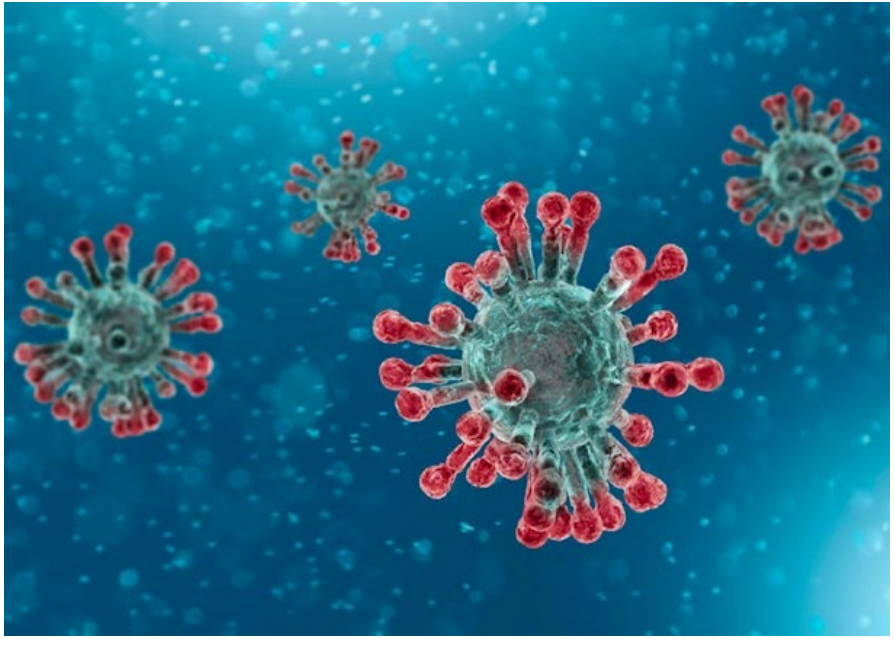
Maternal Morbidity with COVID-19 in Pregnancy and the PRIORITY Study



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June 6, 2021

UCSF

The New York Times MARCH 5, 2020

What Pregnant Women Should Know About Coronavirus

by Apoorva Mandavilli

The risks, so far, seem no greater than for anyone else, but the research is thin and only applies to later stage of pregnancy.

The information available so far is thin, but it appears that pregnant women are no more likely than anyone else to have severe symptoms from the coronavirus. In an analysis of 147 women, only 8 percent had severe disease and 1 percent were in critical condition, according to a report published on Feb. 28 by the World Health Organization.

ACOG Clinical Practice Advisory

The American College of Obstetricians and Gynecologists

March 13, 2020:

"Currently available data on COVID-19 does not indicate that pregnant women are at increased risk. However, pregnant women are known to be at greater risk of severe morbidity and mortality from other respiratory infections such as influenza and SARS-CoV. As such, pregnant women should be considered an at-risk population for COVID-19..."

December 14, 2020:

"Available data suggest that pregnant women with COVID-19 may be at increased risk for more severe illness compared with nonpregnant peers. Given the growing evidence, CDC now includes pregnant women in its "increased risk" category for COVID-19 illness. … Importantly, analyses so far are limited by a large amount of missing data …"

Research

Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis

BMJ 2020 ; 370 doi: https://doi.org/10.1136/bmj.m3320 (Published 01 September 2020)
Cite this as: *BMJ* 2020;370:m3320

- Allotey *et al,* for PregCOV-19 Living Systematic Review Consortium
- WHO-sponsored working group
- Includes all cohort studies of COVID-19 in pregnancy or recent pregnancy; all languages
- Plan to do continual updates up to 2 years
- **Versions:**
  - **Original publication- September 1, 2020 (77 studies)**
  - **Update 1- February 2, 2021 (192 studies)**

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Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis

Allotey, et al. Update 1- February 2, 2021→ included studies through October 6, 2020

192 studies: United States (n=58, 30%), China (n=31, 16%)

- Italy (n=17), Spain (n=15), Turkey (n=8), UK (n=7), India (n=7); 5 each from Brazil, France, Mexico.

64,676 pregnant or recently pregnant

- 92 studies - maternal outcomes
- 95 studies - pregnancy-related maternal outcomes

Sampling

- Universal testing (89 studies)
- Risk based guidelines (25 studies)
- Symptom based (32 studies)
- Unknown (46 studies)

Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis

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Maternal Outcomes	vs. non-pregnant with COVID-19 OR (95% CI)
Mortality	0.96 (0.79-1.18)
ICU Admission	**2.13 (1.54-2.95)**
Invasive ventilation	**2.59 (2.28-2.94)**
ECMO	**2.02 (1.22-3.34)**
O2 supplementation	0.21 (0.04-1.13)
ARDS	1.51 (0.03-79.93)
Major Organ Failure	1.51 (0.03-79.93

Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis

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Perinatal Outcomes	vs. pregnant without COVID-19 OR (95% CI)
Preterm birth <37w - 17% (6% spontaneous)	**1.47 (1.13-1.91)**
Cesarean delivery	1.12 (0.91-1.38)
Stillbirth	**2.84 (1.25-6.45)**
Neonatal death	2.77 (0.92-8.37)
NICU admission	**4.89 (1.87-12.81)**
Low 5m APGAR	1.38 (0.71-2.70)
Fetal distress	2.37 (0.77-7.31)

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Risk Factors for Severe Outcomes	OR (95% CI)			
	Severe Disease	ICU Admission	Invasive Ventilation	Maternal Death
Age ≥ 35y	**1.8 (1.3-2.6)**	**2.1 (1.7-2.6)**	1.7 (0.6-5.0)	0.9 (0.2-3.7)
BMI ≥ 30	**2.4 (1.8-3.1)**	**2.7 (1.1-6.6)**	**6.6 (2.0-22.0)**	**2.3 (1.2-4.3)**
Non-white ethnicity	0.9 (0.6-1.6)	**1.7 (1.2-2.3)**	**2.2 (1.3-4.0)**	**1.6 (1.05-2.5)**
Any Comorbidity	**1.8 (1.5-2.2)**	**1.7 (1.3-2.2)**	**5.3 (1.8-15.7)**	2.5 (0.8-8.2)
Chronic hypertension	**2.0 (1.1-3.5)**	**4.7 (2.4-9.4)**	**63.8 (9.7-420.5)**	**4.3 (1.8-10.0)**
Asthma	1.4 (0.9-2.4)	2.9 (0.5-16.7)	-	1.7 (0.7-4.2)
Pregestational diabetes	**2.1 (1.6-2.8)**	**4.7 (1.9-11.2)**	18.6 (0.3-1324)	**14.9 (4.2-52.8)**
Gestational diabetes	1.2 (0.7-2.1)	**3.3 (1.6-6.9)**	-	-
Preeclampsia	**4.2 (1.3-14.0)**	**179.4 (7.7-4168)**	-	-

Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis

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Strengths

- Rigorous meta-analysis of all available international studies
- Will continue to update

Limitations

- Heterogeneity of studies and data
- Outcomes are primarily from hospital-based diagnosis
- Awaiting data on first trimester infections
- Need more studies with contemporaneous pregnant comparison groups

The PRIORITY Study:
COVID-19 Outcomes During Pregnancy and in the Mother-Infant Dyad

Co-Principal Investigators:

Yalda Afshar, MD PhD (UCLA)

Valerie Flaherman, MD MPH (UCSF)

Stephanie L. Gaw, MD PhD (UCSF)

Vanessa Jacoby, MD MAS (UCSF)

PRIORITY: Pregnancy Coronavirus Outcomes Registry

UCLA UCSF

PRIORITY: Four Outcome Cores

Inclusion:

- Age ≥ 13 yrs
- Pregnant now or ≤ 6 weeks
- Under investigation *or* confirmed diagnosis (RT-PCR) of COVID-19 since January 2020
- Speaks any language
- Any site across the country (private practice, academic hospitals, midwives)
- If medically unable to self-consent (ventilated), family member can provide proxy consent

Maternal Outcomes

-COVID-19 disease course

-Pregnancy outcomes: miscarriage, abortion, live birth, fetal death

-Obstetric outcomes: antenatal complications, delivery outcomes and complications

-Maternal health: to 1 year postpartum

Infant Outcomes

-Newborn Outcomes: transmission, early infection, complications

-Birth defects

-Breast feeding

-Health and Development up to 1 year of life

Reproductive Health Equity and Birth Justice

-Impact of racism, poverty, care experiences in outcomes among BIPOC communities

-Identify research questions important to BIPOC communities

Biospecimens Core

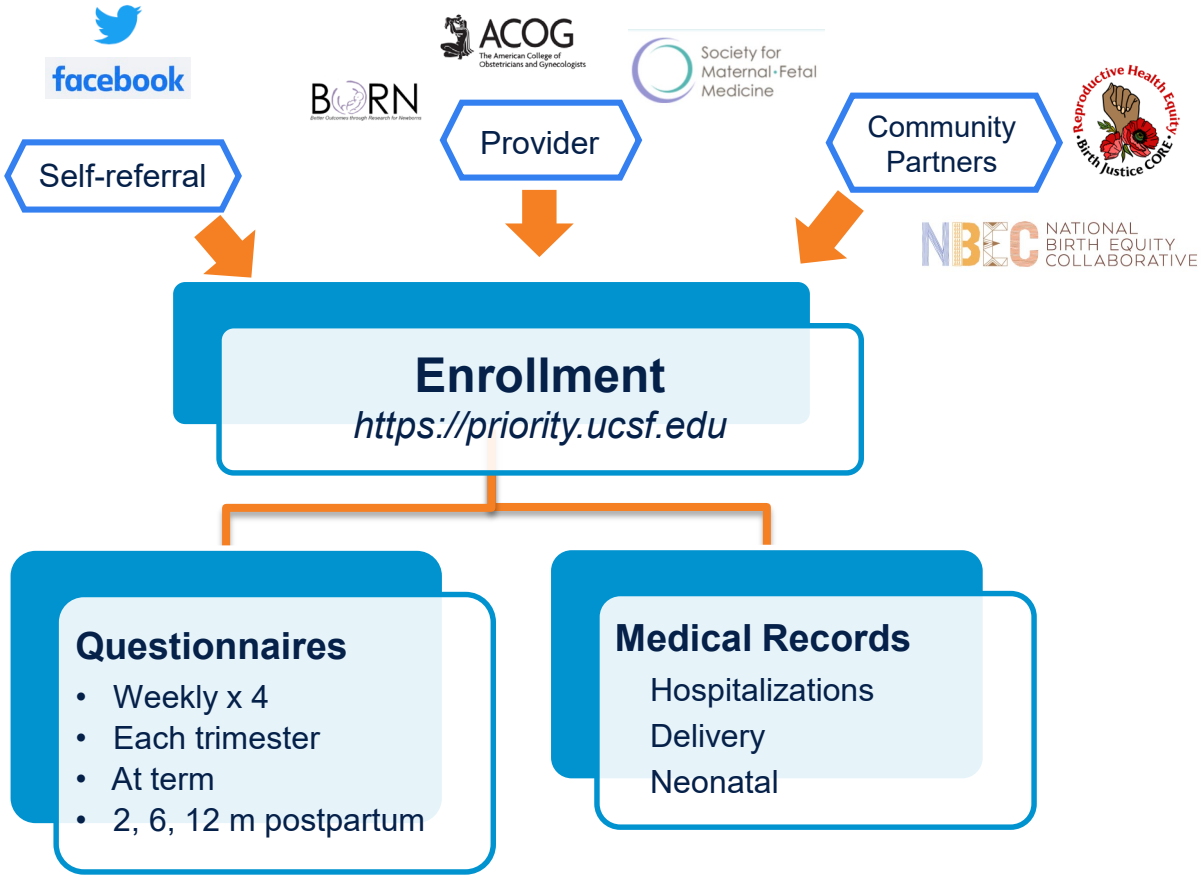
-Transmission of virus during pregnancy/birth

-Transmission in breast milk

-Impact on placental function

-Immune responses and correlations with disease severity

PRIORITY Study Design



PRIORITY-B

- Blood (maternal, cord, infant)
- Placenta
- Breastmilk
- Stool, meconium

UCSF · SANTA CLARA VALLEY MEDICAL CENTER Hospital & Clinics · UCLA · MARSHALL UNIVERSITY Joan C. Edwards School of Medicine · KernMedical · OREGON HEALTH & SCIENCE UNIVERSITY OHSU

Mother/Baby dyad is followed through 12 months of age.

Community Engagement- Addressing Disparities

Ifeyinwa V. Asiodu PhD, RN, IBCLC
Brittany D. Chambers PhD, MPH
Kia Skrine Jeffers, PhD, RN, PHN
Monica R. McLemore, PhD, MPH, RN, FAAN

RHE&BJ Core developed → platform within PRIORITY study for authentic and transparent community engagement throughout and specifically w BIPOC communities.

RHE&BJ core works to ensure that Reproductive Health Equity and Birth Justice are deeply rooted in the PRIORITY study.

- Support enrollment of Black, Indigenous, and People of Color (BIPOC) participants
- Targeted survey instruments
- National Community Advisory Council
- Research Priorities of Affected Communities (RPAC)

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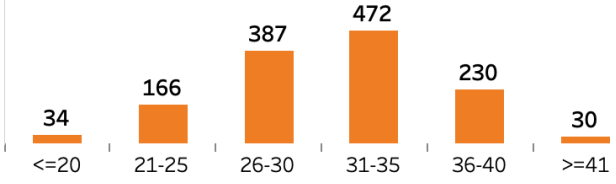
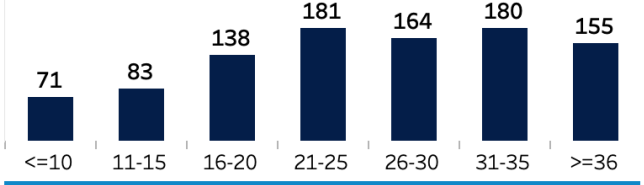
PRIORITY Study Participant Characteristics

Enrolled	COVID Status			Current Pregnancy Status	
1,333	853 COVID+	239 COVID-	241 Other	185 Pregnant	1,148 Recently Pregnant

Age (in years)



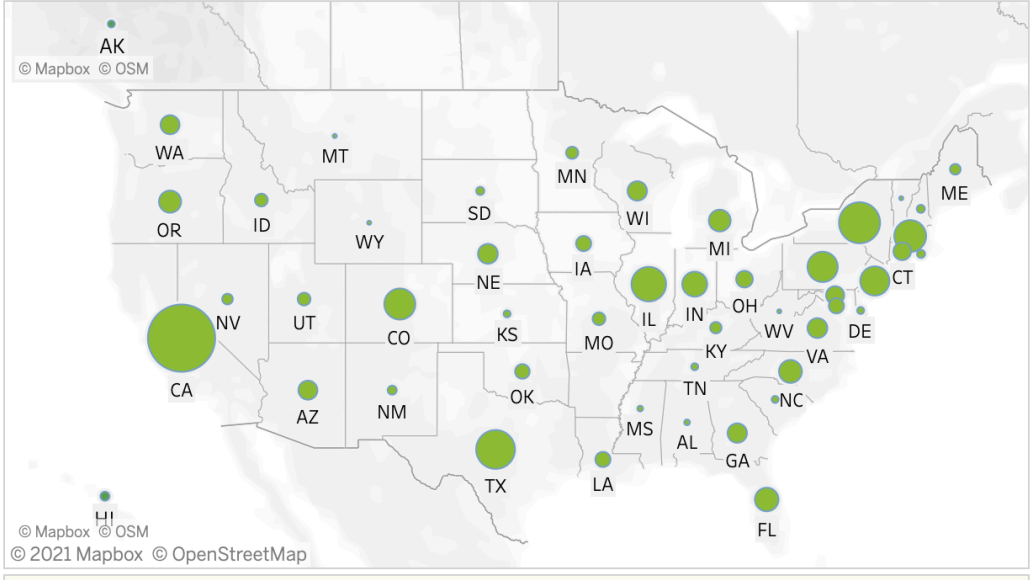
How far along in the pregnancy (in weeks)



Race/Ethnicity

- American Indian/Alaska Native: 1.1%
- Asian: 5.9%
- Black or African American: 10.0%
- Hispanic or Latina: 36.0%
- Native Hawaiian or Other Pacific Islander: 1.2%
- Unknown: 4.1%
- White: 48.9%

Map



On May 4, 2020, we launched a Reproductive Health Equity and Birth Justice Core aimed at increasing community partnerships and recruitment efforts among Black, Indigenous, and People of Color. We strive to ensure that PRIORITY participants appropriately represent racial and ethnic groups that have experienced the highest number of COVID-19 cases and deaths.

https://priority.ucsf.edu/dashboard

UCLA UCSF

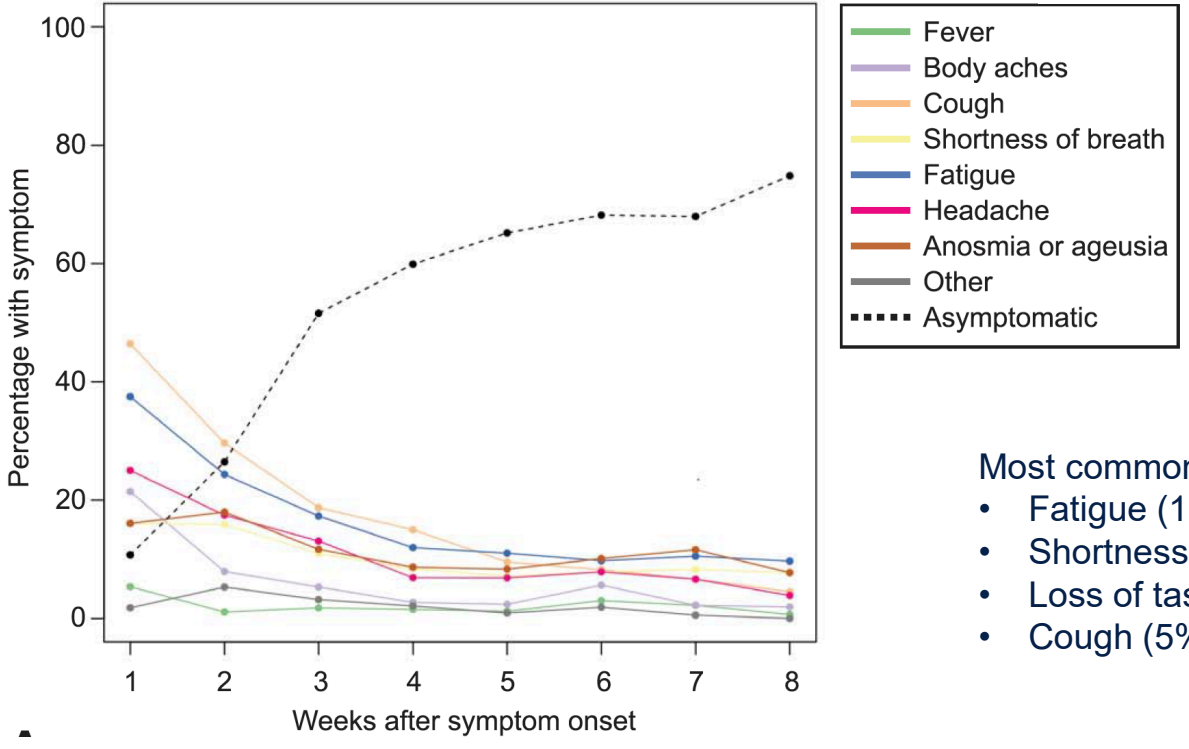
COVID-19 has prolonged course of symptoms in 25% of pregnant patients

Original Research

OPEN

Clinical Presentation of Coronavirus Disease 2019 (COVID-19) in Pregnant and Recently Pregnant People

Yalda Afshar, MD, PhD, Stephanie L. Gaw, MD, PhD, Valerie J. Flaherman, MD, Brittany D. Chambers, PhD, MPH, Deborah Krakow, MD, Vincenzo Berghella, MD, Alireza A. Shamshirsaz, MD, Adeline A. Boatin, MD, MPH, Grace Aldrovandi, MD, Andrea Greiner, MD, Laura Riley, MD, W. John Boscardin, PhD, Denise J. Jamieson, MD, and Vanessa L. Jacoby, MD, MAS, on behalf of the Pregnancy CoRonavIrus Outcomes RegIsTrY (PRIORITY) Study



95% are not hospitalized

Most common after 8w:

- Fatigue (10%)
- Shortness of Breath (8%)
- Loss of taste/smell (8%)
- Cough (5%)

Clinical Infectious Diseases

BRIEF REPORT

Infant Outcomes Following Maternal Infection With Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2): First Report From the Pregnancy Coronavirus Outcomes Registry (PRIORITY) Study

Valerie J. Flaherman,[1] Yalda Afshar,[2] W. John Boscardin,[1] Roberta L. Keller,[1] Anne H. Mardy,[1] Mary K. Prahl,[1] Carolyn T. Phillips,[1] Ifeyinwa V. Asiodu,[1] Vincenzo Berghella,[3] Brittany D. Chambers,[1] Joia Crear-Perry,[4] Denise J. Jamieson,[5] Vanessa L. Jacoby,[1] and Stephanie L. Gaw[1]

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First 263 births (179 COVID+), through 8 weeks of age

- Most babies born to COVID+ mothers were healthy
  - No difference in ICU admission or respiratory problems
- No babies had respiratory infections, pneumonia, or a need to be hospitalized in the first 6 weeks after birth.
- Births ≤ 14d of COVID-19 diagnosis had a higher chance of NICU admission than if >14d from diagnosis (26% vs 12%, p=0.03)
- 2 (1%) infants tested positive at 24 h

Forthcoming data

Maternal outcomes

- **Pregnancy and delivery outcomes**
- Maternal mental health – depression and anxiety
- Impact of social determinants of health
- Modes of transmission

Neonatal outcomes

- **958 have delivered, 917 live births.**
- **Neurodevelopment sequelae** are currently being explored
  - Ages and Stages Questionnaire, 3rd edition.
  - Survey at 6mo and 12mo follow-up.

PRIORITY-VOICE Study (Dr. Brittany Chambers)

- Interview 40 birthing people
- Explore the perceptions and experiences of engaging in maternity care;
- Identify barriers to engaging in maternity care and possible solutions on how to improve prenatal and birthing care experiences

PRIORITY-B Biospecimen Analysis

- > 300 participants enrolled, > 200 dyad samples collected
- Immune response and impact on disease severity, perinatal outcomes

UCSF School of Medicine

PRIORITY Team

UCLA

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PRIORITY-B Site Pis

Dongli Song, MD (Santa Clara Valley MC)
Balaji Govindaswami, MD (Marshall U)
Leslie Myatt, PhD (OHSU)
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Thank you to our partners

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UCSF COVID-19 (Coronavirus) Response Fund

And many individual donors through our crowdfunding sites:

https://givingtogether.ucsf.edu/fundraiser/2718761
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