly emerging and evolving which may strengthen current understanding.
- There is **currently unclear evidence on the long-term effects** of COVID-19 in pregnancy for either women or their children.
- **Robust evidence based guidance are available that highlight excellent real-world evidence of vaccine efficacy in pregnancy**, with no concerning safety signals.

This review should be cited as:

Rapid evidence summary of **evidence of direct harm from COVID-19 infection and COVID-19 vaccine in pregnant/post-partum women and the unborn child**. Report RES00024. Wales COVID-19 Evidence Centre. October 2021. http://www.primecentre.wales/resources/RES/RES00024_Wales_COVID-19_Evidence_Centre-Pregnant%2C_Post_Partum_Women_unborn_child.pdf

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Wales COVID-19 Evidence Centre (WCEC)

Rapid Evidence Summary

Evidence of direct harm from COVID-19 infection and COVID-19 vaccine in pregnant/post-partum women and the unborn child

Report number: RES00024 (October 2021)

FULL REPORT

1. What is a Rapid Evidence Summary?

Rapid Evidence Summaries are designed to provide an interim evidence briefing to inform further work and provide early access to key findings. They are based on a limited search of key resources and the assessment of abstracts. Priority is given to studies representing robust evidence synthesis. No quality appraisal or evidence synthesis are conducted, and the summary should be interpreted with caution. This rapid evidence summary was conducted in one week.

Production of report

Specialist Unit for Review Evidence (SURE) team, Cardiff University

2. Requesting stakeholder group

Public Health and Vaccine policy leads, Welsh Government

3. Context/Background

In July 2021, guidance from the Royal College of Obstetricians and Gynaecologists changed to recommend that all pregnant women are vaccinated against COVID-19. However, there is concern in Wales that COVID-19 vaccine uptake in pregnant women is low, contributing to increased hospital admissions in this population group.¹ The aim of this rapid evidence summary was to summarise evidence for the extent of direct harm from **COVID-19 infection** and **COVID-19 vaccination** to **pregnant women**, those that had **recently given birth** and the **unborn child**. This work was conducted in **seven days to inform a Welsh Government communication strategy** aimed at pregnant women and health professionals involved in their care.

¹ [Chief Medical Officer encourages pregnant women to have COVID-19 vaccine | GOV.WALES](#)

4. Research question

Review question: What is the evidence of direct harm from COVID-19 infection and COVID-19 vaccine in pregnant/post-partum women and the unborn child?	
Participants:	Pregnant women, post-partum women, unborn child, neonate
Intervention / exposure	COVID-19 infection, COVID-19 vaccination
Comparison	No COVID-19 infection or vaccination exposure
Outcomes	Deaths, hospital admissions, pre-term delivery, miscarriage, still born, small for dates
Other study considerations	
Due to the seven-day time constraints of this report, the team focussed on evidence based guidelines from UK organisations to identify the most relevant and robust evidence sources to address the research question. An exception was made to include the World Health Organization.	

5. Summary of the evidence base

Type of evidence available

Key statements and the degree of certainty of evidence that contribute to guidance published during 2021 from six organisations are summarised in Table 1. From the 23 resources searched, these were identified as the most robust and relevant to pregnant women living in Wales. Guidance from the **Royal College of Obstetricians and Gynaecologists (RCOG)** [Coronavirus \(COVID-19\) Infection in Pregnancy, Version 14](#) was highlighted as the **best available evidence** which was developed by a multidisciplinary group and is updated by weekly literature reviews.

6. Key findings

COVID-19 Infection

- **Pregnant women** have same risk of getting COVID-19 as other healthy adults. If they do catch COVID-19, they are at slightly **increased risk of becoming severely unwell**, particularly in **third trimester** or if have an **identified risk factor**, and are more likely to have pregnancy complications like **preterm birth or stillbirth**.
- Noted by RCOG: there has been **no reported increase in the incidence of congenital anomalies following COVID-19 infection during pregnancy**. It seems likely that neonatal morbidity for babies born to mothers with COVID-19 infection is linked to **preterm birth** rather than the COVID-19 infection itself.
- The effects of COVID-19 infection on women during the **postpartum period are unclear**.
- Risk factors for becoming severely unwell include: **ethnic minority backgrounds**, having a **BMI above 25 kg/m²**, having a **pre-pregnancy co-morbidity**, (e.g. diabetes or hypertension), a **maternal age of 35 years or older**, **living in increased socioeconomic deprivation** and **working in healthcare or other public-facing occupations**.

- Noted by RCOG: owing to the relatively recent emergence of COVID-19 and the rapidly evolving nature of the pandemic, **highest quality evidence is lacking.**

COVID-19 Vaccination

- **Vaccination against COVID-19 in pregnancy and whilst breastfeeding is recommended.**
- **There has been no evidence to suggest foetal harm following vaccination against COVID-19. Foetal harm is considered to be extremely unlikely based on evidence from other non-live vaccines.** Long term risks of harm cannot be precisely estimated until large scale studies of vaccination in pregnancy have been completed.
- There is **no evidence to suggest that COVID-19 vaccines affect fertility.**
- **Women planning a pregnancy or fertility treatment can also receive a COVID-19 vaccine** and do not need to delay conception.
- COVID-19 vaccines **can be given at any time in pregnancy**, and preference is to offer the **Pfizer-BioNTech** or **Moderna** vaccines.
- Women in the immediate postpartum period should be offered vaccination in line with the general (non-pregnant) population.
- Noted by RCOG: **There is excellent real-world evidence of vaccine efficacy.** There is ongoing research on COVID-19 vaccines in pregnant women, addressing aspects of immunity, safety, different vaccines and optimal schedules for protecting women.

Areas of uncertainty

- The long-term effects of COVID-19 in pregnancy for women is unclear.

7. Options for further work

This report was developed in seven days to inform a Welsh Government media campaign to improve COVID-19 vaccination uptake in pregnant women. Robust evidence based guidelines have been identified therefore no further rapid review work was indicated.

8. Methods

A search for guidelines and recommendations made by professional and regulatory organisations was carried out between 5th October and 7th October 2021. Although, we used an extensive list, we agreed on a UK focus due to varying regulatory status of vaccines between countries. An exception was made to include World Health Organisation guidance as the only included source that was not specific to the UK. Each resource and subsequent relevant records were screened by a single reviewer. Data was extracted directly from the report to address the research question. In addition, we also searched the list of resources provided by the Stakeholders, most of the documents were identified in our search or were irrelevant publication types for the purpose of this RES. Details of the search are provided in the appendix.

Date of search: between 5th October and 7th October

Search concepts used: details in appendix

Search completed by: Specialist Unit for Review Evidence, Wales COVID-19 Evidence Centre partner

9. Summary of included evidence

Evidence type	Total
Systematic reviews (SRs)	0
Rapid reviews (RRs)	0
Evidence based Clinical Guidelines (CGs)	6
Protocols for reviews that are underway	0
Economic evaluations (EE)	0

Table 1: Summary of included evidence relating to the harms of COVID-19 in pregnancy

Citation	Scope / aims	Methods for developing guidance and recency	Key findings & certainty of evidence	Reviewer comments and reasons for selection
<p>Royal College of Obstetricians & Gynaecologists</p> <p>Coronavirus (COVID-19) Infection in Pregnancy, Version 14</p> <p>Updated 25 August 2021 (history of revisions provided)</p>	<p>Guidance for healthcare professionals who care for pregnant women during the COVID-19 pandemic, includes guidance on vaccination in pregnancy. It is not intended to replace existing clinical guidelines, but to act as a supplement with additional advice on how to implement standard practice during this time.</p>	<p>This guidance has been developed by a multidisciplinary group (comprehensive list in acknowledgements including a specific RCOG COVID-19 guidance cell) using the best available evidence retrieved by weekly literature reviews undertaken by a member of the RCOG Library team.</p> <p>Search results are published weekly on the RCOG Website.</p> <p>Retrieved evidence is reviewed by clinically trained members of the guidance team for inclusion.</p> <p>Meta-analysis of key outcomes (unpublished outside of report)</p> <p>Case series with less than 20 cases have been excluded.</p> <p>For each section of the guidance, the best available evidence is included.</p> <p>Evidence tables are included in an appendix.</p>	<p>Maternal COVID-19 infection is associated with an approximately doubled risk of stillbirth and may be associated with an increased incidence of small-for-gestational age babies. The preterm birth rate in women with symptomatic COVID-19 appears to be two to three times higher than the background rate; these are primarily iatrogenic preterm births. It seems likely that neonatal morbidity for babies born to mothers with COVID-19 infection is linked to preterm birth rather than the COVID-19 infections itself.</p> <p>There is growing evidence that pregnant women may be at increased risk of severe illness from COVID-19 compared with non-pregnant women, particularly in the third trimester. The overall risk of death remains very low.</p> <p>Risk factors associated both with being infected and hospitalised with COVID-19 include ethnic minority backgrounds, having a BMI above 25 kg/m², having a pre-pregnancy co-morbidity, (e.g. diabetes or hypertension), a maternal age of 35</p>	<p>Provided by key respected organizations and regularly reviewed.</p> <p>Published by the RCOG, Royal College of Midwives, Royal College of Paediatrics and Child Health, Public Health England and Public Health Scotland.</p> <p>Useful set of Q+As for patients developed alongside the guidance.</p>

		<p>Good practice points are based on expert consensus of the multidisciplinary guidance group.</p> <p>Has not been externally peer reviewed but specific individuals and groups were asked to review its content prior to publication.</p>	<p>years or older, living in increased socioeconomic deprivation and working in healthcare or other public-facing occupations.</p> <p>The delta variant seems to be associated with more severe disease: 1:10 symptomatic women admitted to hospital with alpha variant needed admission to intensive care whereas this is 1:7 for symptomatic women with the delta variant.</p> <p>There is no reported increase in congenital anomalies incidence because of COVID-19 infection. Vertical transmission is rare.</p> <p>Women should be informed that COVID-19 infection is not a contraindication to breastfeeding.</p> <p>Certainty of evidence Owing to the relatively recent emergence of COVID-19 and the rapidly evolving nature of the pandemic, highest quality evidence is lacking. 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</p>	
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<p>Medicines and Healthcare Products Regulatory Agency (MHRA)</p> <p>Coronavirus vaccine: weekly summary of Yellow Card reporting.</p> <p>Last updated 30 September 2021 (The report covers the period 9 December 2020 to 22 September 2021)</p>	<p>The Medicines and Healthcare products Regulatory Agency is an executive agency of the Department of Health and Social Care. MHRA regulates medicines, medical devices and blood components for transfusion in the UK.</p>	<p>MHRA operates a Yellow Card page for reporting adverse reactions to and drug, vaccine or medical device. Yellow Card has a specific page for COVID-19 at: https://coronavirus-yellowcard.mhra.gov.uk/</p>	<p>making.</p> <p>Pregnant women have the same risk of getting COVID-19 as non-pregnant women but they may be at an increased risk of becoming severely ill, particularly if they get infected in the third trimester or if they also have underlying medical problems, compared to non-pregnant women.</p>	<p>MHRA is the agency that licences COVID-19 vaccines for use in the population.</p> <p>MHRA encourages reporting of side effects via its Yellow Card scheme and reviews and reports upon the data collected.</p>
<p>UK Health Security Agency</p> <p>Guidance: COVID-19 vaccination: women of childbearing age, currently pregnant or breastfeeding</p> <p>Last updated 8 October 2021</p>	<p>Information for all women of childbearing age, those currently pregnant or breastfeeding on coronavirus (COVID-19) vaccination.</p>	<p>This guidance has been developed by PHE using the best available evidence. There are no specific methods outlined.</p>	<p>Although the overall risk from COVID-19 disease in pregnant women and their new babies is low, in later pregnancy some women may become seriously unwell and need hospital treatment.</p> <p>Hospital admission and severe illness may be more common in pregnant women than in women of the same age who are not pregnant. Women with COVID-19 disease are more likely to have their babies early than women without COVID-19. Pregnant women with underlying clinical conditions are at even higher risk of suffering serious complications from COVID-19.</p>	<p>Very succinct overview of key known facts, it references data from the RCM, RCOG, JCVI and WHO.</p> <p>Provides a list of risk factors for pregnant women that put them at higher risk.</p>

			<p>Risk factors for pregnant women: If you have underlying medical conditions such as:</p> <ul style="list-style-type: none"> • immune problems • diabetes • high blood pressure • heart disease • asthma <p>Or if you are:</p> <ul style="list-style-type: none"> • overweight • over the age 35 • in your third trimester of pregnancy (over 28 weeks) • of black and Asian minority ethnic background • You are at more risk from COVID-19 than women of the same age who are not pregnant. <p>Certainty of evidence References data from the RCM, RCOG, JCVI and WHO. Noted by RCOG that COVID-19 is a relatively new problem, therefore high quality evidence is lacking.</p>	
<p>Scientific Advisory Group for Emergencies</p> <p>Research and analysis: UKOSS/ISARIC/CO-CIN: Females in Hospital with</p>	<p>Paper prepared by the ISARIC4C Consortium, UK Obstetric Surveillance System (UKOSS)</p>	<p>Three sources of data were used for this analysis: 1. ISARIC4C / CO-CIN: The ISARIC Coronavirus Clinical Characterisation Consortium (ISARIC4C) is a UKRI and NIHR</p>	<p>Executive summary:</p> <ul style="list-style-type: none"> • The apparent excess of hospitalisations in women of reproductive age with COVID-19 compared to men is likely to be largely due to 	<p>Detailed statistical analysis of primary data. Includes data from a large number of UK based hospitals only.</p> <p>Associated journal publication:</p>

<p>SARS-CoV-2 infection, the association with pregnancy and pregnancy outcomes, 25 March 2021</p> <p>Published 9 April 2021</p>	<p>and COVID-19 Clinical Information Network (CO-CIN).</p> <p>The objectives of this study were to investigate:</p> <ol style="list-style-type: none"> 1. The contribution of pregnancy to this over-representation of women aged 20-39. 2. The characteristics and respiratory support requirements of women admitted to hospital with SARS-CoV-2 infection in pregnancy. 3. The management and outcomes of infection for pregnant women and their babies. 4. Any changes in patterns over time. 	<p>funded collaboration of named investigators from universities and public health agencies. CO-CIN includes all hospitals in England Wales and Scotland and a few in Northern Ireland. Cases are enrolled with proven SARS-CoV-2 infection or high suspicion of COVID-19. Clinical data is collated from usual health care records to a generic case report form prepared in readiness for use in outbreaks of infection of public health interest</p> <ol style="list-style-type: none"> 2. The UK Obstetric Surveillance System (UKOSS): The UK Obstetric Surveillance System (UKOSS) is a research platform in operation in all consultant-led obstetric units in the UK (n=194) to enable national observational studies of pregnancy complications. Cases were defined as any pregnant woman admitted with confirmed maternal SARS-CoV-2 infection defined as detection of viral RNA on polymerase chain reaction (PCR) testing of blood or a nasopharyngeal swab, respiratory compromise in the presence of characteristic radiographic changes of COVID-19, or both. 	<p>admission screening of women admitted for labour and birth and other pregnancy-related complications.</p> <ul style="list-style-type: none"> • Of symptomatic pregnant women hospitalised with COVID-19, 10% received critical care and 1% died. 18% had a preterm birth, about 2.5 times the background rate. • Symptomatic pregnant women received treatments for COVID-19 late or not at all. Recruitment to therapeutic clinical trials remains low. • Pregnant women hospitalised in areas/periods since the B117 variant became predominant were more likely to require respiratory support. • Indirect effects are also evident, with maternal deaths due to women delaying attendance at hospital or concealing pregnancy. • We have no evidence on the long-term effects of COVID-19 in pregnancy for either women or their children. • It would be useful to have systematic evidence on 	<p>Knight et al. (2020)</p>
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		<p>3. The MBRRACE-UK Confidential Enquiry into Maternal Death: conducts surveillance of all deaths of women during pregnancy and up to a year after the end of pregnancy, regardless of how the pregnancy ends. For the purposes of this analysis, deaths occurring between 01/03/2020 and 28/02/2021 were examined.</p>	<p>vaccination and pregnancy collected and analysed and when it exists from clinical trials for this to be presented at the earliest opportunity.</p> <p>Policy points:</p> <ul style="list-style-type: none"> • Any assessment of priority groups for vaccination/vaccine research needs to take into account the lifelong developmental, educational, economic and societal impact of pre-term births to pregnant women with COVID and not just solely women's mortality. • Future pandemic planning must include mechanisms for early inclusion of pregnant women in both treatment and vaccine trials, ideally through regulatory requirements. • Further study of long-term outcomes of hospitalisation with COVID-19 in pregnancy for both women and offspring would be facilitated by support and resources for collection of NHS numbers of included women and their infants to allow linkage to health and educational datasets. 	
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			<ul style="list-style-type: none"> This paper may be shared with JCVI to inform their decision-making and future priorities. <p>Certainty of evidence COVID 19 is a relatively new problem, therefore high-quality evidence is lacking. However, detailed analysis has been conducted on primary data collected.</p>	
World Health Organization Increasing understanding of the impact of COVID-19 for pregnant women and their babies Last updated 12 March 2021	Highlight new research findings that help to shed light on the risks of COVID-19 for pregnant women and their babies.	Departmental news item that highlights guidance summarized from data produced via a living systematic review and meta-analysis on risk factors and clinical outcomes of COVID-19 on maternal and perinatal women. Journal published in September 2020. Guidance compiled March 2021.	<p>Pregnant women:</p> <ul style="list-style-type: none"> Pregnant women seen at the hospital with suspected or confirmed COVID-19 are less likely to experience a fever or muscle pain, but if they develop severe disease they are more likely to need intensive care than non-pregnant women with COVID-19. Pregnant women with COVID-19, who have pre-existing medical conditions, such as diabetes or chronic high blood pressure, or those who are non-white, older or overweight, are also more likely to suffer severe health complications due to COVID-19. These findings underline the need for pregnant 	Data for recommendations extracted from Knight et al. (2020) Ongoing, global, research which is collecting and synthesising data on the situation for pregnant women with COVID-19 in countries worldwide.

			<p>women and recently pregnant women to take all precautions to avoid COVID-19 disease, in particular if they have underlying conditions.</p> <p>Newborn and postnatal women</p> <ul style="list-style-type: none"> • Recently pregnant women with COVID-19 are more likely to be admitted to the intensive care unit or need respiratory support when compared with non-pregnant women of reproductive age. • Pregnant women with COVID-19 were also more likely to give birth prematurely. • 1 in 4 of all babies born to women with COVID-19, were admitted to a neonatal unit but data on causes of preterm births or indications for admission to neonatal units among these babies is lacking. • The extent to which mother-to-child transmission of SARS-CoV-2 occurs, either in utero, intrapartum or in the early postnatal period, is unclear. • Stillbirth and newborn death rates however were low. 	
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			<p>Certainty of evidence: Guidance was developed using data from a living systematic review and meta-analysis on risk factors and clinical outcomes of COVID-19 on maternal and perinatal women.</p>	
<p>Public Health England</p> <p>The Green Book: Immunisation against infectious disease, 2017 chapter 14a, COVID-19</p> <p>Last updated 16 September 2021</p>	<p>The Green Book has the latest information on vaccines and vaccination procedures, for vaccine preventable infectious diseases in the UK.</p> <p>Information for public health professionals on immunisation</p>	<p>Edited by Dr Mary Ramsay BSc MB BS MRCP MSc MFPHM FFPHM Consultant Epidemiologist Public Health England.</p> <p>First published in 2006 as Immunisation against infectious disease by The Stationery Office, and popularly known as the 'Green Book', this publication is now available as individual chapters via the Immunisation section of the GOV. UK website and not in printed form. These chapters are updated as necessary to reflect the current policies and procedures as advised by the Joint Committee on Vaccination and Immunisation.</p>	<p>Pregnant women and neonates The risk to pregnant women and neonates following COVID-19 infection is generally low: more than half of pregnant women who test positive for SARS-CoV-2 are asymptomatic, and although stillbirth and neonatal death remain very rare, some UK studies have suggested a high rate of stillbirth in infected women (Allotey et al. 2020, Gurol-Urganci et al. 2021).</p> <p>It is still unclear whether SARS-CoV-2 can be transmitted vertically, and only about 2% of neonates born to COVID-positive mothers in the UK test positive for SARS-CoV-2 in the first 12 hours of life (Vousden et al. 2021). However, the risk of preterm birth is increased two to threefold for women with symptomatic COVID-19 (Vousden et al. 2021), usually as a result of a medical recommendation to deliver early to improve maternal oxygenation (NICE Guideline 2019). Furthermore, a small proportion of pregnant women can have severe or</p>	<p>Selected because referred to in the press release JCVI issues new advice on COVID-19 vaccination for pregnant women. Green book referred to as a clinical professional guide for vaccinators in the UK.</p> <p>Specific section on COVID-19 in pregnant women and neonates.</p> <p>Refers to cohort studies (Gurol-Urganci et al. 2021 and Vousden et al. 2021), registry data (Mullins et al. 2021 pre-print) and a living systematic review and meta-analysis (Allotey et al. 2020).</p> <p>No detail on methods for developing guidance other than that the chapters are updated as advised by the JCVI.</p>

			<p>fatal COVID-19. The study by Mullins et al. (2021), an international registry, indicates that pregnant women are more likely to be admitted to the intensive care unit (ICU) with COVID-19 than age-matched non-pregnant women, and there is a signal that this is true in the UK as well (ICNARC 2021).</p> <p>Pregnant women are more likely to have severe COVID-19 infection if they are overweight or obese, are of black and asian minority ethnic background, have co-morbidities such as diabetes, hypertension and asthma, or are 35 years old or older (Vousden et al. 2021, Allotey et al. 2020).</p>	
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Table 2: Summary of included evidence related to vaccination against COVID-19 in pregnancy

Citation	Scope / aims	Methods for developing guidance and recency	Key recommendations & certainty of evidence	Reviewer comments and reasons for selection
Royal College of Obstetricians & Gynaecologists. Coronavirus (COVID-19) Infection in Pregnancy. Version 14: updated 25 August 2021.	Guidance for healthcare professionals who care for pregnant women during the COVID-19 pandemic, includes guidance	This guidance has been developed by a multidisciplinary group (comprehensive list in acknowledgements including a specific RCOG COVID-19 guidance cell) using the best available evidence retrieved by weekly literature reviews	<p>Vaccination in pregnancy against COVID-19 is strongly recommended</p> <p>More than 200 000 women in the UK and USA have had a COVID-19 vaccine in pregnancy with no concerning safety signals. There is excellent real-world evidence of vaccine efficacy with 98% of women</p>	<p>Provided by key respected organizations and regularly reviewed.</p> <p>Published by the RCOG, Royal College of Midwives, Royal College of Paediatrics and Child Health, Public Health England and Public Health Scotland.</p>

<p>Updated 25 August 2021 (history of revisions provided)</p>	<p>on vaccination in pregnancy. It is not intended to replace existing clinical guidelines, but to act as a supplement with additional advice on how to implement standard practice during this time.</p>	<p>undertaken by a member of the RCOG Library team.</p> <p>Search results are published weekly on the RCOG Website.</p> <p>Retrieved evidence is reviewed by clinically trained members of the guidance team for inclusion.</p> <p>Meta-analysis of key outcomes</p> <p>Case series with less than 20 cases have been excluded.</p> <p>For each section of the guidance, the best available evidence is included.</p> <p>Evidence tables are included in an appendix.</p> <p>Good practice points are based on expert consensus of the multidisciplinary guidance group.</p> <p>Has not been externally peer reviewed but specific individuals and groups were asked to review its content prior to publication.</p>	<p>admitted to hospital and getting severe infection having not had the vaccine.</p> <p>COVID-19 vaccines can be given at any time in pregnancy, and preference is to offer the Pfizer-BioNTech or Moderna vaccines.</p> <p>Pregnant women receiving a COVID-19 vaccine show similar patterns of reporting for common minor adverse effects to non-pregnant people.</p> <p>Breastfeeding women can receive a COVID-19 vaccine without having to stop breastfeeding.</p> <p>Women in the immediate postpartum period should be offered vaccination in line with the general (non-pregnant) population.</p> <p>There has been no evidence to suggest fetal harm following vaccination against COVID-19, and fetal harm is considered to be extremely unlikely based on evidence from other non-live vaccines. Risk of fetal harm cannot be precisely estimated until large scale studies of vaccination in pregnancy have been completed.</p>	<p>Provides section: 'How should women be counselled' (2.5)</p> <p>Useful set of Q+As for patients developed alongside the guidance.</p> <p>And a range of information for healthcare professionals and pregnant women about COVID-19 vaccination.</p>
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			<p>Certainty of evidence There is excellent real-world evidence of vaccine efficacy.</p> <p>There is ongoing research on COVID-19 vaccines in pregnant women, addressing aspects of immunity, safety, different vaccines and optimal schedules for protecting women.</p>	
<p>Medicines and Healthcare Products Regulatory Agency (MHRA). Coronavirus vaccine: weekly summary of Yellow Card reporting. The report covers the period 9 December 2020 to 22 September 2021. Last accessed 06/10/2021 at: https://www.gov.uk/government/publications/coronavirus-COVID-19-vaccine-adverse-reactions/coronavirus-vaccine-summary-of-yellow-card-reporting</p> <p>Last updated 30 September 2021</p>	<p>The MHRA closely monitors the safety of COVID-19 vaccine exposures in pregnancy, including Yellow Card reports for COVID-19 vaccines used in pregnancy. These reports have been reviewed by the independent experts of the Commission on Human Medicines' COVID-19 Vaccines Benefit Risk Expert Working Group and by the Medicines for</p>	<p>MHRA operates a Yellow Card page for reporting adverse reactions to a drug, vaccine or medical device. Yellow Card has a specific page for COVID-19 at: https://coronavirus-yellowcard.mhra.gov.uk/</p> <p>Administration of COVID-19 vaccines (not restricted to pregnant, post-partum or breastfeeding women)</p> <p>Up to 22 September 2021, an estimated 22.4 million first doses of the Pfizer/BioNTech vaccine and 24.8 million first doses of the COVID-19 Vaccine AstraZeneca had been administered, and around 19.4 million and 24.0 million second doses of the Pfizer/BioNTech vaccine and COVID-19 Vaccine AstraZeneca respectively. An approximate 1.4 million first doses and</p>	<p>Safety of COVID-19 vaccines in pregnancy</p> <p>The current advice of the Joint Committee on Vaccination and Immunisation (JCVI) is that the COVID-19 vaccines should be offered to those who are pregnant at the same time as non-pregnant individuals based on their age and clinical risk group. The Pfizer/BioNTech and Moderna vaccines are currently the preferred vaccines for use during pregnancy.</p> <p>The numbers of reports of miscarriage and stillbirth are low in relation to the number of pregnant women who have received COVID-19 vaccines to date (more than 72,000) and how commonly these events occur in the UK outside of the pandemic. There is no pattern from the reports to suggest that any of the COVID-19 vaccines used in</p>	<p>MHRA is the agency that licences COVID-19 vaccines for use in the population.</p> <p>MHRA encourages reporting of side effects via its Yellow Card scheme and reviews and reports upon the data collected.</p>

	<p>Women's Health Expert Advisory Group (MWHEAG).</p> <p>The MHRA closely monitors the safety of COVID-19 vaccines during breastfeeding, including evaluation of Yellow Card reports for COVID-19 vaccines from breastfeeding women. These reports have been reviewed by the independent experts of the Commission on Human Medicines' COVID-19 Vaccines Benefit Risk Expert Working Group, by paediatric and breastfeeding experts.</p>	<p>approximately 1.2 million second doses of the COVID-19 Vaccine Moderna have also now been administered.</p> <p>Receipt of Yellow Card reports (not restricted to pregnant, post-partem or breastfeeding women)</p> <p>As of 22 September 2021, for the UK, 117,297 Yellow Cards have been reported for the Pfizer/BioNTech vaccine, 233,242 have been reported for the COVID-19 Vaccine AstraZeneca, 16,361 for the COVID-19 Vaccine Moderna and 1,101 have been reported where the brand of the vaccine was not specified.</p>	<p>the UK, or any reactions to these vaccines, increase the risk of miscarriage or stillbirth. Sadly, miscarriage is estimated to occur in about 20 to 25 in 100 pregnancies in the UK and most occur in the first 12 to 13 weeks of pregnancy (the first trimester). Stillbirths are sadly estimated to occur in about 1 in 200 pregnancies in the UK. A few reports of commonly occurring congenital anomalies and preterm births have also been received. There is no pattern from the reports to suggest that any of the COVID-19 vaccines used in the UK increase the risk of congenital anomalies or birth complications.</p> <p>Pregnant women have reported similar suspected reactions to the vaccines as people who are not pregnant.</p> <p>Like most vaccines and medicines, clinical trials of COVID-19 vaccine in pregnant women were not carried out prior to use of the vaccines in the general population. However, evidence from non-clinical studies of the COVID-19 vaccines available in the UK have not raised any concerns about safety in pregnancy. The COVID-19 vaccines do not contain organisms that can multiply</p>	
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			<p>in the body, so they cannot infect an unborn baby in the womb. Extensive international experience for the Pfizer/BioNTech Vaccine and COVID-19 Vaccine Moderna used in pregnancy have also not raised any safety concerns.</p> <p>The MHRA will continue to closely monitor safety data for use of the COVID-19 vaccines in pregnancy, including through evaluation of electronic healthcare record data.</p> <p>Safety of COVID-19 vaccines in breastfeeding</p> <p>There is no current evidence that COVID-19 vaccination while breastfeeding causes any harm to breastfed children or affects the ability to breastfeed.</p> <p>COVID-19 vaccines do not contain live components and there is no known risk associated with being given a non-live vaccine whilst breastfeeding. The current advice of the Joint Committee on Vaccination and Immunisation (JCVI) is that breastfeeding parents may be offered any suitable COVID-19 vaccine depending on their age.</p>	
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			<p>We have received about 3,000 Yellow card reports from women breastfeeding at the time of vaccination. Most of these women reported only suspected reactions in themselves which were similar to reports for the general population, with no effects reported on their milk supply or in their breastfed children.</p> <p>A small number of women have reported decreases in their milk supply, most of which were transient, or possible reactions in their breastfed child. A number of factors can affect milk supply and infant behaviour, including general maternal health, amount of sleep, and anxiety. The symptoms reported for the children (high temperature, rash, diarrhoea, vomiting and general irritability) are common conditions in children of this age, so some of the effects reported may have occurred by coincidence.</p> <p>A small number of women may experience a reduction in their breast milk production and it may be helpful for breastfeeding women to know how to maintain their breast milk supply, particularly if they are feeling unwell. The NHS website has a good resource for this.</p>	
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			It is important to note that Yellow Card data cannot be used to derive side effect rates or compare the safety profile of COVID-19 vaccinations as many factors can influence ADR reporting.	
Public Health England Guidance: Safety of COVID-19 vaccines when given in pregnancy Last updated 30 April 2021	Guidance on vaccination in pregnancy, the effect of COVID-19 in pregnancy, getting pregnant and the effect of the second dose of the vaccine in pregnancy.	This guidance has been developed by PHE using the best available evidence. There are no specific methods outlined and it was last updated 30 April 2021.	The COVID-19 vaccines available in the UK have been shown to be effective and to have a good safety profile. The Joint Committee on Vaccination and Immunisation (JCVI) has advised that pregnant women should be offered COVID-19 vaccines at the same time as people of the same age or risk group. Evidence so far reviewed by the Medicines and Healthcare products Regulatory Agency (MHRA), the UK regulatory agency responsible for licencing medicines including vaccines, has raised no specific concerns for safety in pregnancy. Evidence on COVID-19 vaccines is being continuously reviewed by the World Health Organization and the regulatory bodies in the UK, USA, Canada and Europe.	Reference to MHRA and JCVI published guidance on vaccination safety and regulation.
UK Health Security Agency	Information for all women of childbearing age, those currently	This guidance has been developed by PHE using the best available evidence. There are no	The coronavirus (COVID-19) vaccines available in the UK have been shown to be effective and to have a good safety profile. These	Very succinct overview of key known facts, it references data from the RCM, RCOG, JCVI and WHO.

<p>Guidance: COVID-19 vaccination: women of childbearing age, currently pregnant or breastfeeding</p> <p>Last updated 8 October 2021</p>	<p>pregnant or breastfeeding on coronavirus (COVID-19) vaccination.</p>	<p>specific methods outlined and it was last updated 29 July 2021.</p>	<p>vaccines do not contain live coronavirus and cannot infect a pregnant woman or her unborn baby in the womb.</p> <p>In the USA, around 90,000 pregnant women have been vaccinated mainly with Pfizer and Moderna vaccines and no safety concerns have been identified.</p> <p>Pfizer and Moderna vaccines are the preferred vaccines for pregnant women of any age who are coming for their first dose.</p> <p>The first dose of COVID-19 vaccine will give you good protection. You need the second dose to get longer lasting protection. You do not need to delay this second dose.</p> <p>Breastfeeding: The JCVI has recommended that the vaccines can be received whilst breastfeeding. This is in line with recommendations from the USA and the World Health Organization.</p>	<p>Includes information pertaining to safety in breastfeeding.</p>
<p>Public Health England</p> <p>Guidance Inadvertent vaccination in pregnancy (VIP)</p>	<p>Advice for health professionals on pregnant women who are inadvertently vaccinated</p>	<p>The Immunisation department at Public Health England (PHE) follows up women who have inadvertently been given certain vaccines in pregnancy (VIP) across the UK. These women</p>	<p>There are no known risks for women who are vaccinated against COVID-19 during any stage of pregnancy or shortly before conception.</p>	<p>Guidance refers reader to Guidance: Safety of COVID-19 vaccines when given in pregnancy for further details.</p>

<p>Last updated 18 June 2021</p>	<p>against coronavirus (COVID-19), chicken pox (varicella), shingles or measles, mumps, rubella.</p>	<p>would therefore not have been aware they were pregnant at the time of vaccination.</p>		
<p>Public Health England COVID-19: the green book, chapter 14a Last updated 16 September 2021</p>	<p>The Green Book has the latest information on vaccines and vaccination procedures, for vaccine preventable infectious diseases in the UK.</p> <p>Information for public health professionals on immunisation</p>	<p>Edited by Dr Mary Ramsay BSc MB BS MRCP MSc MFPHM FFPHM Consultant Epidemiologist Public Health England.</p> <p>First published in 2006 as Immunisation against infectious disease by The Stationery Office, and popularly known as the 'Green Book', this publication is now available as individual chapters via the Immunisation section of the GOV. UK website and not in printed form. These chapters are updated as necessary to reflect the current policies and procedures as advised by the Joint Committee on Vaccination and Immunisation.</p>	<p>Reinforcing immunisation JCVI have advised that adults who received a primary course in Phase 1 of the COVID-19 vaccination programme (priority groups 1-9) should be offered a COVID-19 booster vaccine. The JCVI recommend that the reinforcing dose should be offered no earlier than six months after completion of the primary vaccine course. Advice on reinforcing doses for younger people, including children under 16 years and healthy pregnant women are therefore under further consideration.</p> <p>Pregnant women in eligible groups Pfizer and Moderna vaccines are the preferred vaccines for eligible pregnant women (for those under 18, Pfizer BioNTech vaccine (Comirnaty®) is preferred), because of more extensive experience of their use in pregnancy. Pregnant women who commenced</p>	<p>Methods for developing guidance not detailed.</p> <p>Selected because referred to in the press release JCVI issues new advice on COVID-19 vaccination for pregnant women. Green book referred to as a clinical professional guide for vaccinators in the UK.</p> <p>Sections specifically about both pregnancy and breastfeeding and COVID-19 vaccination. Pregnancy also mentioned within other sections.</p> <p>No detail on methods for developing guidance other than that the chapters are updated as advised by the JCVI</p>

			<p>vaccination with AstraZeneca, however, are advised to complete with the same vaccine (see section on pregnancy).</p> <p>Pregnancy There is no known risk associated with giving inactivated, recombinant viral or bacterial vaccines or toxoids during pregnancy or whilst breast-feeding (Kroger et al. 2013). Since inactivated vaccines cannot replicate, they cannot cause infection in either the mother or the fetus. Although AstraZeneca COVID-19 vaccine contains a live adenovirus vector, this virus is not replicating so will not cause infection in the mother or the fetus. As with most pharmaceutical products, large clinical trials of COVID-19 vaccine in pregnancy have not been carried out.</p> <p>Developmental and reproductivity testing of the Pfizer BioNTech, Moderna and AstraZeneca vaccines in animals have not raised any concerns. Adenovirus vectors, similar to those used in the AstraZeneca COVID-19 vaccine, have been widely used to vaccinate women against Ebola without raising any concern; formal trials of these</p>	
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			<p>vaccines in pregnancy are due to proceed.</p> <p>Although clinical trials on the use of COVID-19 vaccines during pregnancy are not advanced, the available data do not indicate any harm to pregnancy. JCVI has therefore advised that women who are pregnant should be offered primary and reinforcing immunisation at the same time as non-pregnant women, based on their age and clinical risk group. There is extensive post-marketing experience of the use of the Pfizer BioNTech and Moderna vaccines in the USA with no safety signals so far (CDC 2021). Over 60,000 women now report having been vaccinated whilst pregnant or when they might be pregnant in England. Because of wider experience with mRNA vaccines, these are currently the preferred vaccines to offer to pregnant women. Clinicians should discuss the risks and benefits of vaccination with the woman, who should be told about the limited evidence of safety for the vaccine in pregnancy.</p> <p>Routine questioning about last menstrual period and/or pregnancy testing is not required before offering the vaccine. Women who are</p>	
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			<p>planning pregnancy or in the immediate postpartum should be vaccinated with a suitable product for their age and clinical risk group.</p> <p>If a woman finds out she is pregnant after she has started a course of vaccine, she should complete vaccination during pregnancy using the same vaccine product (unless contra-indicated).</p> <p>Termination of pregnancy following inadvertent immunisation should not be recommended. Surveillance of the inadvertent administration of COVID-19 vaccines in early pregnancy is being conducted for the UK by the PHE Immunisation Department, to whom such cases should be reported (PHE 2021). As above, women who are inadvertently vaccinated in early pregnancy should be offered the second dose of the same product.</p> <p>Breastfeeding</p> <p>There is no known risk associated with being given a non-live vaccine whilst breastfeeding. JCVI advises that breastfeeding women may be offered any suitable COVID-19 vaccine.</p> <p>The developmental and health benefits of breastfeeding should be considered along with the mother's</p>	
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			<p>clinical need for immunisation against COVID-19; at the same time, women should be informed about the emerging safety data for the vaccine in breastfeeding.</p> <p>Thrombosis and thrombocytopenia syndrome (TTS) occurring after COVID-19 vaccination</p> <p>A recently recognised condition involving serious thromboembolic events accompanied by thrombocytopaenia, has been reported after AstraZeneca vaccination.</p> <p>There is no evidence of any underlying risk factors in the individuals affected by this condition who have mainly been previously healthy. The condition is rare, tends to present with unusual forms of clotting and the mechanism is believed to be an idiosyncratic reaction related to an immune response to the AstraZeneca vaccine. This may be related to the recipient's polymorphisms in genes encoding Fc receptors in the immune system and is an area of active research. Because of this likely immune mechanism, there is no reason to believe that individuals with a past history of clots or of certain thrombophilic conditions</p>	
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			would be at increased risk of this very rare condition. Similarly, although pregnancy increases the risk of clotting conditions, there is no evidence that pregnant women, those in the post-partum or women on the contraceptive pill are at higher risk of the specific condition of thrombosis in combination with thrombocytopaenia after the AstraZeneca vaccine. There have been no confirmed cases reported in pregnant women to date. Caution should be used, however, when vaccinating individuals who have a history of a previous episode of heparin induced thrombocytopenia and thrombosis (HITT or HIT type 2).	
<p>World Health Organization</p> <p>Frequently asked questions: COVID-19 vaccines and breastfeeding based on WHO interim recommendations,</p> <p>Last updated 12 August 2021</p>	<p>The FAQs are intended to provide answers to health care providers and the public, including mothers who are breastfeeding or expressing milk, on breastfeeding and the following COVID-19 vaccines:</p> <p>Pfizer-BioNTech BNT162b2</p>	<p>Guidance drawn from most recent recommendations (15 Sept 2021) from the WHO SAGE for immunization of 6 vaccines: Pfizer-BioNTech BNT162b2 Moderna mRNA-1273 Oxford University - AstraZeneca AZD1222 Janssen Ad26.COV2.S Sinopharm - BIBP vaccine Sinovac – CoronaVac Only the first 4 are approved for UK use.</p>	<p>General Vaccine guidance: Healthy individuals currently breastfeeding or expressing milk can receive the vaccines. Taking the vaccine should not be an impediment to begin breastfeeding or a cause for its interruption. Mothers who are vaccinated continue breastfeeding after vaccination. Vaccine efficacy in lactating women is expected to be similar to efficacy in non-lactating women.</p> <p>Pfizer-BioNTech BNT162b2</p>	<p>Guidance developed jointly between: IFE core group, UNICEF, WHO, COVID-19 infant feeding working group, and is based on recommendations from WHO strategic advisory group of experts (SAGE).</p> <p>Highlights the lack of specific research on the effect of vaccines in pregnant and breastfeeding women, however makes the statement that the absence of data does not mean the vaccine is not safe.</p>

	<p>Moderna mRNA-1273 Oxford University - AstraZeneca AZD1222 Janssen Ad26.COVS.S Sinopharm - BIBP vaccine Sinovac - CoronaVac</p>		<p>Approved for use in lactating women as in other adults.</p> <ul style="list-style-type: none"> - Pfizer–BioNTech BNT162b2 is not live virus vaccines and the mRNA does not enter the nucleus of the cell and is degraded quickly. - It is biologically and clinically unlikely there is a risk to the breastfeeding child. - It is highly unlikely that vaccination will have any impact on women’s ability to make milk. <p>Moderna mRNA-1273 Approved for use in lactating women as in other adults.</p> <ul style="list-style-type: none"> - Moderna mRNA-1273 is not live virus vaccine and the mRNA does not enter the nucleus of the cell and is degraded quickly. - It is biologically and clinically unlikely there is a risk to the breastfeeding child. - It is highly unlikely that vaccination will have any impact on women’s ability to make milk. <p>Oxford University - AstraZeneca AZD1222</p>	<p>Note that the UK Green Book states ‘Pfizer and Moderna vaccines are the preferred vaccines for eligible pregnant women (for those under 18, Pfizer BioNTech vaccine (Comirnaty®) is preferred), because of more extensive experience of their use in pregnancy. Pregnant women who commenced vaccination with AstraZeneca, however, are advised to complete with the same vaccine (see section on pregnancy within Chapter 14a of Green Book)’.</p>
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			<p>Approved for use in lactating women as in other adults.</p> <ul style="list-style-type: none"> - AZD1222 vaccine is not live virus vaccine. The vaccine is a non-replicating vaccine, it is unlikely to pose a risk to the breastfeeding child. - It is highly unlikely that vaccination will have any impact on women's ability to make milk. <p>Janssen Ad26.COV2.S Approved for use in lactating women as in other adults.</p> <ul style="list-style-type: none"> - Janssen Ad26.COV2.S is not live virus vaccine. The vaccine is a non-replicating vaccine, it is unlikely to pose a risk to the breastfeeding child. - It is highly unlikely that vaccination will have any impact on women's ability to make milk. 	
<p>World Health Organization</p> <p>Update 65 – Breastfeeding and newborn care in the context of COVID-19</p>	<p>Technical presentation update from EPI-WIN updates put together by Global Infectious Hazard Preparedness WHO team to</p>	<p>Data extracted for the presentation from most recent SAGE reports available.</p>	<p>Key statement: From the available evidence, mothers should be counselled that the benefits of breastfeeding substantially outweigh any possible risks of transmission.</p> <p>Guidance:</p>	<p>Data compiled from SAGE reports and compiled by the WHO Global Infectious Hazard Preparedness team. No information provided on methods however links to supporting evidence provided.</p>

<p>Last updated 05 August 2021</p>	<p>confirm current breastfeeding and infant care during the COVID 19 pandemic.</p>		<ul style="list-style-type: none"> • Breastfeeding offers substantial health benefits to lactating women and their breastfed children • Vaccine efficacy is expected to be similar in lactating women as in other adults • Currently there is little data on the safety of COVID-19 in lactating women or their breastfed infants • However, current WHO Emergency Use Listed COVID 19 vaccines are unlikely to pose a risk to the breastfeeding child. • On the basis of these considerations, WHO recommends vaccination in lactating women as in other adults. • WHO recommends continuing breastfeeding after vaccination. <p>Certainty of evidence: Data extracted from the Strategic Advisory Group of Experts on Immunization</p>	
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11. Acknowledgements

The team would like to thank Marion Lyons and Heather Payne for their contributions towards this work.

12. About the Wales COVID-19 Evidence Centre

The Centre integrates with worldwide efforts to synthesise and mobilise knowledge from research. We operate as part of [Health and Care Research Wales](#) with a core team, hosted in the Wales Centre for Primary and Emergency (including Unscheduled) Care Research (PRIME).

The centre core team of the centre works closely with collaborating partners in [Health Technology Wales](#), [Wales Centre for Evidence-Based Care](#), [Specialist Unit for Review Evidence centre](#), [SAIL Databank](#), [Bangor Institute for Medical & Health Research/Health and Care Economics Cymru](#), and the [Public Health Wales Observatory](#).

Together we aim to provide around 50 reviews per year, answering the priority questions for policy and practice in Wales as we meet the demands of the pandemic and its impacts.

Director: Professor Adrian Edwards

Contact Email: info@primecentre.wales

Website: <https://healthandcareresearchwales.org/about-research-community/wales-COVID-19-evidence-centre>

13. Appendix: List of resources searched

Resource	Key words used	Date searched	Success or relevancy of the retrieval.
UK focussed resources			
The Joint Committee on Vaccination and Immunisation (JCVI)	“JCVI” with filters “Coronavirus (COVID-19)” and “guidance and regulation” Or “research and statistics” or “policy papers and consultations” or “news and communications”	06/10/2021	Searched, results found
Medicines and Healthcare products Regulatory Agency	Publications site	06/10/2021	Searched, results found
The National Institute for Health and Care	pregnan* OR post-partum and Covid or coronavirus	07/10/2021	Searched, nothing found

Excellence (NICE)			
Public Health England	Pregnant, pregnancy, post-partum, unborn child Narrowed the search using the topic filter 'Coronavirus (COVID-19)'. Then repeated the above with the additional Sub-topic 'vaccinations for coronavirus'	05/10/2021	Searched, results found
Public Health Northern Ireland	COVID-19 OR coronavirus AND Pregnancy OR Postpartum. COVID-19 OR coronavirus AND Pregnancy OR Postpartum AND vaccination.	07/10/2021	Links to other sites including RCOG and RCM
Public Health Scotland	covid-19 or coronavirus and pregnancy or post-partum. covid-19 or coronavirus and vaccination and pregnancy or post-partum.	07/10/2021	Searched results found Links to other sites including RCOG and NHS inform that (signposts to RCOG).
Public Health Wales	covid-19 vaccination, pregnancy, postpartum, coronavirus, refined by "topics" or "publications"	06/10/21	Links to other sites including JCVI, MHRA, Green book, RCOG
Royal College of Midwives	Word combinations pregnancy OR post-partum covid OR coronavirus Checked for guidelines in the publications	05/10/2021	A section on advice for pregnant women Q&As Guidance For Healthcare Professionals link to the RCOG

The Royal College of Nursing	Word combinations pregnancy OR post-partum covid OR coronavirus Checked for guidelines in the publications	05/10/2021	Searched nothing found
Royal College of Obstetricians and Gynaecologists	Guidelines & research services publications	05/10/2021	Searched, results found
Royal College of General Practitioners (UK)	Word combinations: covid-19, coronavirus, vaccination, pregnancy, postpartum	06/10/2021	Links to RCOG guidelines and gov.uk for guidance & royal college for psychiatrists
Scottish Intercollegiate Guidelines Network	pregnan* OR post-partum and Covid or coronavirus	07/10/2021	Searched nothing found
WHO	(pregnan* OR post-partum OR (unborn child)) AND (infection*) (pregnan* OR post-partum OR (unborn child)) AND (vaccin*) Selected 'WHO COVID'	05/10/2021	Searched, results found
Additional resources			
International Guidelines Library https://q-i-n.net/international-guidelines-library/	pregnan* OR post-partum and Covid or coronavirus	05/10/2021	Searched, nothing found
International HTA Database	pregnan* OR post-partum and Covid or coronavirus	05/10/2021	Searched, nothing found

American College of Obstetricians and Gynecologists	word combinations: covid-19, coronavirus, vaccination, pregnancy, postpartum	06/10/2021	Links to webpages
Australian Government Department of Health	word combinations: covid-19, coronavirus, vaccination, pregnancy, postpartum	06/10/2021	No results found
The Royal Australian and New Zealand College of Obstetricians and Gynaecologists	word combinations: covid-19, coronavirus, vaccination, pregnancy, postpartum	06/10/2021	Links to webpages
Australian College of Midwives	word combinations: covid-19, coronavirus, vaccination, pregnancy, postpartum	06/10/2021	Links to webpages
Immunisation Advisory Centre – COVID-19 Education (New Zealand)	word combinations: covid-19, coronavirus, vaccination, pregnancy, postpartum		Links to a webpage
Ministry of Health New Zealand	word combinations: covid-19, coronavirus, vaccination, pregnancy, postpartum		Links to a webpage
New Zealand College of Midwives	word combinations: covid-19, coronavirus, vaccination, pregnancy, postpartum		Links to webpages
TRIP	pregnant OR postpartum AND vaccine AND covid or coronavirus		Evidence Based Synopsis: COVID-19: EFFECTS OF VACCINES ON FERTILITY AND PREGNANCY OUTCOMES

			<u>COVID-19: VACCINATION FOR WOMEN WHO ARE PREGNANT OR LACTATING</u>
			<u>COVID-19: VACCINATION FOR WOMEN WHO ARE PREGNANT OR LACTATING</u>
List of resources provided by the Stakeholders			
RCOG	<u>Coronavirus infection and pregnancy</u>		
RCM	<u>Guidance for pregnant women</u>		
RCOG (Clinical guidance recommended by RCM)	<u>COVID-19 vaccines, pregnancy and breastfeeding</u>		
RCOG	<u>Coronavirus (COVID-19) Infection in Pregnancy</u>		
medrxiv.org	Impact of SARS-CoV-2 variant on the severity of maternal infection and perinatal outcomes: Data from the UK Obstetric Surveillance System national cohort. <u>https://www.medrxiv.org/content/10.1101/2021.07.22.21261000v1</u>		
	The incidence, characteristics and outcomes of pregnant women hospitalized with symptomatic and asymptomatic SARS-CoV-2 infection in the UK from March to September 2020: A national cohort study using the UK Obstetric Surveillance System (UKOSS) (plos.org) <u>https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0251123</u>		
CDC	<u>COVID-19 Vaccination for Pregnant People to Prevent Serious Illness, Deaths, and Adverse Pregnancy Outcomes from COVID-19</u>		
CDC	<u>Pregnant and Recently Pregnant People</u>		