



# Supporting Your Perinatal Units During COVID-19

---

November 12, 2021  
12:00 – 1:00 PM



# Welcome

---



- Please type your **name** and **organization** in the chat box and send to “Everyone”.
- Please also do so for all those in the room with you viewing the webinar.

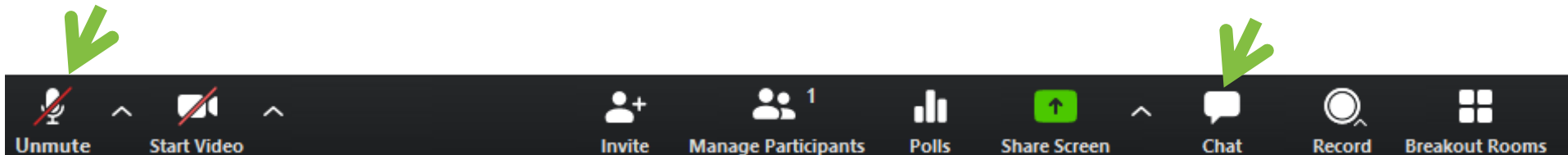


# Welcome

---



- Attendees are automatically muted to reduce background noise
- We will take questions during Q&A at the end, though please feel free to enter questions/comments in the “chat” box during the presentations
- Slides will be available via email and at [alpqc.org/resources/covid-19](https://alpqc.org/resources/covid-19)
- We are now recording



# Agenda

---



Welcome		12:00 – 12:05
Patient Perspective on Vaccination in Pregnancy		12:05 – 12:15
COVID-19 Vaccine Outcomes in Pregnancy		12:15 – 12:30
COVID-19 Vaccine Hesitancy in Pregnancy		12:30 – 12:40
Q&A		12:40 – 1:00



# Patient Perspective on Vaccination in Pregnancy

Meg Davis, MPH, RD, CDCES

# COVID19 Pregnancy & Vaccination

## Overview and Recent Updates

Carolyn M Webster, MD

Assistant Professor

UAB Maternal-Fetal Medicine

November 12, 2021

# COVID19 & Pregnancy

- Maternal/Adult Complications
  - Respiratory
    - Pneumonia, respiratory failure, ARDS
    - Secondary infections
  - Thromboembolic
  - Cardiac
    - acute cardiac injury, arrhythmias
  - Renal failure
  - Gastrointestinal and liver disorders
  - Neurologic
    - Disorders of smell and taste
    - Headache, dizziness, myalgia, alteration of consciousness, weakness,
    - Strokes, seizures
  - Cutaneous
    - Morbilliform rash, urticarial, vascular lesions, and vesicular lesions
  - Psychiatric
    - anxiety, depression, insomnia, PTSD

Is COVID19  
worse in  
pregnancy?

# COVID19 & Pregnancy

- Maternal/Adult Complications
  - Respiratory
    - Pneumonia, respiratory failure, ARDS
    - Secondary infections
  - Thromboembolic
  - Cardiac
    - acute cardiac injury, arrhythmias
  - Renal failure
  - Gastrointestinal and liver disorders
  - Neurologic
    - Disorders of smell and taste
    - Headache, dizziness, myalgia, alteration of consciousness, weakness,
    - Strokes, seizures
  - Cutaneous
    - Morbilliform rash, urticarial, vascular lesions, and vesicular lesions
  - Psychiatric
    - anxiety, depression, insomnia, PTSD

Is COVID19  
worse in  
pregnancy?

- Likely yes
  - For symptomatic & severe disease
  - For second-half of pregnancy
- Does it matter?
  - aka is this the right question



# COVID19 & Pregnancy (vs nonpregnant)

# COVID19 & Pregnancy (vs nonpregnant)

- Early studies
  - Data from pregnant women in 1<sup>st</sup> half of 2020
    - Ellington MMWR 2020, Collin 2020, Delahoy MMWR 2020, Khan 2021
  - Showed increased risk of more severe illness in symptomatic pregnant women compared to nonpregnant peers
    - Increased risk of hospitalization
    - Increased risk of ICU admission
    - Increased risk of mechanical ventilation
    - No increase in death

# COVID19 & Pregnancy (vs nonpregnant)

- Systematic review (Allotey et al, 2020)
  - 192 studies; > 64,000 pregnant/PP women w/ suspected/confirmed COVID19
  - Maternal outcomes
    - 17.4 % had pneumonia
    - 17.1 % received oxygen by cannula
    - 11.3 % had severe disease
    - 13.4 % had ARDS
    - 3.3 % were admitted to an ICU
      - ✓ Risk was higher in pregnant women vs nonpregnant women, OR 2.13 (95%CI 1.5-3.0)
    - 1.6% received invasive ventilation
    - 0.11% received ECMO
    - 0.8 % percent died
      - ✓ Risk of death was similar in pregnant vs nonpregnant women, OR 0.96 (0.79-1.2)

# COVID19 & Pregnancy (vs nonpregnant)

- CDC Report (Zambrano et al, 2020)
  - CDC's COVID-19 Response Pregnancy and Infant Linked Outcomes Team
  - Report of
    - > 23,000 pregnant women
    - >386,000 nonpregnant women
    - Symptomatic, laboratory-confirmed SARS-CoV-2 infection
  - Pregnant patients had a higher risk of
    - ICU admission
      - ✓ 10.5 versus 3.9 per 1000 cases, aRR 3.0, 95% CI 2.6-3.4
    - Receiving invasive ventilation
      - ✓ 2.9 versus 1.1 per 1000 cases, aRR 2.9, 95% CI 2.2-3.8
    - Receiving ECMO
      - ✓ 0.7 versus 0.3 per 1000 cases, aRR 2.4, 95% CI 1.5-4.0
    - Death
      - ✓ 1.5 versus 1.2 per 1000 cases, aRR 1.7, 95% CI 1.2-2.4

# COVID19 & Pregnancy (vs nonpregnant)

- Prospective cohort study (Martinez-Portilla et al)
  - 5183 pregnant & 175,905 nonpregnant women with COVID-19
  - Crude rates (preg vs nonpreg) / Propensity score-matched risks
    - Death
      - ✓ 1.5 % vs 1.5 % / OR 1.84, 95% CI 1.26-2.69
    - Pneumonia
      - ✓ 9.9 % vs 6.5 % / OR 1.86, 95% CI 1.60-2.16
    - ICU admission
      - ✓ 13 % vs 6.9 %; / OR 1.86, 95% CI 1.41-2.45
    - Intubation
      - ✓ 8.1 % vs 9.9 %; / OR 0.93; 95% CI 0.70-1.25

# COVID19 & Pregnancy (vs nonpregnant)

- Current body of evidence
  - Susceptibility/Transmission
    - Pregnant women appear similarly susceptible to COVID19 infection
    - No increased or decreased risk of transmission
  - Symptomatic disease
    - Symptomatic vs asymptomatic disease rates appear similar in many (but not all) studies
  - Severe disease
    - Continued evidence of increased risk of ICU admission, mechanical ventilation, ECMO
  - Death
    - Risk of death (versus nonpregnant women) remains less clear
    - Risk of death (versus uninfected pregnant women) IS higher

# COVID19 & Pregnancy (vs nonpregnant)

- Current body of evidence
  - Asymptomatic disease
    - Pregnant women with asymptomatic disease appear to have a similar course/risk to non-pregnant pregnant women with asymptomatic disease
    - Research/studies ongoing

# Pregnancy outcomes (COVID vs uninfected)



# Pregnancy outcomes (COVID vs uninfected)

- Pregnancy complications (from COVID infection)
  - Miscarriage
    - ✓ Data is limited but current body of evidence has NOT shown increased frequency of miscarriage
  - Preterm birth & Cesarean delivery
    - ✓ Large observational data has not shown an overall increase in PTB or cesarean
    - ✓ However, this has been shown in several smaller studies, particularly in women with more severe disease
  - Preeclampsia
    - ✓ Risk of Preeclampsia, Preeclampsia with SF, Eclampsia, and HELLP syndrome all increased
    - ✓ Large meta-analysis (>700,000 patients) showed 62% increased odds of preeclampsia w/ COVID19 infection
      - Risk increased in both symptomatic and asymptomatic women (although higher in those w/ symptoms)

# Pregnancy outcomes (COVID vs uninfected)

- Pregnancy complications (from COVID infection)
  - By severity
    - ✓ Data shows increase in maternal/neonatal adverse outcomes in women with more severe disease
    - ✓ Outcomes if asymptomatic seem similar to those without infection (exception of preeclampsia)
  - By gestational age
    - ✓ Data shows increase in neonatal adverse events in infections >20 wks and especially >26 weeks
    - ✓ Outcomes if infection <20wks seem similar to those without infection

# Pregnancy outcomes (COVID vs uninfected)

- Systematic review (Allotey et al, 2020)
  - 192 studies; > 64,000 pregnant/PP women w/ suspected/confirmed COVID19
  - Maternal outcomes
    - 17.4 % had pneumonia
    - 17.1 % received oxygen by cannula
    - 11.3 % had severe disease
    - 13.4 % had ARDS
    - 3.3 % were admitted to an ICU
      - ✓ Risk was higher in pregnant women vs nonpregnant women, OR 2.13 (95%CI 1.5-3.0)
      - ✓ Risk was higher in pregnant women w/ COVID vs pregnant women without, OR 19 (95% CI 7.5-45.8)
    - 1.6% received invasive ventilation
    - 0.11% received ECMO
    - 0.8 % percent died
      - ✓ Risk of death was similar in pregnant vs nonpregnant women, OR 0.96 (0.79-1.2)
      - ✓ Risk was higher in pregnant women w/ COVID vs pregnant women without, OR 2.9 (95% CI 1.08-7.52)
    - NICU admission
      - ✓ Risk higher in babies of COVID+ mothers vs uninfected mothers OR 4.9 (95%CI 1.87-12.81)

# Pregnancy outcomes (COVID vs uninfected)

- In utero transmission
  - Rare but some cases are described
  - Systematic review (Kotlyar et al, 2021)
    - Infants born to 936 COVID19-infected mothers
    - Results
      - ✓ Nasopharyngeal samples (at birth or w/in 48hrs): 27 of 936 (2.9%) + for viral RNA
      - ✓ Cord blood samples 1 of 34 (2.9%)
      - ✓ Placental samples 2 of 26 (7.7%)
      - ✓ Neonatal serologies (IgM): 3 of 82 +
  - CDC Report (Woodworth et al, 2020)
    - COVID-19 Response Pregnancy and Infant Linked Outcomes Team
      - ✓ > 5000 pregnant women with laboratory-confirmed COVID infection
    - Results
      - ✓ 2.6 % of the 610 infants with available SARS-CoV-2 test results had a positive test, primarily those born to persons with infection at delivery

# Delta variant

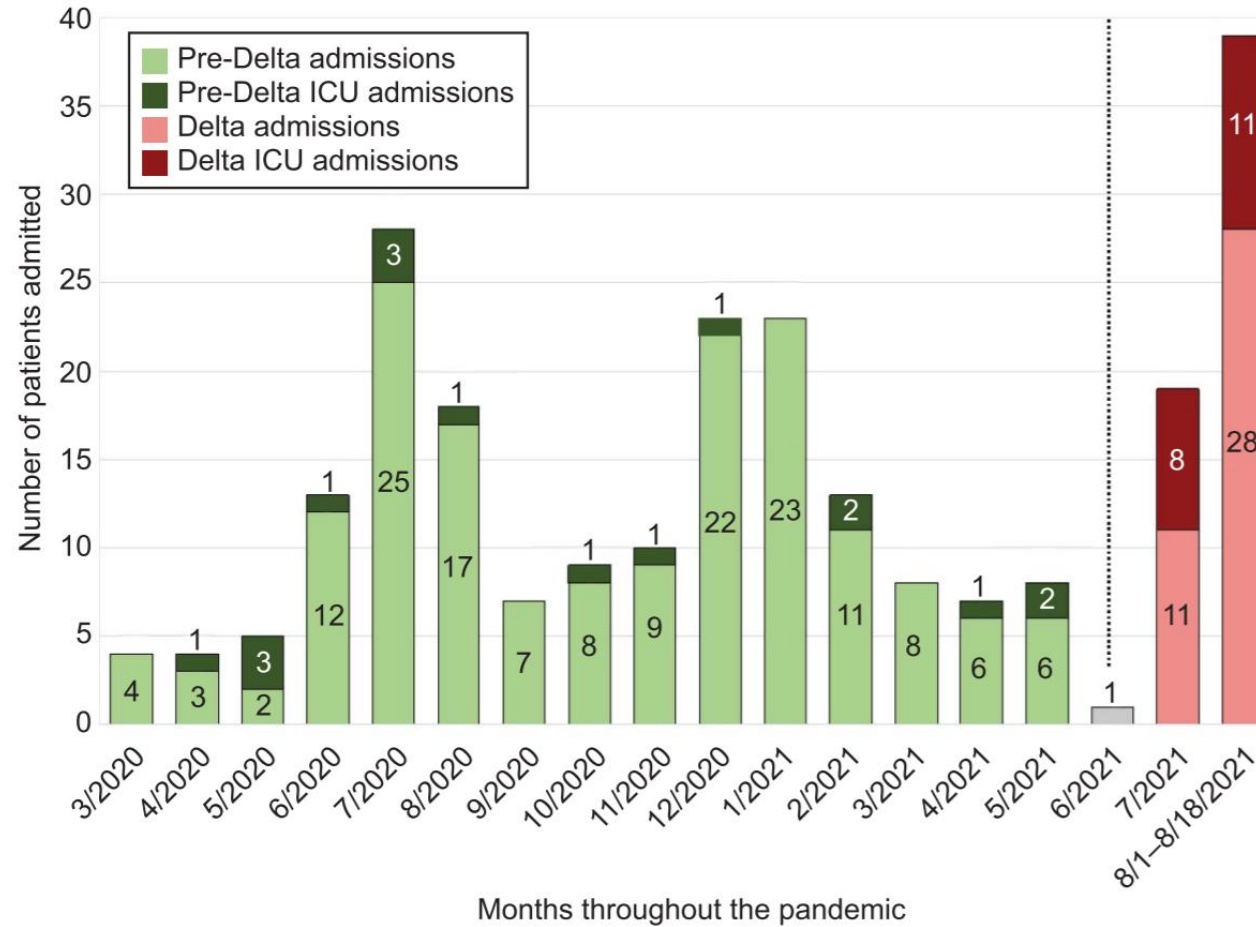
# Delta variant & Pregnancy

*Research Letter*

## **Maternal and Perinatal Outcomes Associated With the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Delta (B.1.617.2) Variant**

*Angela R. Seaseley, MD, MS, Christina T. Blanchard, MS, Nitin Arora, MD, MPH, Ashley N. Battarbee, MD, MSCR, Brian M. Casey, MD, Jodie Dionne-Odom, MD, MSPH, Rachel G. Sinkey, MD, Jeff M. Szychowski, PhD, Alan T. Tita, MD, PhD, and Akila Subramaniam, MD, MPH, on behalf of the CWRH COVID-19 Working Group*

# Delta variant & Pregnancy



**Fig. 1.** Admission trends in relationship to the rise in the Delta (B.1.617.2) variant among pregnant patients positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). *Dashed line* represents transition from predominately Alpha to predominately Delta variant and denotes the period excluded from the analysis due to the multiple variants in the community at that time. ICU, intensive care unit.

*Seasey. SARS-CoV-2 Delta Variant Outcomes in Pregnancy. Obstet Gynecol 2021.*

# Delta variant & Pregnancy

**Table 1. Illness Severity and Perinatal Outcomes of Patients Who Required Delivery During Their Admission With Coronavirus Disease 2019 (COVID-19), According to Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Variant Type**

	Period		P	RR (95% CI)	aRR (95% CI)*
	Pre-Delta (n=224)	Delta (n=69)			
Disease severity <sup>†</sup>			<.001		
Asymptomatic	104 (46)	11 (16)		0.34 (0.20–0.60)	0.34 (0.19–0.59)
Mild–moderate	91 (41)	33 (48)		1.18 (0.88–1.58)	1.22 (0.90–1.65)
Severe–critical	29 (13)	25 (36)		2.80 (1.76–4.44)	2.76 (1.73–4.40)
ICU admission	18 (8)	20 (29)	<.001	3.61 (2.03–6.42)	3.42 (1.91–6.11)
Received pharmacologic treatment <sup>‡</sup>	35 (16)	25 (36)	<.001	2.32 (1.50–3.59)	2.31 (1.49–3.59)
Required respiratory support <sup>§</sup>	29 (13)	25 (36)	<.001	2.80 (1.76–4.44)	2.76 (1.73–4.40)
Intubation	12 (5)	16 (23)	<.001	4.33 (2.15–8.70)	4.18 (2.06–8.48)
ECMO	3 (1)	3 (4)	.15	3.25 (0.67–15.72)	—
VTE	5 (2)	2 (3)	.67	1.30 (0.26–6.55)	—
Maternal death	1 (1)	1 (2)	.42	3.25 (0.21–51.22)	—
Patients who required delivery	n=91	n=28			
Cesarean birth	28 (31)	17 (61)	.004	1.97 (1.29–3.03)	—
Indication, worsening maternal status	4 (14)	12 (71)	<.001	4.94 (1.90–12.88)	4.94 (1.90–12.88)
Preterm birth at less than 37 wk	30 (32)	22 (73)	<.001 <sup>  </sup>	2.37 (1.66–3.36)	2.36 (1.68–3.32)
Gestational age at delivery (wk)	35.6±5.6	33.7±4.8	.14	—	—
NICU admission	37 (44)	20 (74)	.008 <sup>  </sup>	1.77 (1.23–2.53)	1.77 (1.25–2.51)
Delivery complications					
Preeclampsia	21 (23)	5 (18)	.56	0.77 (0.32–1.86)	—
Abruptio	2 (2)	1 (4)	.56 <sup>¶</sup>	1.63 (0.15–17.26)	—
PPH	10 (11)	4 (14)	.74 <sup>¶</sup>	1.30 (0.44–3.83)	—
Transfusion	10 (11)	4 (14)	.74 <sup>¶</sup>	1.30 (0.44–3.83)	—
Stillbirth	6 (6)	1 (3)	.55 <sup>  </sup>	0.53 (0.07–4.24)	—
Neonatal positive SARS-CoV-2 test result <sup>#</sup>	0 (0)	1 (4)	—	—	—

RR, relative risk; aRR, adjusted relative risk; ICU, intensive care unit; ECMO, extracorporeal membrane oxygenation; VTE, venous thromboembolism; NICU, neonatal intensive care unit; PPH, postpartum hemorrhage; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

Data are n (%) or mean±SD unless otherwise specified.

\* Adjusted relative risk (95% CI) with pre-Delta as reference, adjusted for asthma.

<sup>†</sup> Disease severity based on the National Institutes of Health guidelines and categorized by the Metz et al study.<sup>1</sup>

<sup>‡</sup> Treatment includes azithromycin, cephalosporins, remdesivir, dexamethasone, or convalescent plasma.

<sup>§</sup> Respiratory support included any form of supplemental oxygen (nasal cannula, high flow, bilevel positive airway pressure, and intubation).

<sup>||</sup> Log-binomial regression models with repeated measures to account for correlation in data due to multiple gestations.

<sup>¶</sup> Fisher exact test.

<sup>#</sup> Positive neonatal SARS-CoV-2 test result within 48 hours of delivery; placental studies in process to help determine whether this was a vertical transmission.



# COVID19 Vaccination & Pregnancy

# COVID Vaccination & AL

## Alabama

Doses given

4.99M

Fully vaccinated

2.22M

% of population fully vaccinated

45.2%



## United States

Doses given

434M

Fully vaccinated

193M

% of population fully vaccinated

58.6%

Location	Doses given	Fully vaccinated	% of population fully vaccinated
Puerto Rico	5.13M	2.36M	74.0%
Guam	261K	122K	72.3%
Vermont	1.03M	448K	71.8%
Rhode Island	1.62M	757K	71.5%
Maine	2.06M	957K	71.2%
Connecticut	5.59M	2.54M	71.2%
Massachusetts	10.8M	4.84M	70.2%
New York	28.2M	13.1M	67.3%
New Jersey	12.7M	5.94M	66.9%
Maryland	8.83M	4.02M	66.5%
Washington, D.C.	1.1M	446K	64.4%
Washington	10.7M	4.88M	64.1%
Virginia	12.2M	5.44M	63.7%
New Hampshire	1.98M	862K	63.4%
Oregon	5.82M	2.67M	63.3%
New Mexico	2.92M	1.31M	62.6%
Colorado	8.01M	3.58M	62.2%
California	55.9M	24.5M	61.9%
Minnesota	7.59M	3.48M	61.7%
Pennsylvania	18.3M	7.85M	61.3%
Illinois	16.8M	7.74M	61.1%
Northern Mariana Islands	75,787	35,091	61.0%
Delaware	1.35M	589K	60.5%
Florida	29.3M	12.9M	60.2%
Hawaii	2.01M	852K	60.2%
Wisconsin	7.62M	3.42M	58.8%
Nebraska	2.41M	1.1M	56.6%
American Samoa	66,424	31,162	56.5%
Iowa	3.9M	1.77M	56.0%
Utah	3.83M	1.74M	54.4%
Michigan	11.9M	5.38M	53.9%
Texas	35.4M	15.6M	53.6%
Kansas	3.45M	1.56M	53.7%
Arizona	9.03M	3.9M	53.6%
Nevada	3.75M	1.65M	53.5%
South Dakota	1.07M	473K	53.5%
North Carolina	12.8M	5.59M	53.3%
Alaska	900K	389K	53.1%
Ohio	13.5M	6.11M	52.3%
Kentucky	5.07M	2.29M	51.2%
Montana	1.24M	545K	51.0%
Oklahoma	4.62M	2M	50.6%
South Carolina	5.88M	2.6M	50.5%
Missouri	6.99M	3.08M	50.2%
Indiana	7.41M	3.38M	50.1%
Georgia	11.8M	5.18M	48.8%
Tennessee	7.73M	3.32M	48.7%
Arkansas	3.35M	1.46M	48.5%
Louisiana	4.98M	2.24M	48.1%
North Dakota	839K	366K	48.0%
U.S. Virgin Islands	111K	49,688	46.7%
Mississippi	3.04M	1.38M	46.2%
Alabama	4.99M	2.22M	45.2%
Wyoming	395K	258K	44.6%
Idaho	1.78M	794K	44.4%
West Virginia	1.6M	737K	41.1%

This data shows the total number of doses given in each location. Since some vaccines require more than 1 dose, the number of fully vaccinated people is often lower. \* shows data reported yesterday - [about this data](#)

# COVID Vaccination & AL



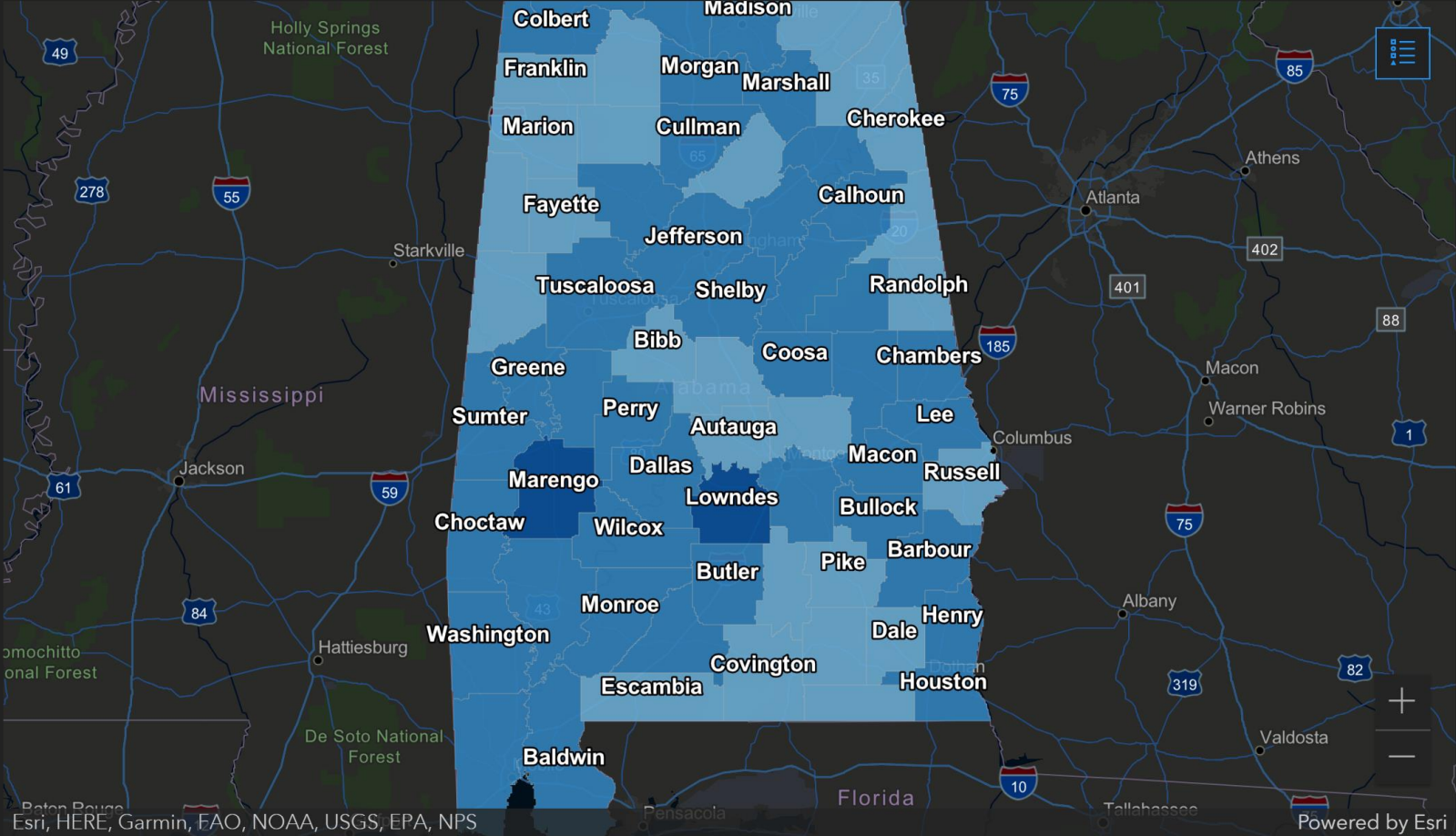
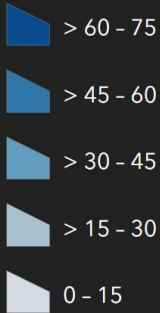
## Alabama's COVID-19 Vaccine Distribution Dashboard

Alabama Department of Public Health | Immunization Division | Updates Tuesday & Thursday by 2:00 p.m.

### Percent of Alabama Residents Receiving One or More Doses by Patient Residence

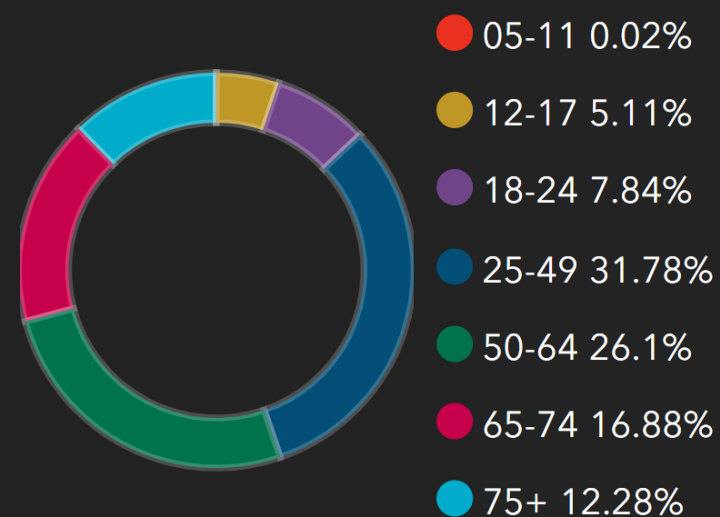
Select a county in the drop-down list to see county-level data

PCTPVAX

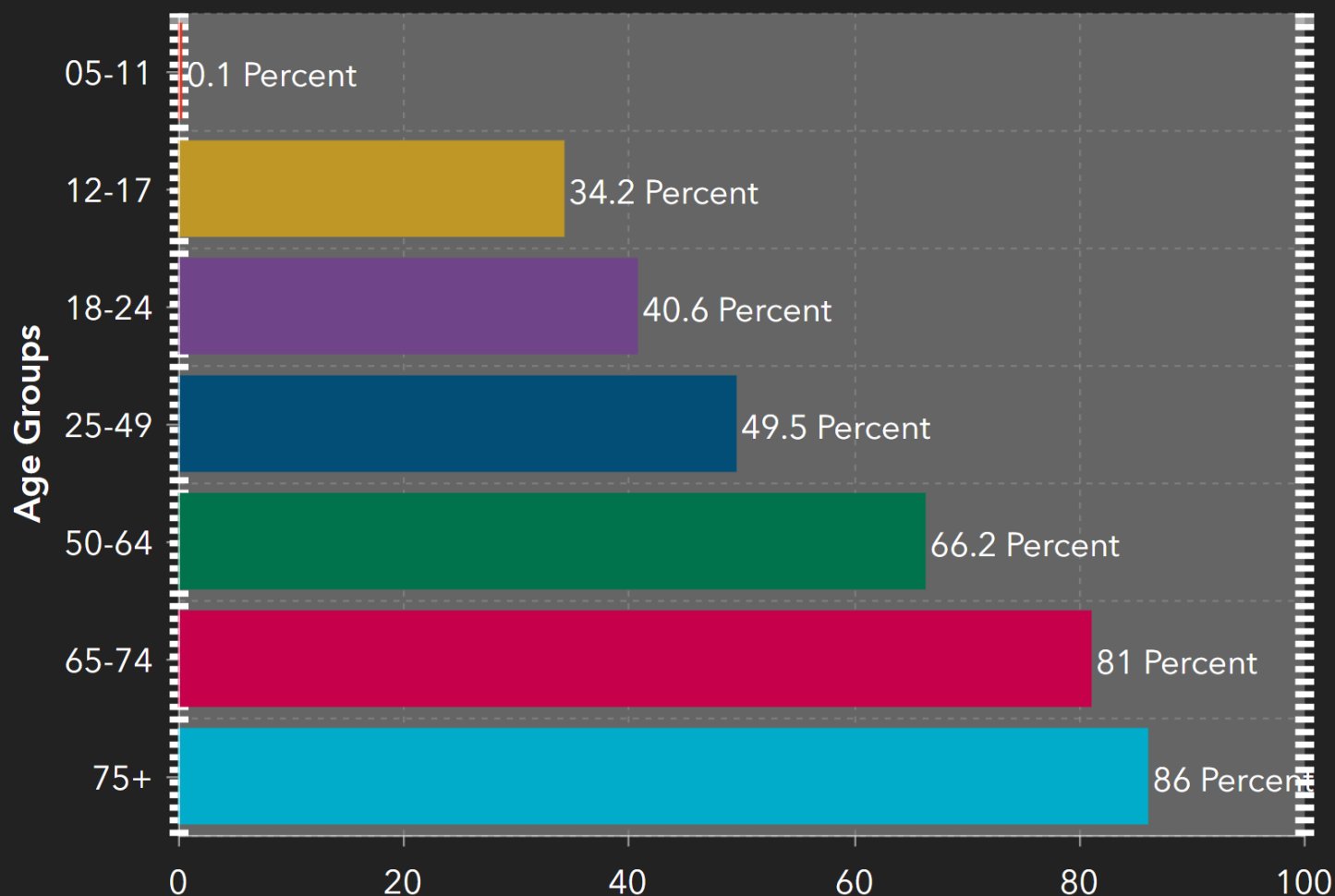


# COVID Vaccination & AL

Age in Years of People Receiving COVID-19 Vaccine

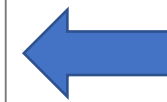
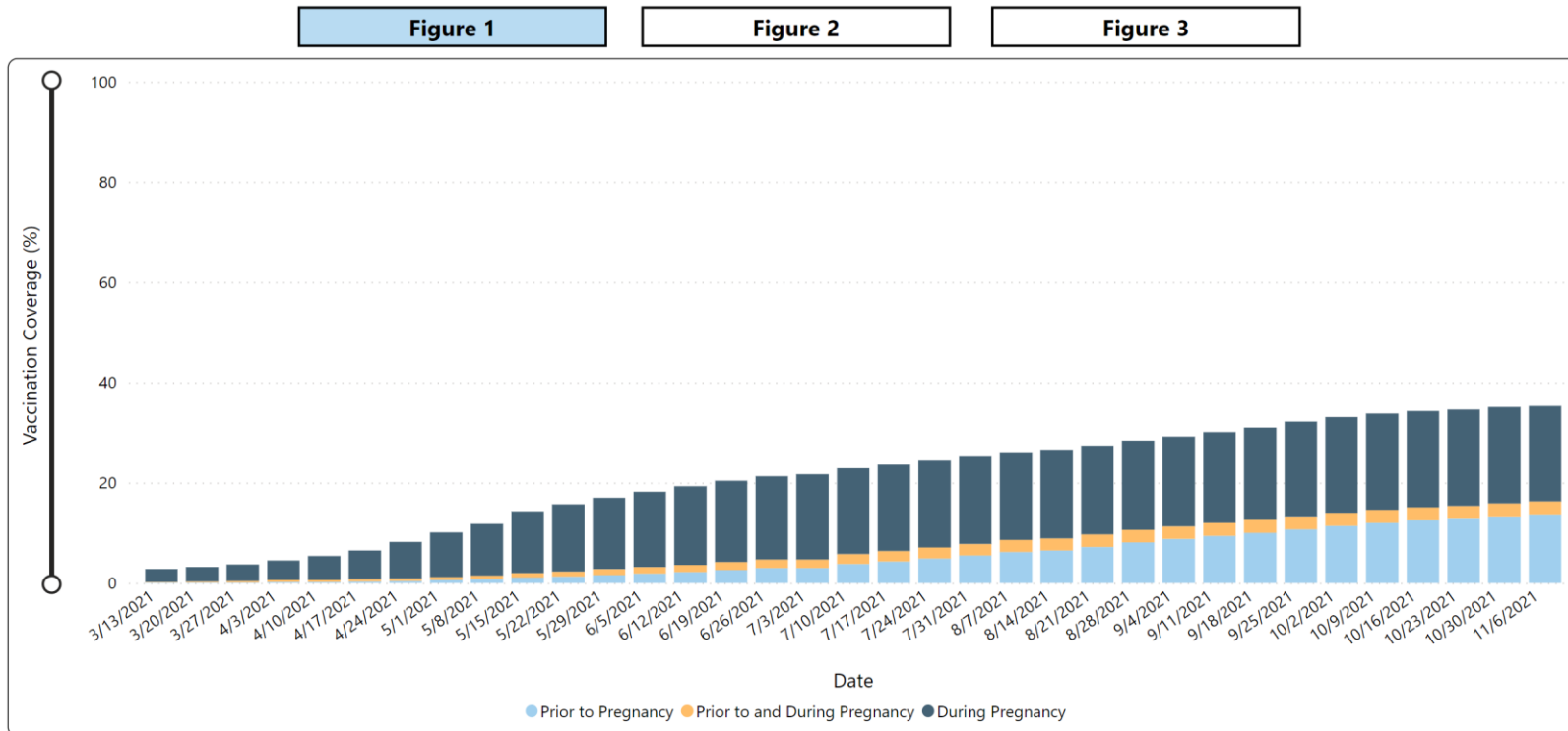


Percent of People in Alabama Initiating COVID-19 Vaccination by Age



# Pregnancy & Vaccination - US

**Figure 1: Percent of Pregnant People Aged 18–49 Years Fully Vaccinated with COVID-19 vaccine Prior to and during Pregnancy, by Timing of Vaccination and Date Reported to CDC – Vaccine Safety Datalink\*, United States  
December 14, 2020 – November 6, 2021**



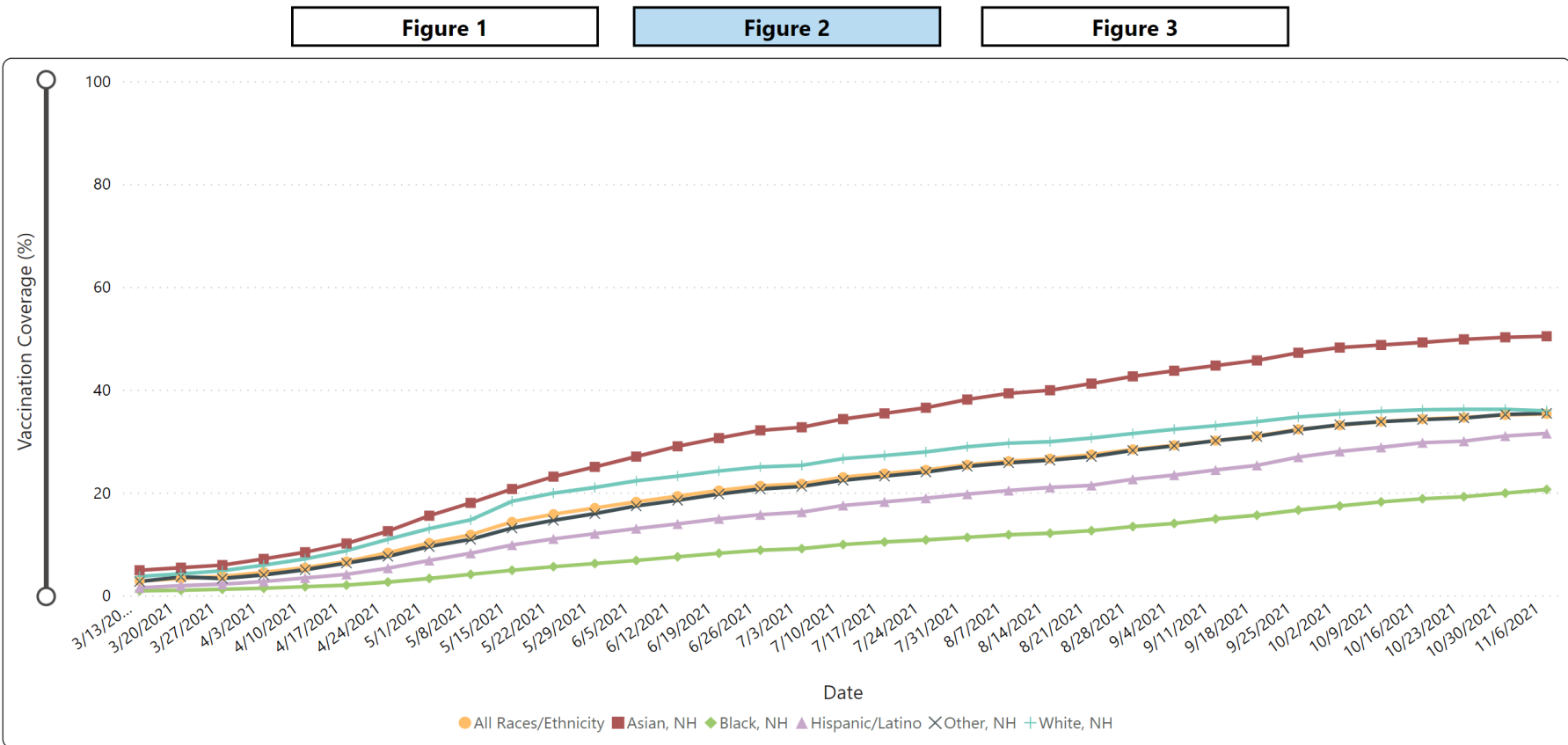
**35.3% of pregnant women vaccinated**

- 19.0 % during pregnancy
- 2.6 % prior to & during pregnancy
- 13.7 % prior to pregnancy

\*Vaccination coverage" represents the total number of pregnant people (denominator as of November 6, 2021 = 200,814) who were fully vaccinated, including both doses of the Pfizer-BioNTech or Moderna vaccines or a single dose of the Johnson & Johnson's Janssen vaccine; "prior to pregnancy" represents total number of pregnant people who were fully vaccinated prior to pregnancy, including both doses of the Pfizer-BioNTech or Moderna vaccines or a single dose of the Johnson & Johnson's Janssen vaccine; "prior to and during pregnancy" represents total number of pregnant people who received one dose of the Pfizer-BioNTech or Moderna vaccines prior to pregnancy and one during pregnancy; "during pregnancy" represents total number of people who received both doses of the Pfizer-BioNTech or Moderna vaccines or a single dose of the Johnson & Johnson's Janssen vaccine during pregnancy.

# Pregnancy & Vaccination - US

**Figure 2: Percent of Pregnant People Aged 18–49 Years Fully Vaccinated with COVID-19 Vaccine Prior to or during Pregnancy Overall, by Race/Ethnicity, and Date Reported to CDC – Vaccine Safety Datalink\*, United States  
December 14, 2020 – November 6, 2021**



Race and Ethnicity	Vaccination Coverage (%)
All Races/Ethnicity	35.3
Asian, NH	50.4
Black, NH	20.6
Hispanic/Latino	31.5
Other, NH	35.4
White, NH	35.9

NH = Non-Hispanic; "Other, NH" race includes American Indian or Alaska Native, Native Hawaiian or Pacific Islander, and Multiple or Other races; "vaccination coverage" represents the total number of pregnant people (denominator as of November 6, 2021 = 200,814) who were fully vaccinated, including both doses of the Pfizer-BioNTech or Moderna vaccines or a single dose of the Johnson & Johnson's Janssen vaccine.

# Pregnancy & Vaccination



## Key Recommendations

- The American College of Obstetricians and Gynecologists (ACOG) recommends that all eligible persons greater than age 12 years, **including pregnant and lactating individuals**, receive a COVID-19 vaccine or vaccine series.

### **SMFM: Provider Considerations for Engaging in COVID-19 Vaccine Counseling With Pregnant and Lactating Patients**

10.26.2021 (last published 10.1.21)

SMFM recommends that pregnant and lactating people be vaccinated against COVID-19. The [Centers for Disease Control and Prevention](#) (CDC) state that “COVID-19 vaccination is recommended for all people aged 12 years and older, including people who are pregnant, lactating, trying to get pregnant now, or might become pregnant in the future.”



# Pregnancy & Vaccination



ACOG



Society for

tal



## Key Recommendations

- The American College of Obstetricians and Gynecologists (ACOG) recommends that all eligible persons get vaccinated to receive a COVID-19 vaccine.

Last updated: July 30, 2021

## COVID-19 Vaccination if You Are Pregnant or Breastfeeding

### Vaccine Counseling

...ated against COVID-19. The CDC states that "COVID-19 vaccine is safe for all people aged 12 years and older, including people who are pregnant, lactating, trying to get pregnant now, or might become pregnant in the future."

...who are pregnant, lactating, trying to get pregnant now, or might become pregnant in the future."



# mRNA vaccines

- mRNA vaccines (Pfizer-BioNTech & Moderna)
  - Consist of messenger RNA encapsulated by lipid nanoparticle for delivery into the host cells
  - Host cells then use the mRNA to generate the coronavirus spike protein (relevant antigens)
  - Spike proteins, similar to all other vaccines, then stimulates immune cells to create antibodies against COVID-19.
- Key vaccine points
  - Not live virus vaccines
  - Do not leave the deltoid muscle (destroyed within days); thus cannot cross placenta
  - Do not enter the nucleus of cells
  - Do not alter human DNA in vaccine recipients
- Therefore, mRNA vaccines cannot cause genetic changes in recipients
  - CDC, Zhang 2019, Schlake 2012

# Safety of mRNA vaccines in Pregnancy

- ACOG's statement
  - Based on the mechanism of action of these vaccines and the demonstrated safety and efficacy in Phase II and Phase III clinical trials, it is expected that the safety and efficacy profile of the vaccine for pregnant individuals would be similar to that observed in nonpregnant individuals.
  - Further, a growing body of observational data so far have not identified any safety concerns for COVID-19 vaccination during pregnancy.

# Safety of mRNA vaccines in Pregnancy

- Pregnant/breastfeeding women were excluded from original vaccine trials
- Follow-up observational studies/ registries have been reassuring
  - CDC's V-safe After Vaccination Health Checker
    - Over 139,000 participants have indicated they were pregnant at the time of vaccination
    - Feb 2021, data was published on 827 completed pregnancies (mostly 3<sup>rd</sup> trimester vaccination)
      - ✓ No obvious safety signals with respect to miscarriage, congenital anomalies, fetal growth, preterm birth, stillbirth, or neonatal death.
  - CDC's Vaccine Adverse Event Reporting System
    - Data reported on 154 pregnancies
    - No excess in side effects or adverse events were observed in these early data compared with the CDC national birth data.

# Safety of mRNA vaccines in Pregnancy

- COVID vaccination & miscarriage
  - Common cause of patient concern
  - Recent studies have shown no increased risk of miscarriage with vaccination
    - NEJM Sept 2021 (Zauche et al)
      - ✓ ~2500 pregnant women receiving mRNA vaccine <20wga
      - ✓ The age-standardized cumulative risk of miscarriage was 12.8%, similar to the expected rate in the general obstetric population
    - JAMA Oct 2021 (Kharbanda et al)
      - ✓ Over 92,000 ongoing pregnancies and 13,000 miscarriages (8-9% vaccination rate)
      - ✓ Those who experienced miscarriage had similar odds of exposure to a COVID-19 vaccine in the prior 28 days as those with ongoing pregnancies (adjusted odds ratio 1.02, 95% CI 0.96-1.08)

# mRNA vaccines in Pregnancy

- COVID vaccination & fertility
  - Another common cause of patient concern
  - Studies have shown no impact on female or male fertility
    - No impact on male sperm counts
    - No impact on Ovarian follicular function
    - No impact on serum hCG, implantation rates, or sustained implantation rates during FET (IVF) in COVID vaccinated, COVID immune, and COVID unvaccinated/nonimmune individuals
    - No impact on ovarian stimulation and embryological variables in patients undergoing IVF before and after receiving COVID vaccination

# COVID19 vaccination & efficacy

- Vaccination is effective
  - Vaccination in pregnant and lactating women reduced incidence of infection compared to nonvaccinated pregnant women
  - Effectiveness of vaccination in pregnant and lactating women is similar to that in non-pregnant women
    - Similar clinical efficacy (reduction in infection)
    - Similar antibody response
- Maternal & Neonatal protection
  - Antibodies to COVID19 have been documented in cord blood as early as 15 days post-immunization
  - Antibodies to COVID19 are present in breastmilk

# Other vaccines/ injections

- TDaP / Flu vaccines
  - Previous recommendations were for 14 day delay in COVID vaccine and TDaP
  - Data has shown no issues with concurrent or close-timing administration
  - New recommendation is proceed with vaccination without delay.
- RhoGAM
  - Has not been shown to interfere with vaccine efficacy.
  - Should not influence timing of either RhoGAM or COVID vaccine administration

# Summary

---



# Summary

- COVID & Pregnancy (vs non-pregnant women)
  - Similar transmission rates to general public
  - Likely similar rates of symptomatic/asymptomatic disease
  - Symptomatic disease is worse in pregnant women
    - Higher hospitalization, ICU admission, mechanical ventilation
    - Unclear if death rates are higher in pregnant vs nonpregnant women
- COVID & Pregnancy (vs uninfected pregnant women)
  - For asymptomatic disease
    - Overall risks (including SAB, PTB, CS) appear similar (EXCEPT ↑ risk of preeclampsia)
    - Risks likely higher if >35yo, if comorbidities, or if >20 weeks
  - For symptomatic disease
    - Increased risk of more severe symptomatic disease, ICU admission, ECMO & death
    - Re: stillbirth, PTB, CS - studies remain inconclusive but recent smaller studies are suspicious for increased rates of these (conclusive evidence likely lagging; Delta variant)
  - In utero transmission is rare but has been documented (~3%)

# Summary

- COVID vaccination in pregnancy is safe
  - mRNA vaccines
    - Do not leave the deltoid muscle
    - Cannot cross the placenta
    - Do not alter human DNA
  - Pregnant women excluded from original trials
  - Observational data/studies are robust and show no harmful effects on pregnancy
- COVID vaccination is effective
  - Reduces asymptomatic, symptomatic, and severe disease
  - Just as effective in pregnancy as in non-pregnant women
    - Similar antibody levels (which are HIGHER and last LONGER than Ab from natural infection)
  - Antibodies are present in babies at birth within 15 days of vaccination!
  - Antibodies are present in breastmilk!

# Summary

- COVID vaccination & Fertility
  - Now robust (& growing) data that fertility is UNAFFECTED
- COVID vaccination & other vaccines/injections
  - No need to wait before/after TDaP or Flu
  - No issues with RhoGAM
- Recommendations
  - Pregnant & Lactating women should get vaccinated
    - all trimesters, sooner is better
  - Couples planning pregnancy should get vaccinated
  - Don't delay COVID vaccination for other vaccines

Next topic:  
COVID19 vaccine  
hesitancy in pregnancy

# References

- Allotey J, Stallings E, Bonet M, et al. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. *BMJ* 2020; 370:m3320.
- Badr DA, Mattern J, Carlin A, et al. Are clinical outcomes worse for pregnant women at  $\geq 20$  weeks' gestation infected with coronavirus disease 2019? A multicenter case-control study with propensity score matching. *Am J Obstet Gynecol* 2020; 223:764.
- Beharier O, Plitman Mayo R, Raz T, et al. Efficient maternal to neonatal transfer of antibodies against SARS-CoV-2 and BNT162b2 mRNA COVID-19 vaccine. *J Clin Invest* 2021; 131.
- Bentov Y, Beharier O, Moav-Zafir A, Kabessa M, Godin M, Greenfield CS, Ketzinel-Gilad M, Ash Broder E, Holzer HEG, Wolf D, Oiknine-Djian E, Barghouti I, Goldman-Wohl D, Yagel S, Walfisch A, Hersko Klement A. Ovarian follicular function is not altered by SARS-CoV-2 infection or BNT162b2 mRNA COVID-19 vaccination. *Hum Reprod*. 2021 Aug 18;36(9):2506-2513. doi: 10.1093/humrep/deab182. PMID: 34364311; PMCID: PMC8385874.
- Chen F, Zhu S, Dai Z, et al. Effects of COVID-19 and mRNA vaccines on human fertility. *Hum Reprod* 2021.
- Collier AY, McMahan K, Yu J, et al. Immunogenicity of COVID-19 mRNA Vaccines in Pregnant and Lactating Women. *JAMA* 2021.
- Collin J, Byström E, Carnahan A, Ahrne M. Public Health Agency of Sweden's Brief Report: Pregnant and postpartum women with severe acute respiratory syndrome coronavirus 2 infection in intensive care in Sweden. *Acta Obstet Gynecol Scand*. 2020;99:819–822.
- Conde-Agudelo A, Romero R. SARS-CoV-2 infection during pregnancy and risk of preeclampsia: a systematic review and meta-analysis. *Am J Obstet Gynecol* 2021.
- Dawood FS, Varner M, Tita A, et al. Incidence, Clinical Characteristics, and Risk Factors of SARS-CoV-2 Infection among Pregnant Individuals in the United States. *Clin Infect Dis* 2021.
- DeBolt CA, Bianco A, Limaye MA, et al. Pregnant women with severe or critical coronavirus disease 2019 have increased composite morbidity compared with nonpregnant matched controls. *Am J Obstet Gynecol* 2021; 224:510.e1.
- Delahoy MJ, Whitaker M, O'Halloran A, et al. Characteristics and Maternal and Birth Outcomes of Hospitalized Pregnant Women with Laboratory-Confirmed COVID-19 - COVID-NET, 13 States, March 1-August 22, 2020. *MMWR Morb Mortal Wkly Rep* 2020; 69:1347.

# References

- Ellington S, Strid P, Tong VT, et al. Characteristics of Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status - United States, January 22-June 7, 2020. *MMWR Morb Mortal Wkly Rep* 2020; 69:769.
- Fu W, Sivajohan B, McClymont E, et al. Systematic review of the safety, immunogenicity, and effectiveness of COVID-19 vaccines in pregnant and lactating individuals and their infants. *Int J Gynaecol Obstet* 2021.
- Goldshtein I, Nevo D, Steinberg DM, et al. Association Between BNT162b2 Vaccination and Incidence of SARS-CoV-2 Infection in Pregnant Women. *JAMA* 2021.
- Gonzalez DC, Nassau DE, Khodamoradi K, Ibrahim E, Blachman-Braun R, Ory J, et al. Sperm parameters before and after COVID-19 mRNA vaccination. *JAMA* 2021;326:273-4.
- Gray KJ, Bordt EA, Atyeo C, et al. COVID-19 vaccine response in pregnant and lactating women: a cohort study. *medRxiv* 2021.
- Khan DSA, Pirzada AN, Ali A, Salam RA, Das JK, Lassi ZS. The Differences in Clinical Presentation, Management, and Prognosis of Laboratory-Confirmed COVID-19 between Pregnant and Non-Pregnant Women: A Systematic Review and Meta-Analysis. *Int J Environ Res Public Health*. 2021 May 24;18(11):5613. doi: 10.3390/ijerph18115613. PMID: 34074005; PMCID: PMC8197383.
- Kharbanda EO, Haapala J, DeSilva M, et al. Spontaneous Abortion Following COVID-19 Vaccination During Pregnancy. *JAMA* 2021; 326:1629.
- Kotlyar AM, Grechukhina O, Chen A, et al. Vertical transmission of coronavirus disease 2019: a systematic review and meta-analysis. *Am J Obstet Gynecol* 2021; 224:35.
- Lokken EM, Huebner EM, Taylor GG, et al. Disease severity, pregnancy outcomes, and maternal deaths among pregnant patients with severe acute respiratory syndrome coronavirus 2 infection in Washington State. *Am J Obstet Gynecol* 2021; 225:77.e1.
- Martinez-Portilla RJ, Sotiriadis A, Chatzakis C, et al. Pregnant women with SARS-CoV-2 infection are at higher risk of death and pneumonia: propensity score matched analysis of a nationwide prospective cohort (COV19Mx). *Ultrasound Obstet Gynecol* 2021; 57:224.

# References

- Metz TD, Clifton RG, Hughes BL, et al. Disease Severity and Perinatal Outcomes of Pregnant Patients With Coronavirus Disease 2019 (COVID-19). *Obstet Gynecol* 2021; 137:571.
- Morris RS. 2021 SARS-CoV-2 spike protein seropositivity from vaccination or infection does not cause sterility. *Fertil Steril Reports*. 2021;2(3):253-255.
- Nir O, Schwartz A, Toussia-Cohen S, et al. Maternal-neonatal transfer of SARS-CoV-2 immunoglobulin G antibodies among parturient women treated with BNT162b2 messenger RNA vaccine during pregnancy. *Am J Obstet Gynecol MFM* 2021; 4:100492.
- Orvieto R, Noach-Hirsh M, Segev-Zahav A, Haas J, Nahum R, Aizer A. Does mRNA SARS-CoV-2 vaccine influence patients' performance during IVF-ET cycle? *Reprod Biol Endocrinol*. 2021 May 13;19(1):69. doi: 10.1186/s12958-021-00757-6.
- Qeadan F, Mensah NA, Tingey B, Stanford JB. The risk of clinical complications and death among pregnant women with COVID-19 in the Cerner COVID-19 cohort: a retrospective analysis. *BMC Pregnancy Childbirth* 2021; 21:305.
- Seasely, Angela R. MD, MS; Blanchard, Christina T. MS; Arora, Nitin MD, MPH; Battarbee, Ashley N. MD, MSCR; Casey, Brian M. MD; et al, MPH; on behalf of the CWRH COVID-19 Working Group Maternal and Perinatal Outcomes Associated With the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Delta (B.1.617.2) Variant. *Obst & Gynec*: 2021;10. doi: 10.1097/AOG.0000000000004607
- Shimabukuro TT, Kim SY, Myers TR, et al. Preliminary Findings of mRNA Covid-19 Vaccine Safety in Pregnant Persons. *N Engl J Med* 2021; 384:2273.
- Woodworth KR, Olsen EO, Neelam V, et al. Birth and Infant Outcomes Following Laboratory-Confirmed SARS-CoV-2 Infection in Pregnancy - SET-NET, 16 Jurisdictions, March 29-October 14, 2020. *MMWR Morb Mortal Wkly Rep* 2020; 69:1635.
- Zambrano LD, Ellington S, Strid P, et al. Update: Characteristics of Symptomatic Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status - United States, January 22-October 3, 2020. *MMWR Morb Mortal Wkly Rep* 2020; 69:1641.
- Zauche LH, Wallace B, Smoots AN, et al. Receipt of mRNA Covid-19 Vaccines and Risk of Spontaneous Abortion. *N Engl J Med* 2021; 385:1533.

## Alabama woman nearly killed by COVID while pregnant: 'It all could have been prevented if I had gotten a vaccination'

Updated: Oct. 19, 2021, 2:30 p.m. | Published: Oct. 19, 2021, 10:56 a.m.



Amanda Harrison holds her baby, Lake, outside her mother's home in Phenix City, Ala., on Monday, Oct. 18, 2021. Harrison was put on a ventilator and later life support after becoming ill with COVID-19 in her third trimester of pregnancy. Doctors delivered Lake at 32 weeks and put Harrison on a type of life support called extracorporeal membrane oxygenation to save her. Harrison, who was unvaccinated, is urging pregnant women to get vaccinated for COVID-19. (AP Photo/Kim Chandler) AP

# The End



# Vaccine Hesitancy in Pregnancy



Brian Brocato, DO  
ALPQC Obstetric Lead  
Maternal-Fetal Medicine  
UAB Medicine



# Vaccine Hesitancy

## What is it.....?

---

- May be different from “antivax”
  - Vaccine skeptic – someone opposed to vaccination
- Hesitant
  - Contemplate or request **delaying recommended immunization schedule**
  - Focused on perceived risk of vaccination rather than prevention of disease
  - Opinion can be swayed toward acceptance





# Vaccine Hesitancy

## In pregnancy

- Report from Ovia Health on 4500 pregnant women
  - 75% of participants – unlikely or somewhat unlikely to get the vaccine
  - Rate has not changed from May to November
  - When data is broken down by race
    - Black women – 100% unlikely to vaccinate in May
    - Black women – 70% unlikely to vaccinate in November





# Vaccine Hesitancy

## In parentine

- Report from Ovia Health on new mothers
  - 60% will vaccinate their children



# WHO publication/guidance manual

- Vaccination and trust
  - How concerns arise and the role of communication in mitigating crises

<https://www.who.int/publications/i/item/vaccination-and-trust>





# Vaccine Hesitancy

## Complex issue

---

- Complacency
  - “I’m not sure why this is necessary”
- Lack of confidence
  - “I’m worried about the safety”
- Convenience
  - “I have to work, two shots three weeks apart”





# Vaccine Hesitancy

## The risk perception gap

---

- Risks associated with disease being far greater than risk associated with vaccination is not the conclusion everyone reaches
- Individual understanding of risk is highly subjective
- Bridging the gap requires:
  - Disease risk are communicated in way that is:
    - Understandable
    - Appealing





# Messaging

**Conveys information, elicits emotion,  
creates trust, ensures understanding**

---

- Focus on gains rather than loss
  - Opportunity for better health
  - Rather than loss – risk of disease
  - Works better with preventive measures
  
- Example: “Your have a right to live a healthy life, protect that right with vaccination”







# Messaging

**Conveys information, elicits emotion,  
creates trust, ensures understanding**

---

- Narratives
  - Best when they describe the decision-making process
  - Help engage with the decision
  - Model behavior
- Example: Narrative of the decision-making process of a women who received the vaccination in pregnancy

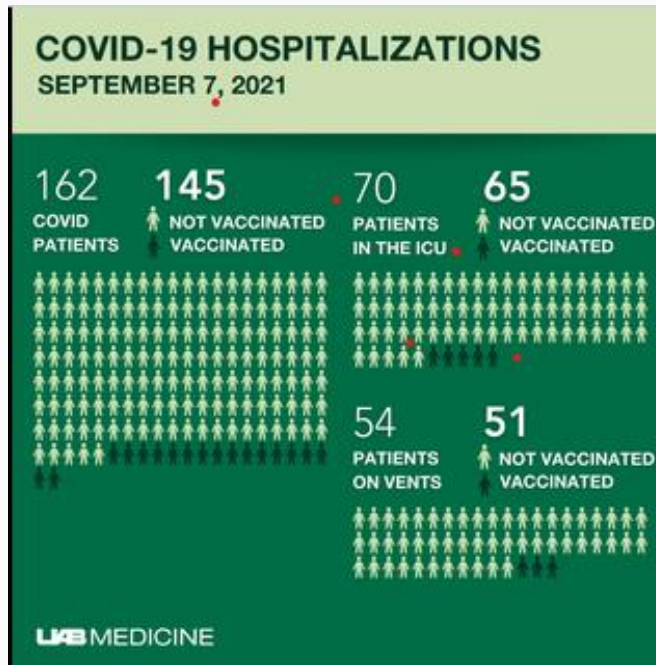


# Messaging

Conveys information, elicits emotion,  
creates trust, ensures understanding

---

- Illustrations
  - Best when combined with text





# Vaccine Hesitancy

## Addressing the issue:

---

- UAB Center for Outreach Development
  - NIH Grant
  - Aimed to address vaccine hesitancy in rural Alabama
  - Will take place in Perry County



# OB Resources

[alpqc.org/resources/covid-19](http://alpqc.org/resources/covid-19)

- ACOG: [COVID-19 Vaccines and Pregnancy - Conversation Guide for Clinicians](#) (3/5/21)
- [ACOG: Tools for Your Practice and Your Patients](#)
- SMFM: [Provider Considerations for Engaging in COVID-19 Vaccine Counseling With Pregnant and Lactating Patients](#) (7/30/21)
- ACOG: [Practice Advisory: Vaccinating Pregnant and Lactating Patients Against COVID-19](#) (7/30/21)
- CDC: [COVID-19 Vaccination Safe for Pregnant People](#) (8/11/21)
- CDC: [Receipt of mRNA COVID-19 vaccines preconception and during pregnancy and risk of self-reported spontaneous abortions](#) (8/9/21)
- [ABOG Statement Regarding Dissemination of COVID-19 Misinformation](#)
- CDC: [Expands Eligibility for COVID-19 Booster Shots](#) (10/21/21)
- SMFM Patient Education (English/Spanish): [COVID-19 Vaccines and Pregnancy](#) (3/4/21)
- [SMFM: Myth-Busting COVID-19 Vaccines in Pregnancy](#) (09/10/21)
- [MotherToBaby help line for COVID-19 and pregnancy questions](#)
- [WHO: Vaccination and Trust – How concerns arise and the role of communication in mitigating crises](#)

# Neonatal Resources

[alpqc.org/resources/covid-19](http://alpqc.org/resources/covid-19)

- CDC: [Recommends Pediatric COVID-19 Vaccine for Children 5 to 11 Years](#). (11/02/21)
- AAP: [Supporting Emotional and Behavioral Health during the COVID19 Pandemic](#) (7/28/21)
- AAP: [Children and COVID-19: State-Level Data Report](#) (11/8/21)
- AAP: [Post COVID Conditions in Children and Adolescents](#) (7/28/21)
- [AAP Management of Infants Born of Mothers with Suspected or Confirmed COVID-19](#) (5/4/21)
- [AAP Interfacility Transport of the Critically Ill Neonatal or Pediatric Patient with Suspected or Confirmed COVID-19](#) (4/29/21)
- [AAP Breastfeeding Guidance Post Hospital Discharge for Mothers or Infants with Suspected or Confirmed SARS-Co V-2 Infection](#) (3/29/21)
- [AWHONN COVID-19 Practice Guidance](#) (8/14/20)

# COVID-19 Publications

[alpqc.org/resources/covid-19](https://alpqc.org/resources/covid-19)

- NEJM: [Effectiveness of Covid-19 Vaccines against the B.1.617.2 \(Delta\) Variant.](#) (7/21/21)
- NEJM: [Breakthrough infections in vaccinated healthcare workers.](#) (7/28/21)
- JAMA: [Characteristics and Outcomes of Women With COVID-19 Giving Birth at US Academic Centers During the COVID-19 Pandemic.](#) (08/11/21)
- Bloomberg: [Pregnant, Unvaccinated and Intubated: Case Surge Alarms Doctors](#) (8/23/21)
- AJOG: [Monoclonal antibody treatment of symptomatic COVID-19 in pregnancy: initial report](#) (8/25/21)
- NEJM: [Receipt of mRNA Covid-19 Vaccines and Risk of Spontaneous Abortion](#) (9/8/21)
- NEJM: [On Preliminary Findings of mRNA Covid-19 Vaccine Safety in Pregnant Persons](#) (9/8/21)
- NEJM: [Resurgence of SARS-CoV-2 Infection in a Highly Vaccinated Health System Workforce](#) (9/9/21)
- The Lilly: [Pregnancy and coronavirus vaccines: Your questions answered](#) (9/24/21)
- Plos Medicine: [Incidence, co-occurrence, and evolution of long-COVID features: A 6-month retrospective cohort study of 273,618 survivors of COVID-19](#) (09/28/2021)
- JAMA: [Short-term and Long-term Rates of Postacute Sequelae of SARS-CoV-2 Infection](#) (10/13/21)

# Birth Equity Resources

[alpqc.org/resources/covid-19](http://alpqc.org/resources/covid-19)

- SMFM [Strategies to provide equitable care during COVID-19 | SMFM Equity](#)
- ACOG [Addressing Health Equity During the COVID-19 Pandemic](#)
- [ANA COVID-19 Webinar Series](#): wide variety of topics, including “How You Can Have a Direct Impact on Reducing the Devastating Racial Disparities of COVID-19”
- CDC [COVID-19 Response Promising Practices in Health Equity II](#)
- CDC [HEAR HER Campaign](#): includes strategies to promote birth equity and reduce preventable maternal mortality
- ACOG CO 729 - [Importance of Social Determinants of Health and Cultural Awareness in the Delivery of Reproductive Health Care](#)

# Mental Health Resources

[alpqc.org/resources/covid-19](http://alpqc.org/resources/covid-19)

- [Therapy Aid Coalition](#): free and low-fee short-term therapy for essential workers and their family members during the COVID crisis
- [ANA Video Education Series: wide variety of topics including “Effective Self-Care Tools”](#)
- [COVID-19 Self-Care Resources \(AWHONN\)](#)
- [Resources to Support Mental Health and Coping with the Coronavirus \(COVID-19\)](#) (SPRC; updated 8/25/21)
- [Taking Care of Your Mental Health in the Face of Uncertainty](#) (AFSP)
- [COVID-19: Stress and Coping](#) (CDC)



# COVID Vaccine Patient Education

## CDC -

- [Safety of COVID-19 Vaccines](#)
- [COVID-19 Vaccines While Pregnant or Breastfeeding](#)
- [How to talk with patients and caregivers about COVID-19 Vaccine](#)
- [Poster: Protect Yourself and Your Baby from COVID-19: Get Vaccinated](#)

## Protect yourself and your baby from COVID-19. Get vaccinated.



- COVID-19 vaccination is recommended for all people 12 years and older, including people who are pregnant, breastfeeding, trying to get pregnant, or might become pregnant in the future.
- The benefits of receiving a COVID-19 vaccine outweigh any known or potential risks of vaccination during pregnancy.
- There is currently no evidence that any vaccines, including COVID-19 vaccines, cause problems trying to get pregnant.
- COVID-19 vaccination in people who are pregnant or breastfeeding builds antibodies that might protect their baby.

Ask your provider about the COVID-19 vaccine.



[cdc.gov/coronavirus](https://cdc.gov/coronavirus)

Flyer: Should I get the COVID-19 vaccine? [English](#) & [Spanish](#)

## ACOG Patient Education



## COVID-19

Experts are learning more every day about the new coronavirus that causes COVID-19. ACOG is following the situation closely. Here you'll find the latest on how COVID-19 affects pregnancy, breastfeeding, and general health care for women.

## Coronavirus (COVID-19), Pregnancy, and Breastfeeding

How does COVID-19 affect pregnant women? Is it safe to get a COVID-19 vaccine? Get answers to these questions and more.

[Read FAQs](#)



## New and Notable



7 Reassuring Facts About COVID-19 Vaccines



My Vaccine Choice: How I Decided to Get a COVID-19 Vaccine During Pregnancy



Coronavirus (COVID-19) and Women's Health Care

SMFM Patient Education (English/Spanish): [COVID-19 Vaccines and Pregnancy](#)

MotherToBaby: If you would like to speak to someone about COVID-19 vaccination during pregnancy: [mothertobaby.org/ask-an-expert/](https://mothertobaby.org/ask-an-expert/)



[marchofdimes.org/covid-19-resources.aspx#resources](https://marchofdimes.org/covid-19-resources.aspx#resources)

ABOUT US HEALTH TOPICS RESEARCH & PROFESSIONALS MEDIA GET INVOLVED IN YOUR AREA

## COVID-19 PANDEMIC RESOURCES AND SUPPORT

We've created educational and support resources, including a COVID-19 Fund, for women preparing for childbirth and families caring for a newborn during this time.

### GET RESOURCES

Access and share COVID-19 resources and tools

### TAKE ACTION

Mobilize your network and step up for moms and babies

### SHARE YOUR STORY

Give voice to honest stories of pregnancy, parenting and loss

Support COVID-19 education

## GET RESOURCES

### HEALTHY MOMS STRONG BABIES WEBINAR SERIES

Each week on Facebook Live, hear the latest COVID-19 health information and have your questions answered by top maternal and infant health experts. Webinar topics include pregnancy during COVID-19, tips to relieve stress, and bringing home a newborn, among others.

[WATCH PAST EVENTS](#)

Visit Facebook to learn about this week's live event.

Visit here to watch the most recent live event.

WHAT PREGNANT & LACTATING PEOPLE NEED TO KNOW ABOUT THE COVID-19 VACCINES

Healthy Moms. Strong Babies. Webinar

March 18, 2021

2:00 - 3:00 pm ET



DR. TRACY S. STEWART



DR. ELIZABETH HENDERSON



DR. DANIEL PAPP

DR. KATE L. BOND



# DISCUSSION PANEL

**Brian Brocato, DO**  
Maternal-Fetal Medicine

**Sam Gentle, MD**  
Neonatology

**DeeAnne Jackson, MD**  
Pediatrics

**Carolyn M. Webster, MD**  
Maternal-Fetal Medicine

## Q&A

Please feel free to **unmute** and ask questions

You may also enter comments or questions in the "chat" box



❖ **THANK YOU** to the providers, nurses, healthcare workers and public health teams working to keep Alabama families safe

- You may send any questions/comments to [eguillaumet@uab.edu](mailto:eguillaumet@uab.edu)
- An evaluation will follow shortly over email, please let us know what you liked/did not like, and what you would like us to cover in future webinars.

# Thank You

---