COVID-19 epidemiology in children ages 6 months–4 years

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Centers for Disease Control and Prevention
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Overview

- COVID-19 incidence and burden
- Emergency department visits
- Hospitalization rates and severity
- COVID-19-associated mortality
- Multisystem Inflammatory Syndrome in Children (MIS-C)
- Post-COVID conditions
- Other impacts of the pandemic on children and families
Currently eligible for COVID-19 vaccination

6 months–4 years

5–11 years

12–17 years
COVID-19 incidence and burden
Trends in number of COVID-19 cases in the United States among persons of all ages

January 23, 2020 – June 14, 2022
Cases: 85,681,615

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COVID-19 weekly cases per 100,000 population among children ages 0–17 years by age group — United States
March 1, 2020 – June 12, 2022

Reporting may be incomplete for the most recent two weeks of data, denoted by the grey box.
COVID-19 weekly cases per 100,000 population among children ages 0–17 years by age group — United States
March 1, 2020 – June 12, 2022

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>578,168</td>
</tr>
<tr>
<td>1–4 years</td>
<td>1,945,389</td>
</tr>
<tr>
<td>5–11 years</td>
<td>5,106,673</td>
</tr>
<tr>
<td>12–17 years</td>
<td>5,691,196</td>
</tr>
</tbody>
</table>

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Seroprevalence of infection-induced SARS-CoV-2 antibodies among children ages 6 months–17 years — National Commercial Lab Seroprevalence Study
September 2021– April 2022

Shading indicates confidence intervals for each trend line.
COVID-19-associated emergency department (ED) visits
Weekly percent of emergency department visits diagnosed with COVID-19 among children ages 1–17 years, National Syndromic Surveillance Program
May 3, 2020–May 14, 2022

Dashed line, on December 19, 2021, represents the first date when >50% of nationally sequenced SARS-CoV-2 specimens were Omicron variant. Data contains emergency department visits from NSSP ED data feeds consistently reporting data from 2020-2022. The data contains visits with an ICD-10 or SNOMED code for COVID-19.
COVID-19-associated hospitalizations

Burden and severity of disease
COVID-19-associated hospitalizations among children and adolescents 6 months–17 years, COVID-NET
March 2020 – March 2022

Cumulative COVID-19-associated hospitalizations among **children and adolescents 6 months–17 years**, COVID-NET

March 2020 – March 2022

Rates of monthly COVID-19-associated hospitalizations by vaccination status among children and adolescents 5–17 years, COVID-NET
June 2021 – March 2022

Proportion of *children ages 6 months–4 years* with COVID-19 associated hospitalization who were primarily admitted for COVID-19, COVID-NET March 2020 – March 2022

<table>
<thead>
<tr>
<th></th>
<th>Primarily admitted for COVID-19</th>
<th>Other reason for admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Omicron</td>
<td>87.3%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Omicron</td>
<td>86.1%</td>
<td>13.9%</td>
</tr>
</tbody>
</table>

All children in COVID-NET had a positive SARS-CoV-2 test within 14 days of or during hospital admission. “Primarily admitted for COVID-19” was defined based on the “Reason for admission” field from the case report form. If the chief complaint or history of present illness in the medical chart documents fever/respiratory illness, COVID-19-like illness, or a suspicion for COVID-19, a case is categorized as having COVID-19 as the primary reason for admission. Examples of other non-COVID-19-related reasons for admission seen in this age group include admissions for trauma or inpatient surgeries.

Percent of children ages 6 months–4 years with COVID-19 associated hospitalization with underlying health conditions

- At least 1 underlying medical conditions
- No underlying medical conditions

New Vaccine Surveillance Network, March 2020 – April 2022
- 46%
- 54%

COVID-NET, March 2020 – March 2022
- 49%
- 51%

Source: 1. New Vaccine Surveillance Network. Preliminary data as of May 25, 2022, reflecting data from March 2020–April 2022

BiPAP: bilevel positive pressure, CPAP: continuous positive pressure

<table>
<thead>
<tr>
<th>Age Group</th>
<th>ICU Admission</th>
<th>High Flow Nasal Cannula</th>
<th>BiPAP or CPAP Use</th>
<th>Mechanical Ventilation</th>
<th>In-Hospital Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 months–4 years (N=535)</td>
<td>23.6%</td>
<td>19.6%</td>
<td>18.6%</td>
<td>6.4%</td>
<td>0.0%</td>
</tr>
<tr>
<td>5–11 years (N=260)</td>
<td>16.2%</td>
<td>6.8%</td>
<td>4.9%</td>
<td>6.4%</td>
<td>0.0%</td>
</tr>
<tr>
<td>12–17 years (N=256)</td>
<td>6.4%</td>
<td>5.8%</td>
<td>3.3%</td>
<td>6.4%</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

COVID-19-associated hospitalizations

Comparisons to other pediatric infectious diseases
Cumulative influenza- and COVID-19-associated hospitalization rates per 100,000 children ages 6 months–4 years, FluSurv-NET and COVID-NET, 2017–2022

Cumulative influenza- and COVID-19-associated hospitalization rates per 100,000 children ages 6 months–4 years, FluSurv-NET and COVID-NET, 2017–2022

Among children ages 6 months–4 years

- Oct 2020–Sep 2021 COVID-19 hospitalization rates were lower than influenza hospitalization rates during 2017–18 through 2019–20 (pre-pandemic) influenza seasons

- Oct 2021–Apr 2022 COVID-19 hospitalization rates were as high or higher than influenza hospitalization rates during 2017–18 through 2021–22 influenza seasons

Other Pediatric Vaccine Preventable Diseases: Hospitalizations per Year Prior to Recommended Vaccines

<table>
<thead>
<tr>
<th>Age</th>
<th>Time period</th>
<th>Hospitalization Burden (Annual rate per 100,000 population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis A&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2005</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Varicella&lt;sup&gt;2&lt;/sup&gt; (Chickenpox)</td>
<td>1993–1995</td>
<td>29-42</td>
</tr>
<tr>
<td>Vaccine-type Invasive Pneumococcal Disease&lt;sup&gt;3&lt;/sup&gt;</td>
<td>1998–1999</td>
<td>40&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
<tr>
<td>COVID-19&lt;sup&gt;4&lt;/sup&gt;</td>
<td>Year 1: April 2020–March 2021&lt;br&gt;Year 2: April 2021–March 2022</td>
<td>Year 1: 29.8&lt;br&gt;Year 2: 89.3</td>
</tr>
</tbody>
</table>

1. [https://www.cdc.gov/mmwr/preview/mmwrhtml/ss5603a1.htm](https://www.cdc.gov/mmwr/preview/mmwrhtml/ss5603a1.htm)
5. Vaccine-type invasive pneumococcal disease annual rate for children <5 years in 1998-1999 was 80 per 100,000, of which about 50% were hospitalized.
COVID-19-associated mortality
COVID-19 deaths in children and adolescents by age based on death certificate data, National Center for Health Statistics, January 1, 2020–May 11, 2022

Children 6 months–4 years:

202 COVID-19 deaths
1.7% of all deaths in this age group

COVID-19 is a leading cause of death among children ages 0–19 years
March 1, 2020–April 30, 2022

<table>
<thead>
<tr>
<th>Age group</th>
<th>Rank of COVID-19 among causes of death</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 year</td>
<td>4</td>
</tr>
<tr>
<td>1–4 years</td>
<td>5</td>
</tr>
<tr>
<td>5–9 years</td>
<td>5</td>
</tr>
<tr>
<td>10–14 years</td>
<td>4</td>
</tr>
<tr>
<td>15–19 years</td>
<td>4</td>
</tr>
</tbody>
</table>

Based on death certificate data from the National Center for Health Statistics. COVID-19 based on cumulative total incidence of COVID-19 deaths from March 1, 2020-April 30, 2022.

Source: Flaxman S, Whittaker C, Semenova E et al. Covid-19 is a leading cause of death in children and young people ages 0-19 years in the United States. medRxiv 2022.05.23.22275458; doi: https://doi.org/10.1101/2022.05.23.22275458
Pediatric vaccine preventable diseases: **Deaths per year in the United States prior to recommended vaccines**

<table>
<thead>
<tr>
<th>Age</th>
<th>Hepatitis A&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Meningococcal (ACWY)&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Varicella&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Rubella&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Rotavirus&lt;sup&gt;5&lt;/sup&gt;</th>
<th>COVID-19&lt;sup&gt;6&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average deaths per year</td>
<td>3</td>
<td>8</td>
<td>16</td>
<td>17</td>
<td>20</td>
<td>86</td>
</tr>
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Multisystem Inflammatory Syndrome in Children (MIS-C)
Multisystem Inflammatory Syndrome in Children (MIS-C)

- Severe illness in **persons ages 0–20 years** characterized by fever, multisystem organ involvement, laboratory evidence of inflammation, and SARS-CoV-2 infection with no alternative plausible diagnosis

- Occurring 2-6 weeks after acute SARS-CoV-2 infection
  - 60–70% of patients are admitted to intensive care
  - 1–2% die

Daily MIS-C and COVID-19 cases reported to CDC (7-day moving average), onset February 19, 2020–May 21, 2022

Total MIS-C cases: 8,525
69 deaths

MIS-C cases are among individuals ages <21 years. COVID-19 cases reflect all cases reported to CDC (among individuals of all ages). The grayed-out area on the right side of the figure represents the most recent 6 weeks of data, for which reporting of MIS-C cases is still incomplete. Date of onset was missing for 1 of the 8,525 cases.

Weekly MIS-C case counts among persons ages 0–20 years by age group (N=8,525)
February 1, 2020 – May 31, 2022
Weekly MIS-C case counts among **persons ages 0–20 years** by age group (N=8,525)
February 1, 2020 – May 31, 2022

Among children 6 months–4 years:
1,990 cases
9 deaths

CDC Data. Age is missing for 1 case
MIS-C patients by race & ethnicity for children and adolescents ages 6 months–17 years by age group
February 1, 2020 – May 31, 2022

Age is missing for 1 case.
Source: CDC data. Accessed June 7, 2022
Post-COVID Conditions in Children
Post-COVID conditions in children

- A range of new, returning or ongoing, health problems occurring 4 or more weeks after acute SARS-CoV-2 infection
- Occur in adults and children <18 years
- Children ages 0–5 years with SARS-CoV-2 infection are more likely than controls (without known SARS-CoV-2 infection) to experience the following symptoms lasting more than 4 weeks after acute infection
  - Fatigue
  - Loss of taste
  - Loss of smell

Post-COVID conditions in children

- Evidence regarding the prevalence and spectrum of post-COVID conditions among children, especially young children, is limited by
  - Inability of younger children to verbalize symptoms
  - Few studies including children
  - Lack of control groups
  - Symptoms frequently occur in children without known SARS-CoV-2 infection

Other impacts of the COVID-19 pandemic on children and families
Percent of parents who say: In the past year, they or another adult in their household left a job or changed work schedules to take care of their children

July 15, 2021–August 2, 2021

<table>
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<th>Category</th>
<th>Percent</th>
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<tr>
<td>Total parents</td>
<td>39%</td>
</tr>
<tr>
<td>Parent of child under age 5 years</td>
<td>48%</td>
</tr>
<tr>
<td>Parent of child ages 5-11 years</td>
<td>45%</td>
</tr>
<tr>
<td>Parent of adolescent ages 12-17 years</td>
<td>33%</td>
</tr>
<tr>
<td>Parent age</td>
<td></td>
</tr>
<tr>
<td>18-39 years</td>
<td>44%</td>
</tr>
<tr>
<td>40 years and older</td>
<td>34%</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>53%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>44%</td>
</tr>
<tr>
<td>White</td>
<td>32%</td>
</tr>
<tr>
<td>Household income</td>
<td></td>
</tr>
<tr>
<td>&lt;$40K</td>
<td>51%</td>
</tr>
<tr>
<td>$40K-$89.9K</td>
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**Race/Ethnicity**
- Black: 53%
- Hispanic: 44%
- White: 32%

**Household income**
- <$40K: 51%
- $40K-$89.9K: 35%
- $90K or more: 35%

Other indirect impacts of COVID-19 pandemic on children

- Worsening of mental or emotional health
- Widening of existing education gaps
- Decreased physical activity and increased body mass index (BMI)
- Decreased healthcare utilization
- Decreased routine immunizations
- Increase in Adverse Childhood Experiences (ACEs)
Conclusion
Summary: COVID-19 epidemiology in children and adolescents ages 6 months–4 years

- As of June 12, 2022, COVID-19 has caused >570,000 cases among infants age <1 year and >1.9 million cases among children ages 1–4 years.

- Omicron surge in the United States led to the highest numbers of COVID-19 cases, emergency department visits, and hospitalization rates seen during the pandemic.
Summary: COVID-19 epidemiology in children and adolescents ages 6 months–4 years

- Children ages 6 months–4 years are at risk of severe illness from COVID-19
  - More than half of hospitalized children ages 6 months–4 years had no underlying conditions
  - During Omicron predominance, COVID-19 associated hospitalizations among children ages 6 months–4 years have similar or increased severity compared to older children and adolescents
  - Burden of COVID-19 hospitalization is similar to or exceeds that of other pediatric vaccine preventable diseases

- COVID-19 pandemic continues to have significant impact on families and increases disparities
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- Division of Vital Statistics, National Center for Health Statistics
- Many more…
For more information, contact CDC
1-800-CDC-INFO (232-4636)

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