

# — COVID-19 Impact on Pregnancy: Outcomes & Vertical Transmission

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# Disclosures

- None



# Severity of Infection: Spectrum of Disease

Category	Description	General Population	Pregnancy
<b>Mild</b>	<b>Asymptomatic to mild pneumonia</b>	<b>81%</b>	<b>69-76%</b>
<b>Severe</b>	<b>Dyspnea, hypoxia, &gt;50% lung involvement 24-48 hours</b>	<b>14%</b>	<b>16-26%</b>
<b>Critical</b>	<b>Respiratory failure, shock, multiorgan dysfunction</b>	<b>5%</b>	<b>5-8%</b>
<b>Case fatality</b>	<b>No deaths mild-severe cases</b>	<b>2.3%</b>	<b>1.6%</b>

# 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

Condition	Incidence	95% Confidence Interval	Usual Incidence
Miscarriage**	39.1%	20.2-59.8	31%
Preterm delivery*	24.3%	12.5-38.6	5-18%
Preterm membrane rupture	20.7%	9.5-34.9	0.5-3%
Preeclampsia**	16.2%	4.2-34.1	3.4-4.6%

# OB Complications: MERS, SARS, COVID-19

Condition	Incidence	95% CI	Usual Incidence
Fetal growth restriction	11.7%	3.2-24.4	10%***
Cesarean delivery**	84%	73.8-91.9	32% US 2017
Perinatal death**	11.1%	8.5-19.6	6 per 1,000 live births
NICU admit**	57.2%	3.6-99.8	77.9 per 1,000 live births
Vertical transmission	0		

# 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**

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## Pregnant? You Need a Flu Shot!



Information for pregnant women



Because you are pregnant, CDC and your ob-gyn or midwife recommend you get the flu shot to protect yourself and your baby from the flu.

You should get vaccinated by the end of October. This timing helps ensure that you are protected before flu activity begins to increase. Talk to your ob-gyn or midwife about getting a flu shot.

### **The flu is a serious illness, especially when you are pregnant.**

Getting the flu can cause serious problems when you are pregnant. Even if you are generally healthy, changes in immune, heart, and lung functions during pregnancy make you more likely to get severely ill from the flu. Pregnant women who get the flu are at higher risk of hospitalization, and even death, than non-pregnant women. Severe illness during your pregnancy can also be dangerous to your developing baby because it increases the chance for significant problems, such as premature labor and delivery.

### **The flu shot is the best protection for you—and your baby.**

When you get your flu shot, your body starts to make antibodies that help protect you against the flu. Antibodies can be passed on to your developing baby, and help protect the baby several months after he or she is born. This is important because babies younger than 6 months of age are too young to get a flu vaccine. If you breastfeed your infant, antibodies may also be passed through breast milk. It takes about two weeks to make antibodies after getting a flu vaccine. Talk to your doctor, nurse, or clinic about getting vaccinated by October of each season, if possible.

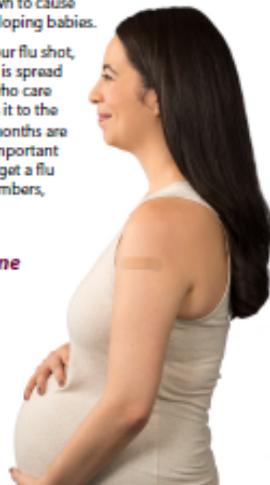
### **The flu shot is safe for pregnant and breastfeeding women and their infants.**

You can get the flu shot at any time, during any trimester, while you are pregnant. Millions of pregnant women have gotten a flu shot. Flu shots have not been shown to cause harm to pregnant women or their developing babies.

If you have your baby before getting your flu shot, you still need to get vaccinated. The flu is spread from person to person. You, or others who care for your baby, may get the flu, and pass it to the baby. Because babies younger than 6 months are too young to receive the vaccine, it is important that everyone who cares for your baby get a flu vaccine, including other household members, relatives, and babysitters.

### **The side effects of a flu vaccine are mild.**

After getting your flu shot, you may experience some mild side effects. The most common side effects include soreness, tenderness, redness and/or swelling where the shot was given. Sometimes you might have a headache, muscle aches, fever, and nausea or feel tired.



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

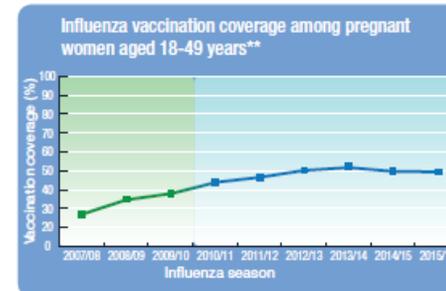


### With only half of pregnant moms getting their flu vaccine, too many remain unprotected

Flu shots help protect pregnant women and their babies from potentially serious illness 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.



#### **If you're pregnant, a flu shot:**

- is safe, and can be received at any time during pregnancy
- can help protect against premature labor and delivery
- protects developing baby 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.**

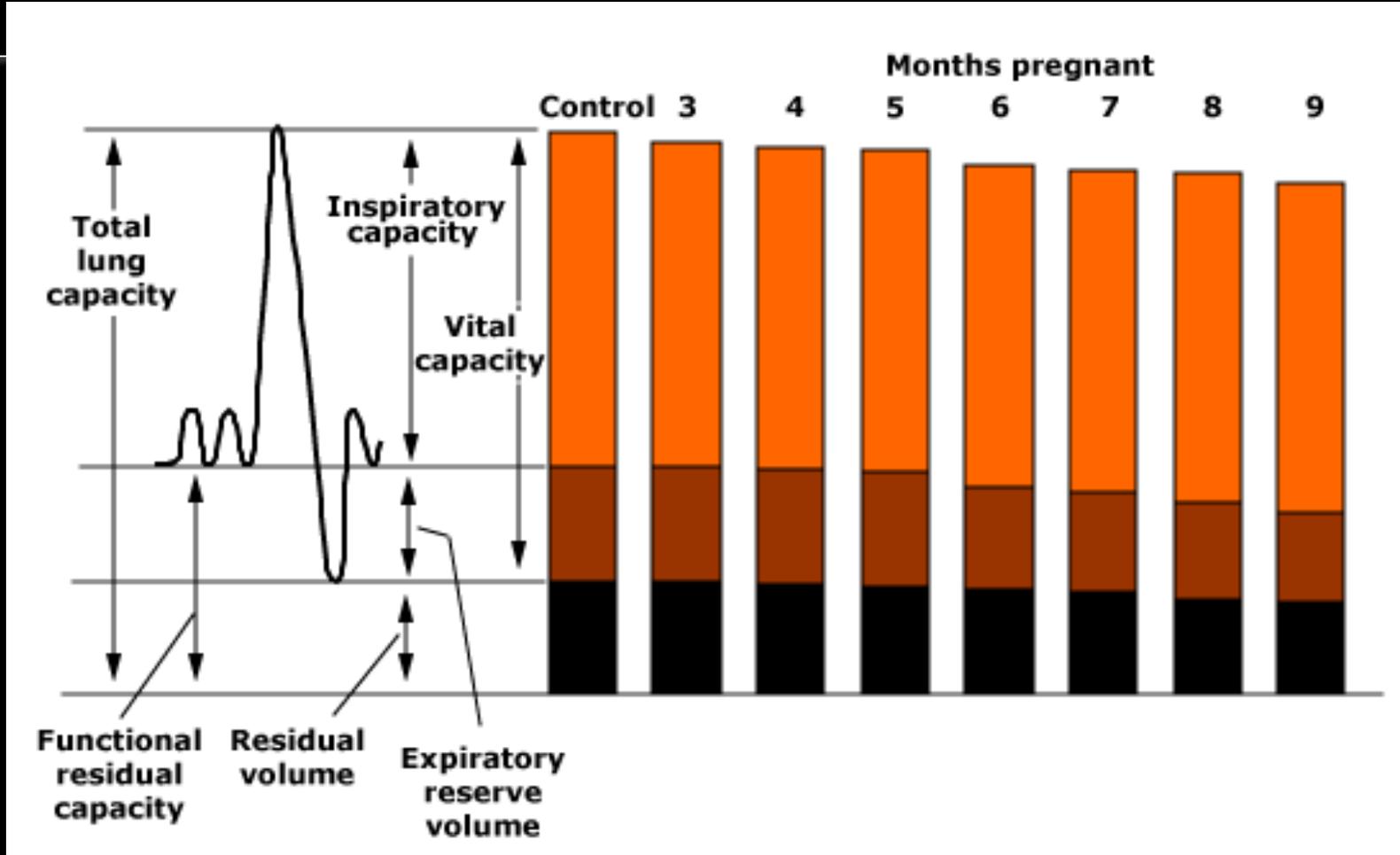
Get vaccinated to protect yourself and your baby.



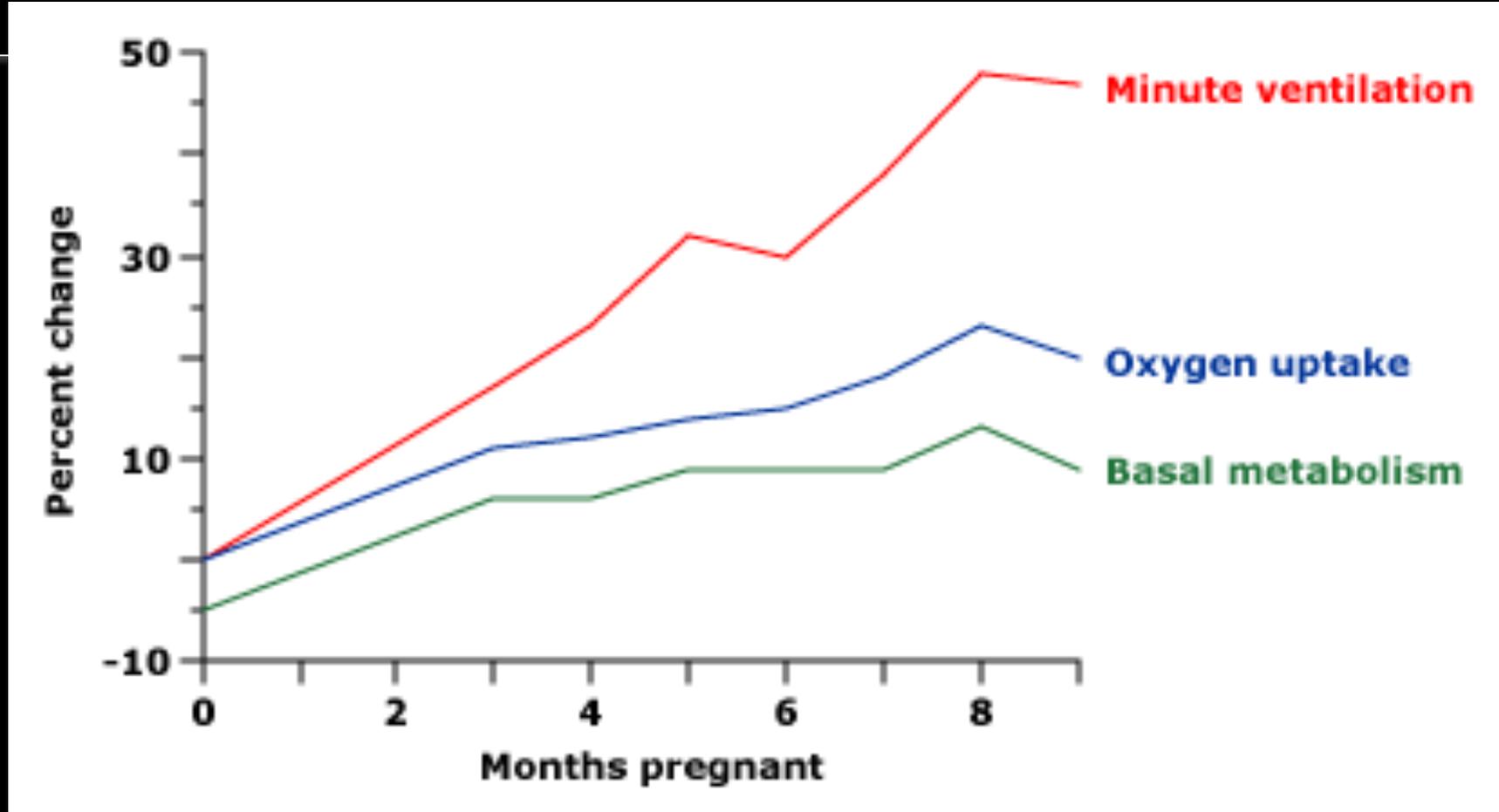
U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention

[www.cdc.gov/flu/protect/vaccine/pregnant.htm](http://www.cdc.gov/flu/protect/vaccine/pregnant.htm)

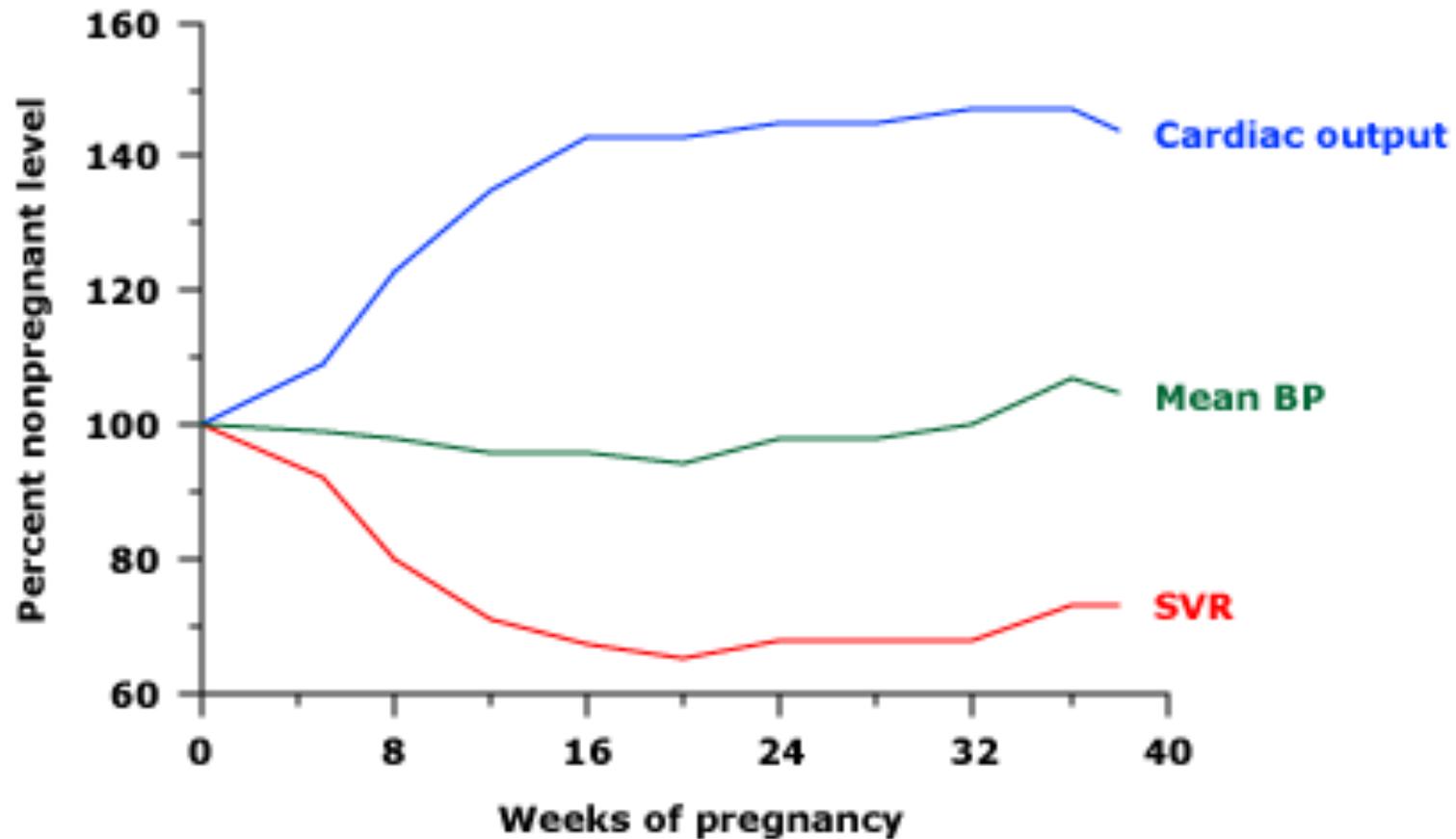
# Physiology of Normal Pregnancy



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Parameter	Non-Pregnant	Pregnant Third Trimester	Change
CVP (mmHg)	3.7 +/- 2.6	3.6 +/- 2.5	None
COP (mmHg)	20.8 +/- 1.0	18.0 +/- 1.5	↓ 14%
PCWP (mmHg)	6.3 +/- 2.1	7.5 +/- 1.8	None
COP-PCWP (mmHg)	14.5 +/- 2.5	10.5 +/- 2.7	↓ 28%

# Pathophysiology of Acute Lung Injury & Systemic Inflammatory Response

Parameter	Non-pregnant	Pregnant Third Trimester
CVP (mmHg)	3.7 +/- 2.6	3.6 +/- 2.5
COP (mmHg)	20.8 +/- 1.0	18.0 +/- 1.5
PCWP (mmHg)	6.3 +/- 2.1	7.5 +/- 1.8
COP-PCWP (mmHg)	14.5 +/- 2.5	10.5 +/- 2.7

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

