



# **COVID-19 During Pregnancy: Exploring Birth and Infant Outcomes through Fatality Review**

*National Center Guidance Report*

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## COVID-19 During Pregnancy: Exploring Birth and Infant Outcomes through Fatality Review

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### Scope of the Problem

COVID-19 is caused by a virus called SARS-CoV-2. It is part of the coronavirus family, which includes common viruses that cause a variety of diseases from head or chest colds to more severe diseases like severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). COVID-19 was first identified in Wuhan, China, in December 2019. On January 30, 2020, the World Health Organization (WHO) declared the outbreak a global health emergency, and by March 11, 2020, WHO characterized the Coronavirus to be a pandemic.

Two years after the first cases of COVID-19 were identified, the US has had over 80,000,000 confirmed cases and 960,311 deaths.<sup>1</sup> Between January 22, 2020, and February 28, 2022, there have been 182,847 recorded cases of birthing persons contracting COVID-19 during pregnancy. Of those cases, 29,519 (16%) required hospitalization, 684 required ICU care, and 285 maternal deaths have occurred.<sup>2</sup>



This guidance will focus on the **unique impact of COVID-19 on pregnancy**, and tips for effective review of cases directly and indirectly attributable to the virus.



Pregnant persons are not more likely to contract COVID-19, but they are more likely to become severely ill from COVID-19 compared to people who are not pregnant. Cardiopulmonary adaptive changes occurring during pregnancy, such as increased heart rate and stroke volume and reduced pulmonary residual capacity, may increase severity of illness for pregnant persons.<sup>3</sup>

Other factors can further increase the risk of getting very sick from COVID-19 during or recently after pregnancy, such as:

- Having certain [underlying medical conditions](https://bit.ly/3IETVct) (URL: <https://bit.ly/3IETVct>)
- Having weakened or compromised immune systems
- Being older than 25 years
- Living or working in a community with high numbers of COVID-19 cases
- Living or working in a community with low levels of COVID-19 vaccination
- Working in places where it is difficult or not possible to keep at least 6 feet apart from people who might be sick
- Being part of some racial and ethnic minority groups, which have been put at [increased risk of getting sick from COVID-19 because of the health inequities they face](https://bit.ly/3iAYJhu) (URL: <https://bit.ly/3iAYJhu>).<sup>4</sup>



Non-fatal adverse maternal outcomes related to COVID-19 include:<sup>5</sup>

- Pregnancy-induced hypertension
- Preeclampsia/eclampsia/HELLP syndrome
- Infections
- Cardiomyopathy
- Venous thromboembolism
- Arterial thrombosis
- Cerebral venous sinus thrombosis
- Kidney failure requiring dialysis
- Encephalopathy
- Superficial or deep incisional surgical site infection
- Multisystem inflammatory syndrome in patients under 18 years

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COVID-19 increases risk for infants and birthing persons. COVID-19 in pregnancy is associated with preeclampsia, and severe COVID-19 can lead to considerable maternal and neonatal morbidity.<sup>6</sup> Compared with mild COVID-19, severe COVID-19 was strongly associated with preeclampsia, gestational diabetes, preterm birth, and low birth weight. Having COVID-19 during pregnancy significantly increases the risks for adverse neonatal outcomes, including delivering a preterm infant, low birth weight, small for gestational age, and stillborn infants.<sup>7</sup> Symptomatic COVID-19 is associated with an increased risk of cesarean delivery and preterm birth compared with asymptomatic COVID-19.

## Considerations for Case Review

### *Health Equity*

Fatality review teams obtain information to provide contextual information about the life, death-causing event, and systems responses. Social factors such as geography, access to education, experience with discrimination, trauma (including historical trauma), and access to physical and behavioral healthcare can contribute to premature mortality. Residential, educational, and occupational segregation impacts access to high-quality education, employment opportunities, healthy foods, and physical and behavioral health care. Combined, these structural inequities have long-lasting health impacts, including adverse birth outcomes and infant mortality.

Some racial and ethnic minority groups have been and continue to be disproportionately affected by COVID-19.<sup>8</sup> Conditions in the places where people live, learn, work, play, and worship affect a wide range of health risks and outcomes, such as COVID-19 infection, severe illness, and death. Long-standing inequities in social determinants of health that affect these groups, such as poverty and healthcare access, are interrelated and influence a wide range of health and quality-of-life risks and outcomes. Persons of color are less likely to be insured, more likely to have existing health conditions, and more likely to be denied testing and treatment than people of other races. Black Americans are more likely to use public transportation, live in rented housing, and hold jobs that can't be done from home—all pointing to more frequent contact with strangers and increased risk of infection.<sup>9</sup> In addition to increased risk of exposure and infection, how individuals respond to COVID-19 can be explained, in part, by exposure to health-threatening conditions early in life—including poor nutrition, exposure to pollutants, and excessive family stress associated with poverty, racism, and other forms of economic or social disadvantage—all of these can have disruptive effects on developing immune and metabolic systems.<sup>10</sup>

Put simply, the structural legacies of racism and other cross-generational traumas may be linked to levels of chronic stress that increase susceptibility to the kinds of health impairments that result in **greater risk of harm from COVID-19**.



## Case Identification

The National Center has created a number of resources for fatality review teams reviewing cases that are directly and indirectly impacted by COVID-19.

A directly related death is defined as a death directly attributable to the virus. In these cases, COVID-19 should be listed on the death certificate. Death of a child, 0–18 as a result of the viral illness COVID-19. **ICD-10-CM code U07.1, COVID-19.**

Deaths indirectly related are less clearly connected to the incident, but ultimately result from it. An indirectly related death occurs when unsafe or unhealthy conditions are present during any phase of a crisis. Indirect deaths may occur immediately following the acute infection rates or may occur at a later time.

In pregnant persons, exposure, symptoms, and confirmed COVID-19 infections can cause a range of illness, from no symptoms to severe illness and death. The Society for Maternal Fetal Medicine (SMFM) has published [guidance for surveillance and pregnancy management for COVID-19 and pregnancy](https://bit.ly/3iwWrzV) (URL: <https://bit.ly/3iwWrzV>).

To categorize fetal and infant deaths attributed to the birthing person contracting COVID-19 during pregnancy, these may be the identifiers and codes seen by case abstractors and FIMR coordinators:

### Exposure:

- Exposure to someone confirmed to have COVID-19: **O99.89, Z20.828**
- Confirmed COVID-19 with symptoms:
  - ☐ Lower respiratory infection: **O99.51\_, J22, O98.51\_, B97.29**
  - ☐ Acute bronchitis: **O99.51\_, J20.8, O98.51\_, B97.29**
  - ☐ Viral Pneumonia: **O99.51\_, J12.89, O98.51\_, B97.29**
  - ☐ Respiratory failure with hypoxia: **O99.51\_, J96.01, O98.51\_, B97.29**
  - ☐ Acute Respiratory Distress Syndrome (ARDS): **O99.51\_, J80, O98.51\_, B97.29**
  - ☐ Respiratory infection, not otherwise specified (other respiratory disorders):  
**O99.51\_, J98.8, O98.51\_, B97.29**



More generally, abstractors may see the following codes:

- ☐ **[O99.89]** Other specified diseases and conditions complicating pregnancy, childbirth, and the puerperium
- ☐ **[O98.51]** Diseases of the respiratory system complicating pregnancy
- ☐ **[O99.51]** Other viral disease complicating pregnancy
- ☐ **[O35.3]** Maternal care for (suspected) damage to fetus from viral disease in mother

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## Resources:

- For general guidance on reviewing deaths related to the pandemic, see [Review of Deaths Due to COVID-19](https://bit.ly/3LmwRKl) (URL: <https://bit.ly/3LmwRKl>).
- For more detail on identifying and documenting indirect deaths due to COVID-19, see the [Supplemental Guidance on Reviewing Deaths During COVID-19](https://bit.ly/3wM6QjO) (URL: <https://bit.ly/3wM6QjO>).

## A Final Note on Indirectly Related Fetal and Infant Deaths Due to COVID-19

The pandemic significantly impacted **mental health**.<sup>11</sup>

Feelings of anxiety and depression were associated with parents' fear of vertical transmission of the virus to their infants, limited accessibility of antenatal care resources, and lack of social support. These experiences also created a source of stress for pregnant and postpartum persons without COVID. Social distancing and isolation/quarantine procedures implemented during the pandemic increased risk of psychological problems among new parents and those who were pregnant.<sup>12</sup> Fatality review teams should pay close attention to the impact of the mental health challenges facing families during the pandemic.



### ***Ad Hoc Team Members***

A typical FIMR Case Review Team (CRT) membership should represent a wide array of personal and professional knowledge, expertise, experience, the racial, ethnic, and cultural diversity of the community, and a broad, creative range of organizations. Getting the right people to the table for review of cases impacted by COVID-19 is critical. To examine these cases holistically, consider having the following expertise, in addition to regular team members:

- Infectious Disease Specialist
- Epidemiologist
- Neurologist/Pediatric Neurologist
- Health Communication Professional
- Mental Health Professional
- Obstetrician
- Maternal Fetal Medicine Specialist
- Neonatologist
- Emergency Medical Service Provider
- Emergency Department Personnel
- Clinical Geneticist
- Endocrinologist
- Lactation Specialist
- Emergency Preparedness and Response Professionals

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Teams may also want to consider expanding their local public health membership to include family planning and sexually transmitted infections clinic staff, as well as advance practice nurses in the above specialties.

## ***Data Collection***

In April 2021, the National Center released a new section, I8, Deaths during the COVID-19 pandemic, in the National Fatality Review-Case Reporting System. (NFR-CRS). This section focuses on the ways in which fetal, infant, and child deaths that occurred during the COVID-19 pandemic may have been impacted by the pandemic. If using the NFR-CRS, teams can use it to examine, understand, and respond to the ways in which communities, systems, pregnant persons, children, and families were impacted by COVID-19. For teams not using the NFR-CRS, data collection and documentation of the birthing person's vaccination status, severity of disease, pre-existing and underlying medical conditions, life stressors, and any disruptions to medical care, social and support services, mental health care, daycare, and home-based services should be gathered and presented to the case review team.

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## ***Understanding Family Experiences Through Interviews***

The family interview is a unique and defining feature of the FIMR process. The interview informs communities of the need and challenges parental and infant populations encounter, elevating the experiences of bereaved parents. Trusting and valuing the stories parents tell allows fatality review teams to better understand the context of the deaths and the resulting fatality review data, providing a lens through which to examine the case more accurately. The interview also provides an opportunity to link parents to needed resources, provide bereavement support, and give them a compassionate professional to listen to the story of their infant's death. During the challenges of the COVID-19 pandemic, more than ever, teams have found that there are pieces of the puzzle of the baby's death that only the family can share. Examination of the medical and service records may reveal that a birthing person delivered early due to preeclampsia, but during the interview, the parents disclosed that they were unable to get prenatal care that could have identified the medical issue earlier due to having several other young children being home schooled and no available, affordable child care. With compassion and persistence, FIMR teams will hear parents' stories of loss and maximize the impact of those stories by using them to craft effective, relevant interventions to increase the health and safety of their communities.



## Opportunities for Prevention

### *Vaccination*

CDC recommends that people who are pregnant get vaccinated and stay up to date with their COVID-19 vaccines, including getting a COVID-19 booster shot when it's time to get one. CDC recommendations align with those from professional medical organizations serving people who are pregnant, including the [American College of Obstetricians and Gynecologists](https://bit.ly/3JWMkk0) (URL: <https://bit.ly/3JWMkk0>), [Society for Maternal Fetal Medicine](https://bit.ly/3LrPdK9) (URL: <https://bit.ly/3LrPdK9>), and the [American Society for Reproductive Medicine](https://bit.ly/3uDljKY) (URL: <https://bit.ly/3uDljKY>), along with many other professional medical organizations.

Evidence continues to build, showing that COVID-19 vaccination before and during pregnancy is safe and effective. It suggests that the benefits of receiving a COVID-19 vaccine outweigh any known or potential risks of vaccination during pregnancy. Research and scientific studies to date have shown no safety concerns for babies born to people who were vaccinated against COVID-19 during pregnancy.<sup>13</sup> For a [full summary of the evidence and what is currently known about the safety and effectiveness of COVID-19 vaccination during pregnancy visit](https://bit.ly/3DmE3U2) (URL: <https://bit.ly/3DmE3U2>).

Finally, emerging data indicate that while vaccinated individuals may still become infected with COVID-19, those who are up to date on their COVID-19 vaccines, including boosters, are less likely to experience severe illness and serious adverse outcomes as a result of SARS-CoV-2 infection.<sup>14</sup>





## Partnering to develop COVID-19 vaccination materials

Responding to the urgent need to get health information to the public, the Baltimore City FIMR partnered with the Johns Hopkins International Vaccine Access Center, Morgan State University, and the Maryland Institute College of Art to develop COVID-19 vaccination materials for a range of audiences, including pregnant/lactating people. They have recruited and trained ambassadors who conduct outreach in the community on vaccination, with a group of representatives specifically working to outreach the pregnant/lactating population. In addition, the Johns Hopkins Center for Communication Programs, in collaboration with the Baltimore City Health Department, developed materials for health care providers to support them in effectively counseling pregnant patient. (URL: <https://bit.ly/3tRGo6v>).

## Reduce the Risk of Contracting COVID-19

There are steps that can help prevent contracting SARS-CoV-2 infection for both vaccinated and non-vaccinated pregnant persons.



### Wearing a Properly-Fitted Mask:

Properly wearing a well-fitting mask over the nose and mouth in indoor public areas where [COVID-19 Community Levels](https://bit.ly/383cUtK) (URL: <https://bit.ly/383cUtK>) is high is recommended.



### Physical Distancing:

Physical distancing is recommended for indoors in public spaces. Those who are pregnant should be advised to stay at least six feet away from other people from outside their household. Inside the home, pregnant persons should avoid close contact with anyone who is sick, and clean and disinfect surfaces regularly, especially after there have been visitors in the home. Pregnant persons should be counseled to avoid poorly ventilated spaces and crowds.



### Handwashing:

Frequent handwashing is one of the most effective ways to protect pregnant persons and other family members from getting sick.



### Monitoring Daily Health:

Pregnant persons should watch for symptoms of COVID-19, such as fever, cough, shortness of breath, and extreme fatigue. If symptoms develop, contact a health professional right away even if symptoms are mild.



### Following Recommendations for Quarantine/Isolation:

A pregnant person who comes into close contact with someone with COVID-19, or a pregnant person who becomes sick or tests positive for COVID-19 should be counseled to stay at home according to the [CDC guidelines for COVID-19 quarantine and isolation](https://bit.ly/36YNfSG) (URL: <https://bit.ly/36YNfSG>).

## *Access to Prenatal and Postnatal Care*

The COVID-19 pandemic required postponement of many non-essential health services to prevent transmission within clinics. This led to significant reductions in the pregnant person's ability to obtain prenatal and postnatal care.<sup>15</sup> In addition, many clinics and hospitals limited the ability of pregnant persons to bring a support person to prenatal care appointments and to be present for the birth itself.

Telemedicine and remote visits replaced traditional face-to-face prenatal care, and significant barriers to participation were identified. The most common barriers to accessing telemedicine were poor phone or internet connectivity and lack of access to necessary equipment. These barriers are likely to disproportionately impact both rural and low-income pregnant people.<sup>16</sup> The pandemic has highlighted the need for clear guidelines for care provision and approaches to minimizing socioeconomic and technological inequalities in access to telemedicine.

## **Washoe County, Nevada FIMR Team**

One FIMR site in Reno Nevada, recognized this issue early in the pandemic and acted. In 2020, the Washoe County, Nevada FIMR team found that delayed and/or interrupted prenatal care due to COVID-19 was a serious risk factor for poor pregnancy outcomes. "Some reasons for delayed health-seeking were lockdown, lack of understanding of guidelines or resources, and fear of contracting infection" shared Rebecca Gonzales, the FIMR Co-Coordinator. The Northern Nevada Maternal Child Health Coalition, the acting FIMR Community Action Team, led increased activities to advocate for pregnant people during the coronavirus pandemic. They promoted access to information for providers and patients to prevent delays in care or lack of care due to concerns about COVID-19 or misinformation about safety procedures and ran Public Service Announcements encouraging those in the community to continue to seek prenatal care during the pandemic.





### ***Mitigate Stress and Mental Health Challenges***

Recent studies have illustrated that those who were pregnant **during** the pandemic were nearly twice as likely to have possible depression than were matched individuals who were pregnant **prior** to the pandemic.<sup>17</sup> Individual- and community-level factors tied to socioeconomic inequality were associated with latent factors of COVID-19-related stress and adversity. Beyond objective adversity, subjective stress responses were strongly associated with depressive symptoms during the pandemic.<sup>18</sup>

The need for providers to assess pregnant persons for pandemic-related stress and offer resources to mitigate the downstream adverse impacts of the COVID-19 pandemic is imperative. In particular, women in lower socioeconomic groups and women of color may have increased stress and stressors and fewer resources to cope with their anxiety, adding to the disparity in COVID-19 diagnoses, hospitalization, clinical outcomes, and mortality.<sup>19</sup> Increasing access to psychological services via telehealth may be useful in preventing negative maternal-infant outcomes. Early mental health interventions may help lower the risk of postpartum depression and help promote the long-term wellbeing. Additional resources that may help alleviate stress include assurance of safe access to healthcare, access to groceries and supplies, online social support via parenting groups, and financial assistance.

## *Caring for the Caregivers*

The global COVID-19 pandemic has been a stressful time for those who work on the front lines of health care. Now, more than ever, it is important for health systems and health care organizations to create and ensure infrastructure and resources to support physicians, nurses, and care team members. Many strategies have emerged for health care organizations to be proactive in monitoring and addressing employee health and well-being. Among them are workload redistribution, improved institutional policies for paid time off and sick leave, access to personal protective equipment (PPE), and increased attention to emotional and mental well-being and social support. Several organizations have assigned therapists to strategic locations (e.g., cafeteria, staff lounges, emergency department) to provide easy access for staff. Several health systems offer drop-in hours with a psychologist onsite for their physicians and care teams. Some organizations are offering 24/7 emotional support through their behavioral health teams. In many cases, this includes emotional support for family members of clinicians as well.<sup>20</sup> Even basic supports such as food/meals during intense shifts, increasing resources for childcare, and pet care for employees have helped organizations to care for health care workers more effectively during times of crisis. All agencies and institutions need to ensure physicians, medical students, and all members of the health care teams have access to appropriate behavioral, mental, primary and specialty health care and addiction services.

Even before the pandemic, it was widely recognized that partners engaged in fatality review can be adversely affected by vicarious trauma, the repeated exposure to hearing the details of others' distress and bad outcomes. The National Center has collected a [list of assessment tools](https://bit.ly/3uFb8Xw) (URL: <https://bit.ly/3uFb8Xw>) that are relatively non-invasive and intended to assess burnout, social connections, psychological distress, and vicarious trauma. These tools may be useful for fatality review teams. In addition, the National Center has developed a [tool kit for FIMR/CDR team members and staff about vicarious trauma](http://bit.ly/2PbaJc0) (URL: <http://bit.ly/2PbaJc0>), how to recognize it, prevention, and treatment strategies for leadership and team members. An archived webinar, [Recognizing and Responding to Vicarious Trauma in Fatality Review](https://bit.ly/3wUpMNd) (URL: <https://bit.ly/3wUpMNd>), is also available.



## Conclusion

FIMR teams in the United States face their first pandemic in the COVID-19 outbreak of 2020. With the emerging and increasing literature on the adverse effects of COVID-19 on birth outcomes and infants, the National Center created this guidance to equip the field to consider the unique aspects of physical, psychological, economic, and health care service provision to pregnant persons during the pandemic. With careful planning, the right partners, and asking the right questions, FIMR teams can identify key points of preparation and intervention. The findings and recommendations compiled by fatality review teams can provide meaningful insights to inform emergency preparedness and response planning, infectious disease, maternal/child public health, and child welfare professionals. As teams face these stories with courage and an eye toward prevention, they will make their communities safer places for birthing persons, infants, children, and families.

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## Resources

- [Centers for Disease Control and Prevention \(CDC\)](https://bit.ly/34QQztS) (URL: <https://bit.ly/34QQztS>)
- [Supporting Obstetrician-Gynecologists and Their Patients During COVID-19](https://bit.ly/3INoNRb) (URL: <https://bit.ly/3INoNRb>)
- [Society for Maternal Fetal Medicine, COVID-19 Task Force Recommendations](https://bit.ly/3JU2YB3) (URL: <https://bit.ly/3JU2YB3>)
- [Robert Wood Johnson Foundation](https://rwjf.ws/3DFMMB3) (URL: <https://rwjf.ws/3DFMMB3>)
  - COVID-19 Resources
  - Medicaid Coverage Gap Resources
  - Health Equity Resources
- [World Health Organization \(WHO\) Coronavirus Disease \(COVID-19\): Pregnancy and Childbirth](https://bit.ly/38g7Xht) (URL: <https://bit.ly/38g7Xht>)



## Endnotes

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