



# Katz

## Katz School of Science and Health

# Infant and Maternal Outcomes During the COVID-19 Pandemic

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### ABSTRACT

During the COVID-19 pandemic, SARS-CoV-2 infection during pregnancy had a negative impact on infant development. To investigate the health outcomes in infants born to COVID+ and COVID- patients, all infants born to mothers with SARS-CoV-2 infection during pregnancy (N=758) and without (N=9345) from 03/01/2020 to 08/17/2022, and infants born pre-pandemic from 03/01/2017 to 08/17/2019 at Montefiore Health System were studied. There were no differences in weight, length, or head circumference curves between infants born to COVID+ and COVID- patients over the first two years of life. Annualized incidence of healthcare utilization were similar between groups, but infants of COVID+ patients had lower annualized incidence of bronchiolitis. Outcomes were not different across COVID-19 waves, except preterm birth incidence was higher in infants born to COVID+ patients in the 1st wave. Compared to pre-pandemic infants, the length of pandemic infants was lower from birth to nine months. Pandemic infants additionally had more adverse perinatal outcomes including increased stillbirth and decreased gestational age, birthweight, and birth length. Pandemic mothers had higher proportion of un-insurance and 1st quintile median household income.

### INTRODUCTION

The COVID-19 pandemic raised concerns about the impact of the SARS-CoV-2 virus on pregnant patients and infants, since there is evidence of vertical transmission during pregnancy or delivery (Vivanti, 2020).

Mothers' cardiovascular, respiratory and psychological distress from pandemic circumstances, could negatively affect fetal development in utero leading to preeclampsia, stillbirth, low birth weight and length, and increased risk of developmental and behavioral disorders (Edlow et al., 2022; Edlow et al., 2023; Fajardo et al., 2023; Hessami et al., 2022; Shah et al., 2023; Shuffrey et al., 2022; Zeng et al., 2021).

The goal of this study was to investigate the physical development, incidence of common pediatric illnesses, and healthcare utilization in the first two years of life of infants born to patients with and without SARS-CoV-2 infection during pregnancy. The following factors were considered:

- physical development of infants measured by weight, length, and head circumference
- admission to emergency department
- common pediatric diagnoses and symptoms
- infection incidence of infants
- socioeconomic status
- insurance status
- prenatal care adequacy

Comparison was made to infants born prior to the COVID-19 pandemic to assess whether pandemic circumstances affected outcomes.

### METHODOLOGY

Five groups of patients who delivered infants within the Montefiore Health System were investigated:

- infants of patients who were hospitalized for SARS-CoV-2 infection during gestation (COVID-hospitalized, N=39)
- infants of patients who were infected with COVID-19, but not hospitalized due to infection during gestation (COVID-non-hospitalized, N=719)
- all infants of patients who tested positive for COVID-19 during gestation, (COVID+, N=758)
- infants of patients who tested negative for COVID-19 during gestation, (COVID-, N=9345)
- infants born prior to the pandemic (pre-pandemic, N=3221)

For group 1-4, infants were born from 3/1/2020 to 8/17/2022 and for group 5, infants were born from 3/1/2017 to 8/17/2019.

SARS-CoV-2 infection was identified with real-time reverse transcriptase PCR-positive assay testing for SARS-CoV-2 RNA.

Health data came from the Montefiore Health System which included the Bronx and lower Westchester County.

Data was extracted and analyzed with statistical software using SQL queries and

### RESULTS

#### Pre-Pandemic vs. pandemic: *Pandemic infants had -*

- lower gestational age (38.41±2.71 vs 38.68±2.55 weeks, p<0.0001),
- Lower birthweight (2597.50±335.88 vs 3142.03±643.92 grams, p<0.0001)
- Lower birth length (48.08±4.61 vs 49.09±3.93 cm, p<0.0001)
- increased incidence of stillbirth (0.75% vs 0.12%, p=0.0001)
- Increased delivered by cesarean (35.88% vs 32.47%, p=0.0005).
- fewer emergency visits (1.59±2.80 vs 2.52±2.20, p<0.0001) but increased outpatient visits (16.94±17.87 vs 15.13±14.54, p=0.002)

#### *Pandemic mothers had -*

- higher proportions of median household incomes in the 1st quintile (21.72% vs 17.88%, p<0.0001), lower proportions in the 3rd quintile (16.44% vs 18.97%, p=0.009)
- lower Medicaid use (74.83% vs 77.46%, p=0.003) and higher uninsured status (2.30% vs 1.55%, p=0.013)
- lower adequate PNC (10.18% vs 14.16%, p<0.0001) and higher inadequate PNC (42.01% vs 34.65%, p<0.0001)

#### **Covid+ vs. Covid- during pandemic:**

- No group differences in growth charts
- Infants born to COVID+ patients in the 1st wave had a higher incidence of preterm birth (21.49% vs 12.53%, p=0.011)

### DISCUSSION & CONCLUSIONS

- This is one of the largest and longest follow-up studies of physical development, illness incidence, and healthcare utilization of infants born to COVID+ patients.
- Some primary and secondary outcomes were affected by birthing persons' COVID-19 status, patient profiles, and pandemic circumstances.
- While it is reassuring that infants born to SARS-CoV-2 infected patients showed normal physical development up to 2 years of age, longer term effects of in utero exposure to COVID-19 disease are still unknown.
- Longer follow-up studies, that include mental and cognitive development assessments are warranted.

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