COVID-19 Impact on Pregnancy: Outcomes & Vertical Transmission

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Disclosures

• None
## Severity of Infection: Spectrum of Disease

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>General Population</th>
<th>Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>Asymptomatic to mild pneumonia</td>
<td>81%</td>
<td>69-76%</td>
</tr>
<tr>
<td>Severe</td>
<td>Dyspnea, hypoxia, &gt;50% lung involvement 24-48 hours</td>
<td>14%</td>
<td>16-26%</td>
</tr>
<tr>
<td>Critical</td>
<td>Respiratory failure, shock, multiorgan dysfunction</td>
<td>5%</td>
<td>5-8%</td>
</tr>
<tr>
<td>Case fatality</td>
<td>No deaths mild-severe cases</td>
<td>2.3%</td>
<td>1.6%</td>
</tr>
</tbody>
</table>
Severity of Infection: Relative Risk

• Small series and case reports to date:
  • No increase in acquiring SARS-CoV-2 infection
  • Moderate increase in severe infection compared to non-pregnant population
  • Most (>90%) of obstetrical patients recover without OB complications
  • Higher incidence of ICU admit 1.5 vs. 0.9% (aRR = 1.5  95% CI 1.2 – 1.8)
  • Higher incidence mechanical ventilation (0.5% vs. 0.3%, aRR = 1.7 95% CI 1.2 – 1.4)
• aRR = adjusted relative risk accounting for age, medical conditions, race/ethnicity
Severity of Infection: Population Insights

• Black and Latinx pregnant women disproportionately affected by SARS-CoV-2 infection
• Underlying medical conditions increase risk
• Increased hospitalization pregnant women (32% vs. 5%) likely related to admission for OB indications such as delivery
• Caution monitoring pregnant women for progression to severe and critical COVID-19 disease warranted
Severity of Infection: Risk Factors for Severe Illness (CDC website)

Are at increased risk:
- Cancer
- Chronic kidney disease
- COPD
- Immunocompromised state
- Obesity
- Serious heart conditions
- Sickle cell disease
- Type 2 diabetes mellitus

Might be at increased risk:
- Moderate to severe asthma
- Cerebrovascular disease
- Cystic fibrosis
- Pulmonary fibrosis
- Hypertension
- Neurological conditions
- Liver disease
- Pregnancy
- Smoking
- Thalassemia
- Type 1 diabetes mellitus
OB Complications: MERS, SARS, COVID-19

• Systemic review and meta-analysis 19 studies, 79 women, 41 pregnancies
  • 41 pregnancies COVID-19 (52% cases)
  • 12 pregnancies MERS (15%)
  • 26 pregnancies SARS (33%)
• Pneumonia (92%), fever (83%), cough (57%), dyspnea (27%)
# OB Complications: MERS, SARS, COVID-19

<table>
<thead>
<tr>
<th>Condition</th>
<th>Incidence</th>
<th>95% Confidence Interval</th>
<th>Usual Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miscarriage**</td>
<td>39.1%</td>
<td>20.2-59.8</td>
<td>31%</td>
</tr>
<tr>
<td>Preterm delivery*</td>
<td>24.3%</td>
<td>12.5-38.6</td>
<td>5-18%</td>
</tr>
<tr>
<td>Preterm membrane rupture</td>
<td>20.7%</td>
<td>9.5-34.9</td>
<td>0.5-3%</td>
</tr>
<tr>
<td>Preeclampsia**</td>
<td>16.2%</td>
<td>4.2-34.1</td>
<td>3.4-4.6%</td>
</tr>
</tbody>
</table>
## OB Complications: MERS, SARS, COVID-19

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<tr>
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<tr>
<td>Fetal growth restriction</td>
<td>11.7%</td>
<td>3.2-24.4</td>
<td>10%***</td>
</tr>
<tr>
<td>Cesarean delivery**</td>
<td>84%</td>
<td>73.8-91.9</td>
<td>32% US 2017</td>
</tr>
<tr>
<td>Perinatal death**</td>
<td>11.1%</td>
<td>8.5-19.6</td>
<td>6 per 1,000 live births</td>
</tr>
<tr>
<td>NICU admit**</td>
<td>57.2%</td>
<td>3.6-99.8</td>
<td>77.9 per 1,000 live births</td>
</tr>
<tr>
<td>Vertical transmission</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Vertical Transmission

- No vertical transmission (Chen et al. 2020; Karimi-Zarchi et al. 2020; Schwartz, 2020; Yan et al. 2020)
- Possible vertical transmission (Alzamora et al. 2020; Turan et al. 2020; Zaigham & Andersson 2020)
- Suspected vertical transmission associated with severe COVID-19 maternal disease
- Spectrum of neonatal disease: neonatal respiratory distress in preterm infants
Recommendations

• PREVENTION best current strategy:
  • Physical distancing, hand hygiene, disinfecting surfaces, wearing a mask or face covering
  • Reduce exposure to children < 10 years of age
  • CDC: in-person playtime children other households should be limited, play outside, wear masks, etc.
  • Evolving recommendations for pregnant women for occupational guidance, restrictions (e.g., health care workers)
  • Comorbidities and individual work situation should guide decision-making
  • Strongly encourage seasonal influenza vaccination
Recommendations

- With suspected infection, work-up per current policies & procedures
- With known infection, careful monitoring for progression to severe disease
- Due to lack of evidence, decisions regarding optimal timing for delivery, mode of delivery (vaginal versus cesarean) are based on obstetrical considerations alone
- No evidence that cesarean delivery reduces vertical transmission
References


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Physiology of Normal Pregnancy

Half of pregnant women protect their babies against the flu. Time to bump it up!

With only half of pregnant moms getting their flu vaccine, too many remain unprotected. Flu shots help protect pregnant women and their babies from potentially serious illnesses during and after pregnancy.

During the 2015-16 flu season, an estimated 50% of pregnant women in the U.S. protected themselves and their babies from flu by getting a flu shot. While this is a significant improvement since the years before the 2009 pandemic, about half of pregnant women, and their babies, still remain unprotected from influenza.

We can do better. All pregnant women need flu shots to protect themselves and their babies.

Influenza vaccination coverage among pregnant women aged 10-49 years:
- It is safe, and can be received at any time during pregnancy.
- Can help protect against premature labor and delivery.
- Protects developing babies before birth and after birth, for the first several months, while baby is too young to get a flu shot.
- Pregnant women also need a whooping cough (Tdap) shot. Talk to your doctor.

Get vaccinated to protect yourself and your baby.

www.cdc.gov/flu/protect/vaccine/pregnant.htm
Physiology of Normal Pregnancy
Physiology of Normal Pregnancy

[Graph showing changes in minute ventilation, oxygen uptake, and basal metabolism over months of pregnancy.]
Physiology of Normal Pregnancy

Graph showing changes in cardiac output, mean BP, and SVR over weeks of pregnancy.
### Physiology of Normal Pregnancy

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<th>Pregnant Third Trimester</th>
<th>Change</th>
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<tbody>
<tr>
<td>CVP (mmHg)</td>
<td>3.7 +/- 2.6</td>
<td>3.6 +/- 2.5</td>
<td>None</td>
</tr>
<tr>
<td>COP (mmHg)</td>
<td>20.8 +/- 1.0</td>
<td>18.0 +/- 1.5</td>
<td>↓ 14%</td>
</tr>
<tr>
<td>PCWP (mmHg)</td>
<td>6.3 +/- 2.1</td>
<td>7.5 +/- 1.8</td>
<td>None</td>
</tr>
<tr>
<td>COP-PCWP (mmHg)</td>
<td>14.5 +/- 2.5</td>
<td>10.5 +/- 2.7</td>
<td>↓ 28%</td>
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Pathophysiology of Acute Lung Injury & Systemic Inflammatory Response

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CVP = central venous pressure; COP = colloid osmotic pressure; PCWP = pulmonary capillary wedge pressure; COP-PCWP = COP minus PCWP gradient

![Diagram of Cardiovascular and Noncardiovascular Pulmonary Edema](image)