

# Vaccination of children against Flu and COVID-19: who benefits?

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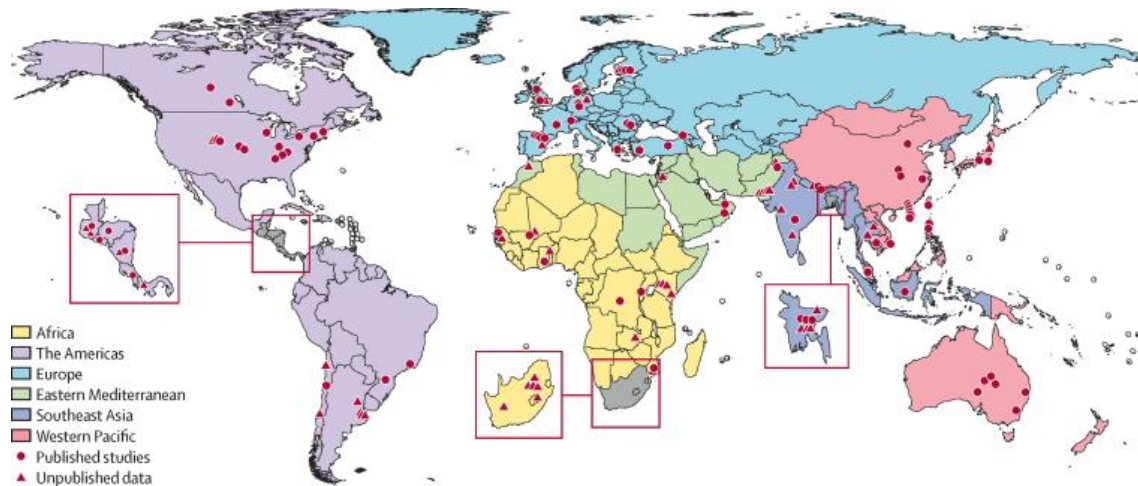
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# Global burden of respiratory infections associated with seasonal influenza in children < 5years

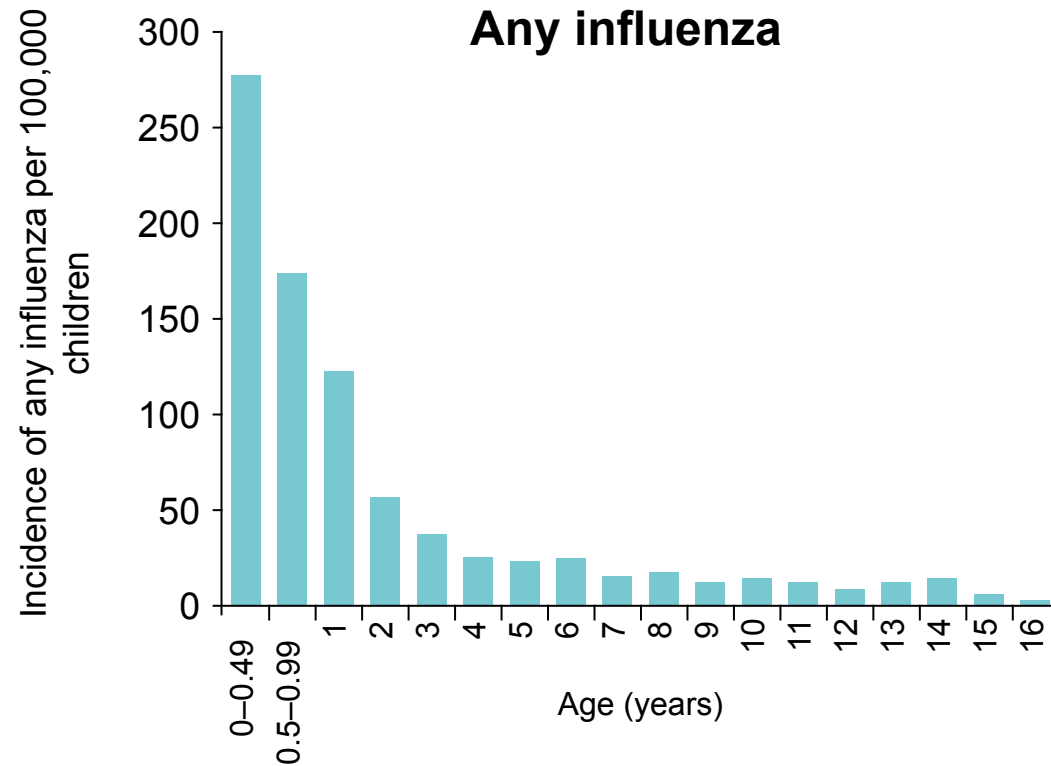


157 studies around the world

- 109.5 million episodes of influenza
- 10.1 million influenza-associated lower respiratory infections
- 870 000 hospitalizations
- 34 800 deaths
- 82% of in-hospital deaths in low-income and lower-middle-income countries

# Incidence of influenza-associated hospitalizations in children < 16 years of age (n=69,068)

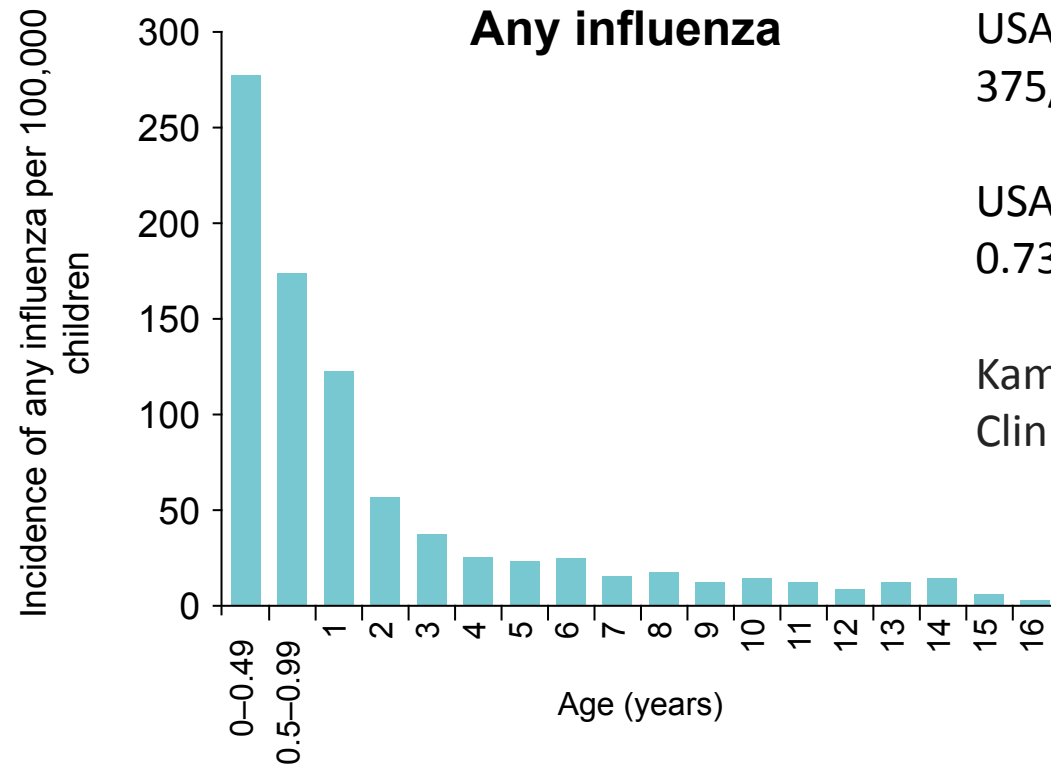
16-year retrospective study  
July 1988–June 2004  
In Finland



Silvennoinen et al.  
Pediatr Infect Dis J 2011

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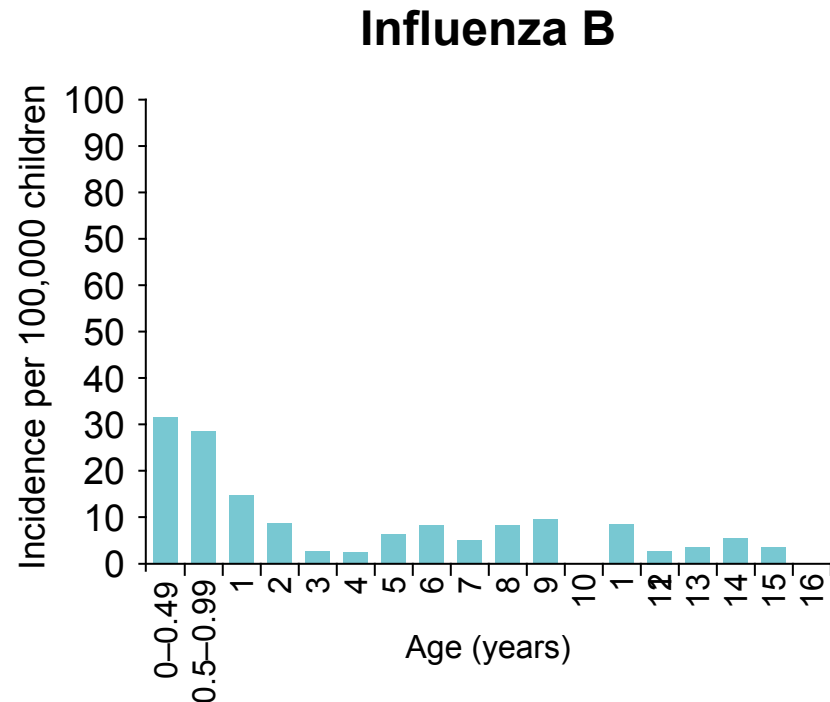
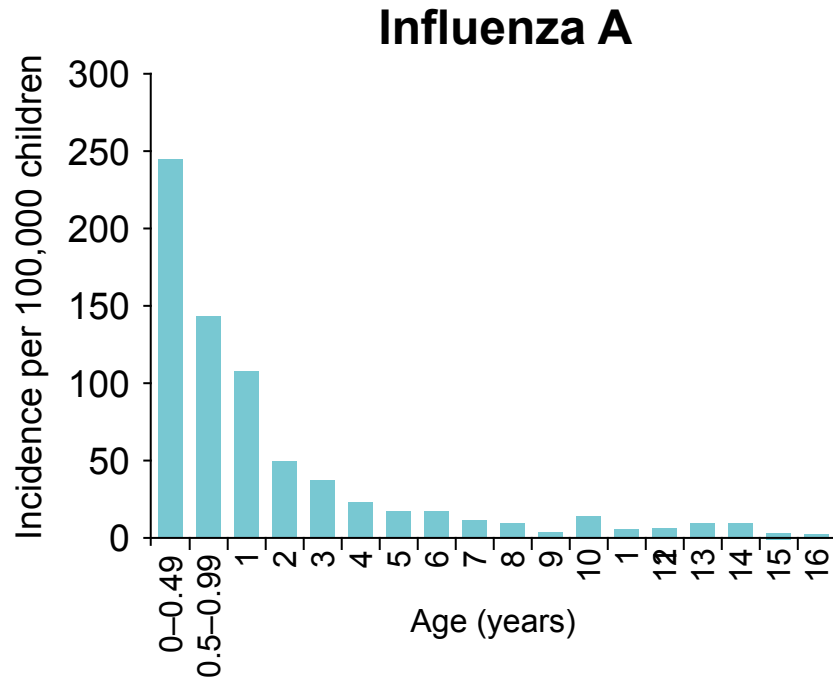
USA hospitalizations < 6 mo:  
375/100 000

USA in-hospital mortality < 6 mo:  
0.73/100 000

Kamidani et al.  
Clin Infect Dis 2022

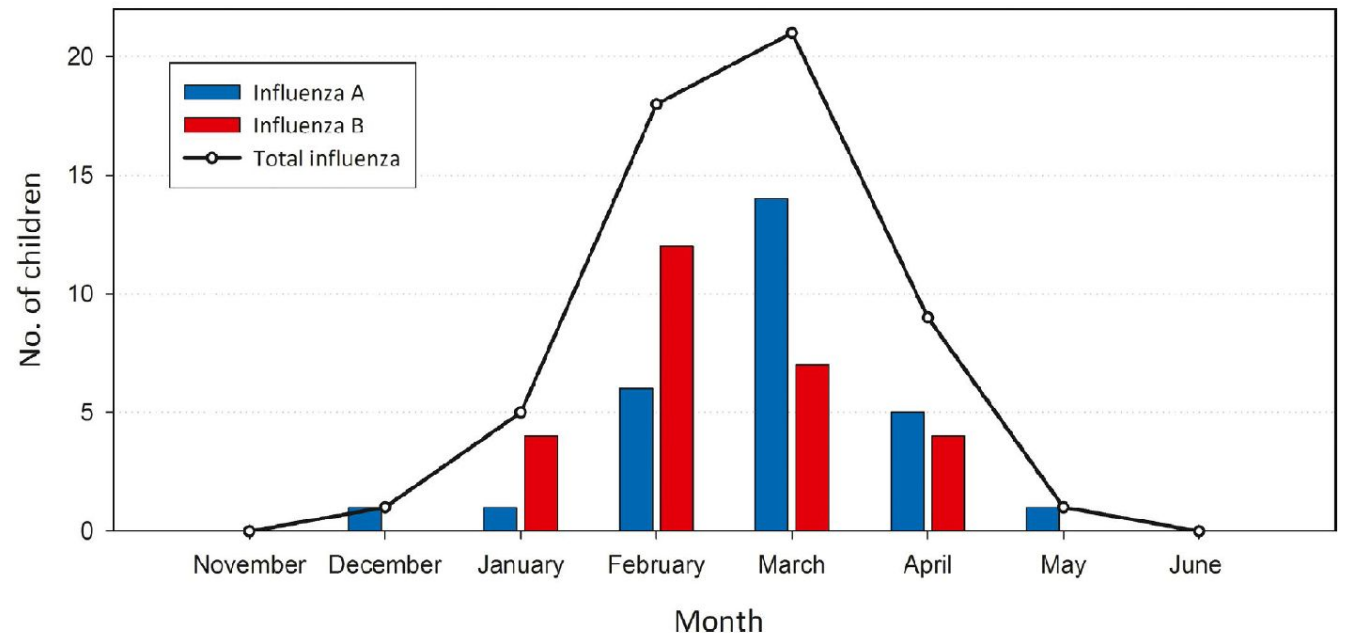
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# Incidence of influenza-associated hospitalizations in children < 16 years of age (n=69,068)

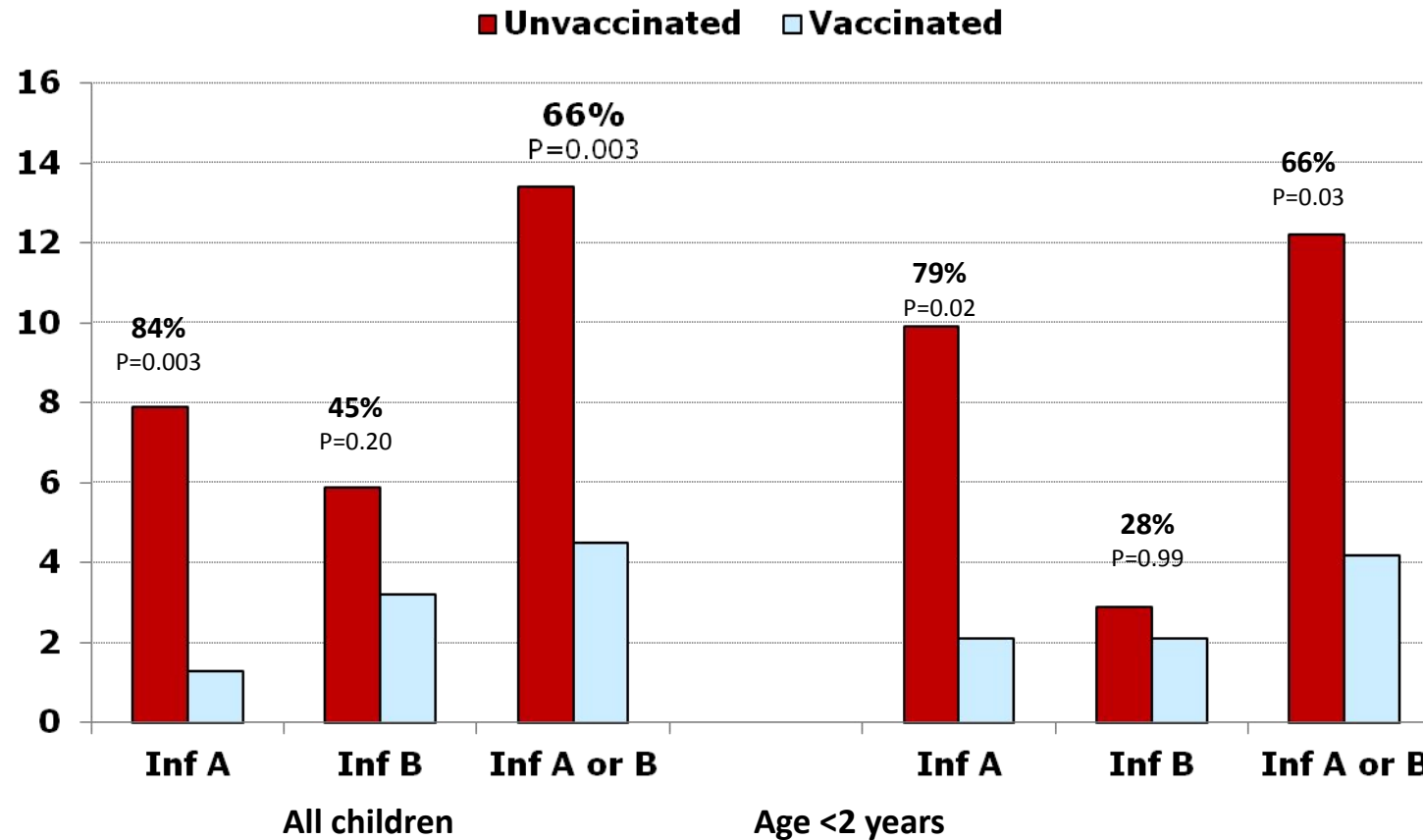


# Influenza in infants

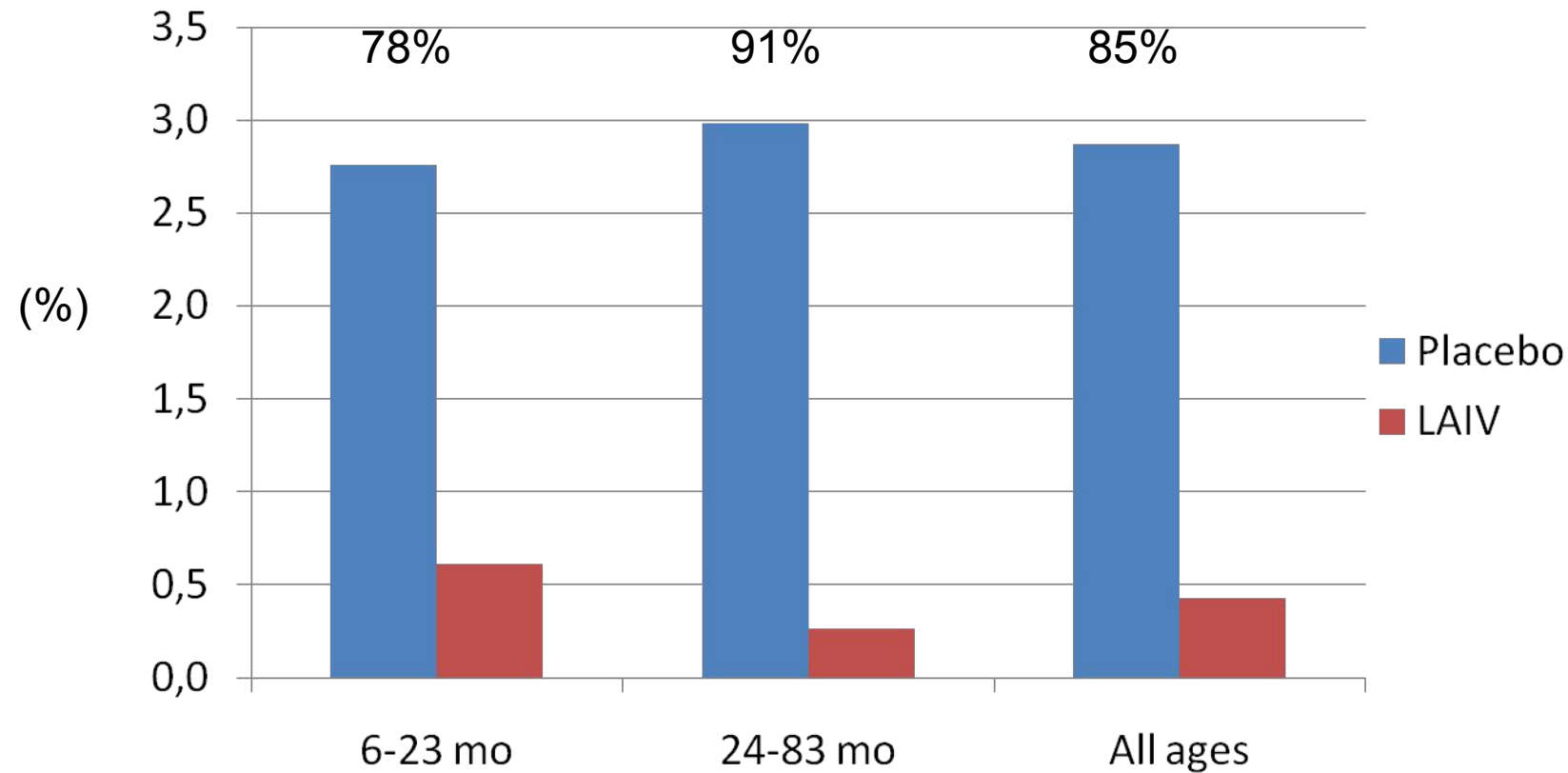
- 408 newborn infants followed for 10 months
- Attack rate of influenza: 13.5 %
- Infants with influenza:
  - Acute otitis media 46%
  - Antibiotic treatment 42%
  - Hospitalization 2%



# Effectiveness of inactivated influenza vaccine in children 9 months to 3 years of age



# Efficacy of live attenuated influenza vaccine against acute otitis media





# Vaccine effectiveness in Finland in 2022–2023

## Children 6 months–6 years of age

### LAIV and IIV combined

Table 3: Effectiveness of Fluenz Tetra and Vaxigrip Tetra in 0.5–6-year-olds, 14+ days after full vaccination

Outcome	Cohort size	Cases*	Person-years at risk*	Cumulative risk*	Vaccine effectiveness**
Influenza A	304310	1007; 82	131850; 26894	0.451%; 0.141%	67.6% (59.4%; 74.2%)
Influenza B	304310	96; 7	131850; 26894	0.045%; 0.018%	78.0% (52.6%; 89.8%)
Any influenza	304310	1102; 89	131850; 26894	0.495%; 0.159%	68.7% (61.0%; 74.8%)
Hospitalisation due to influenza	304310	129; 10	131850; 26894	0.058%; 0.022%	67.6% (37.9%; 83.1%)

\* Not vaccinated; Vaccinated

† Adjusted for year of birth

<https://thl.fi/documents/533963/6240821/Kohti+influenssakautta+2023-2024.pdf/8245722b-135d-82ac-f206-f4bccff1ae57?t=1694423411665>

# WHO recommendation for seasonal influenza vaccination

- Highest priority:
  - Health-care workers
  - Older adults (>65 years of age)
- Priority:
  - Pregnant women
  - Individuals with specific chronic medical conditions
  - Children aged 6-59 months



# Why children are important in transmitting influenza

- Attack rates are highest in children
- Viral shedding is prolonged in children
- Viral loads are higher

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Benefits of vaccinating children:

□ For the children themselves

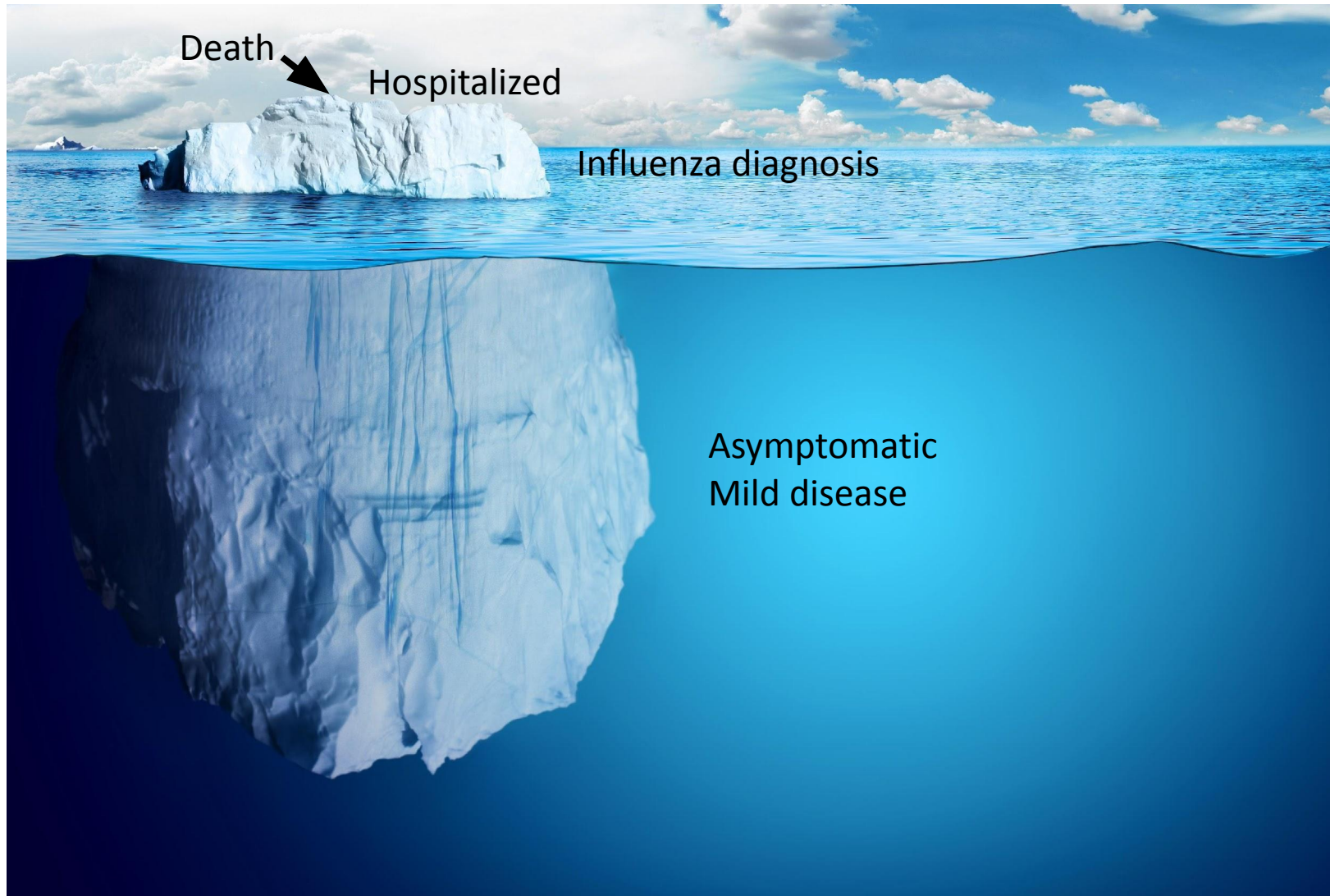
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Benefits of vaccinating children:

- For the children themselves
- For the community by reducing transmission

# We only see the top of the iceberg

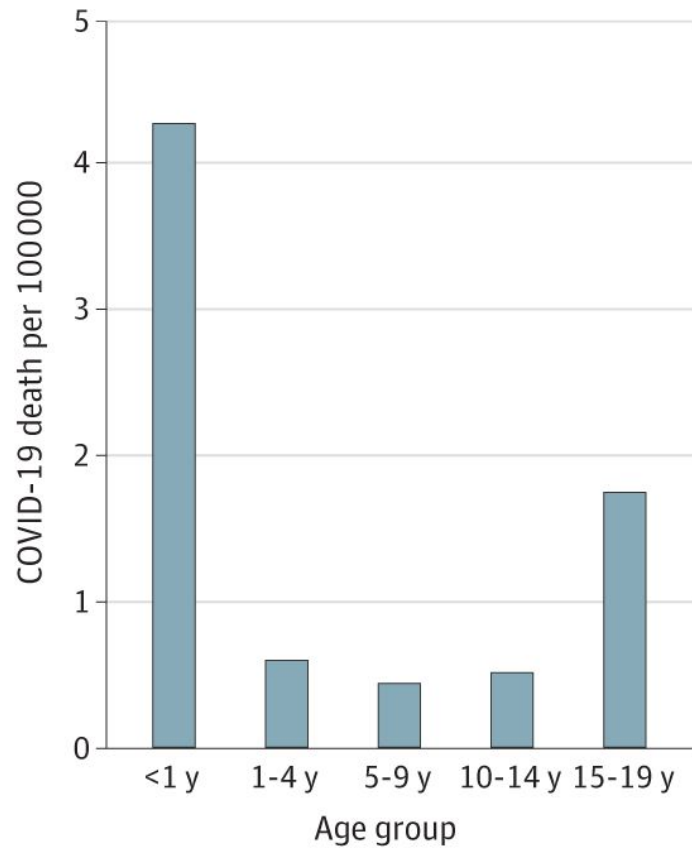


# SARS-CoV-2 in children

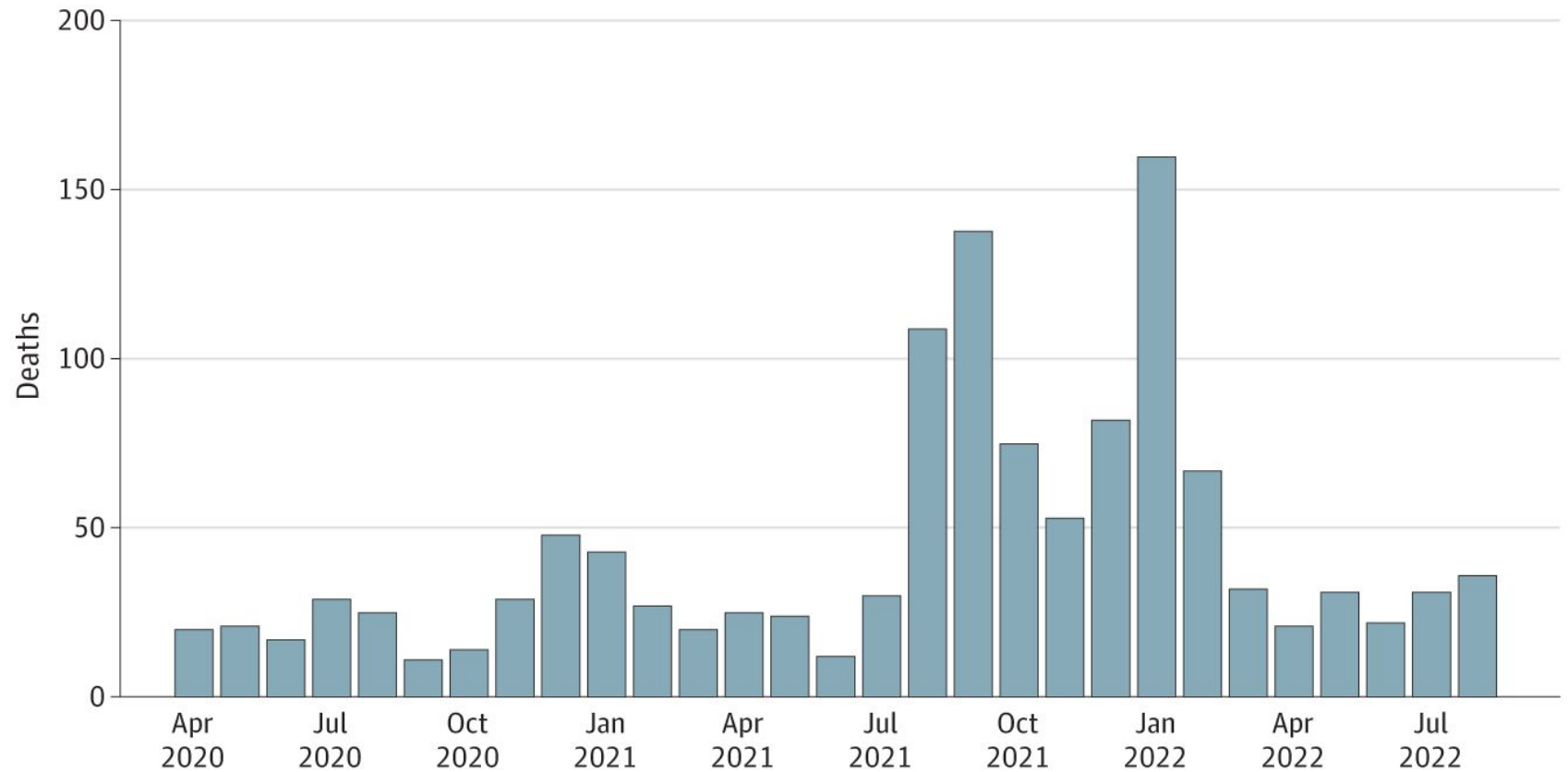
- Symptoms in children are usually mild
- Some children are asymptomatic
- < 2% require hospitalization

# COVID-19 death rate in children

**A** COVID-19 death rate in the US:  
August 1, 2021, to July 31, 2022



**B** Monthly COVID-19 deaths in the US of children and young people aged 0 to 19 years

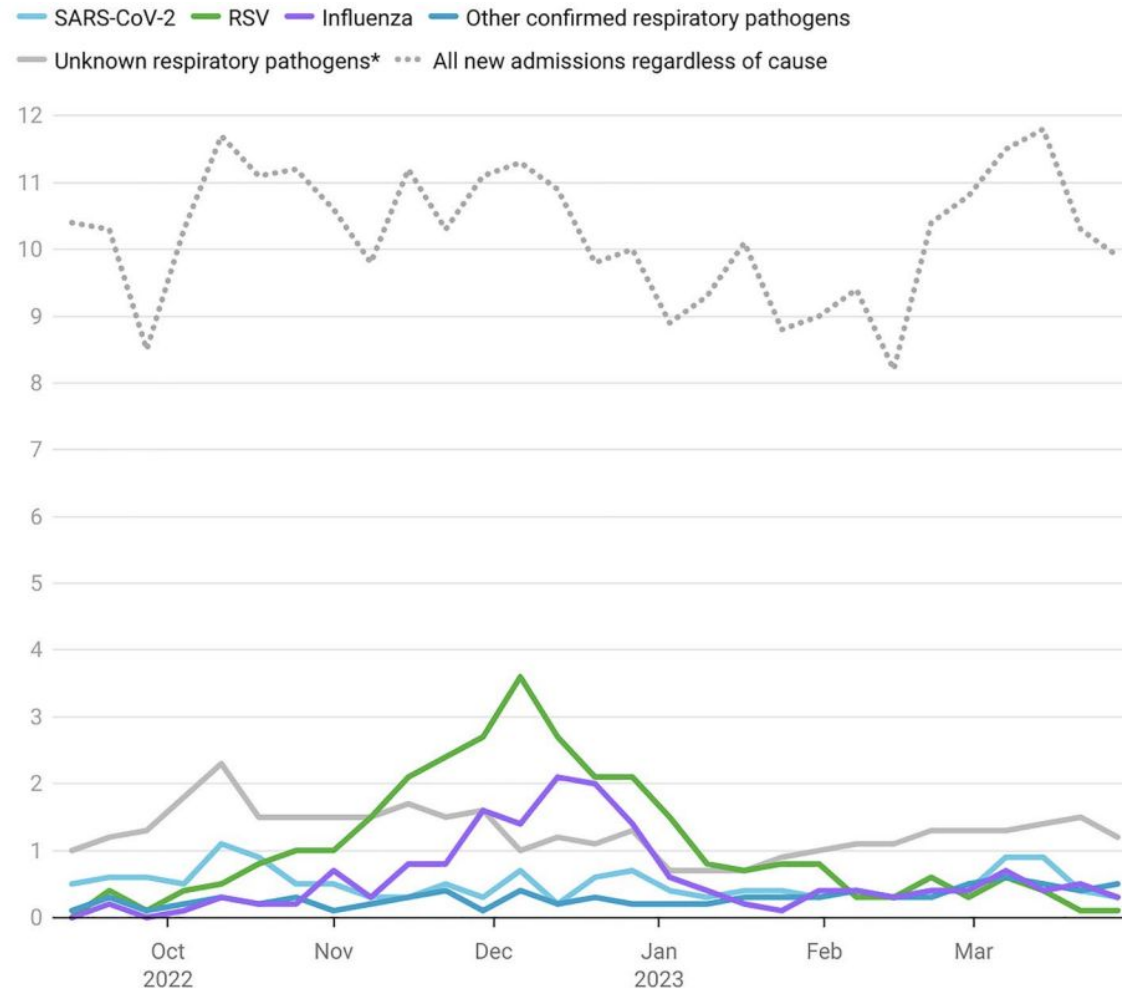




# Respiratory tract infections leading to hospitalization in 2022–2023

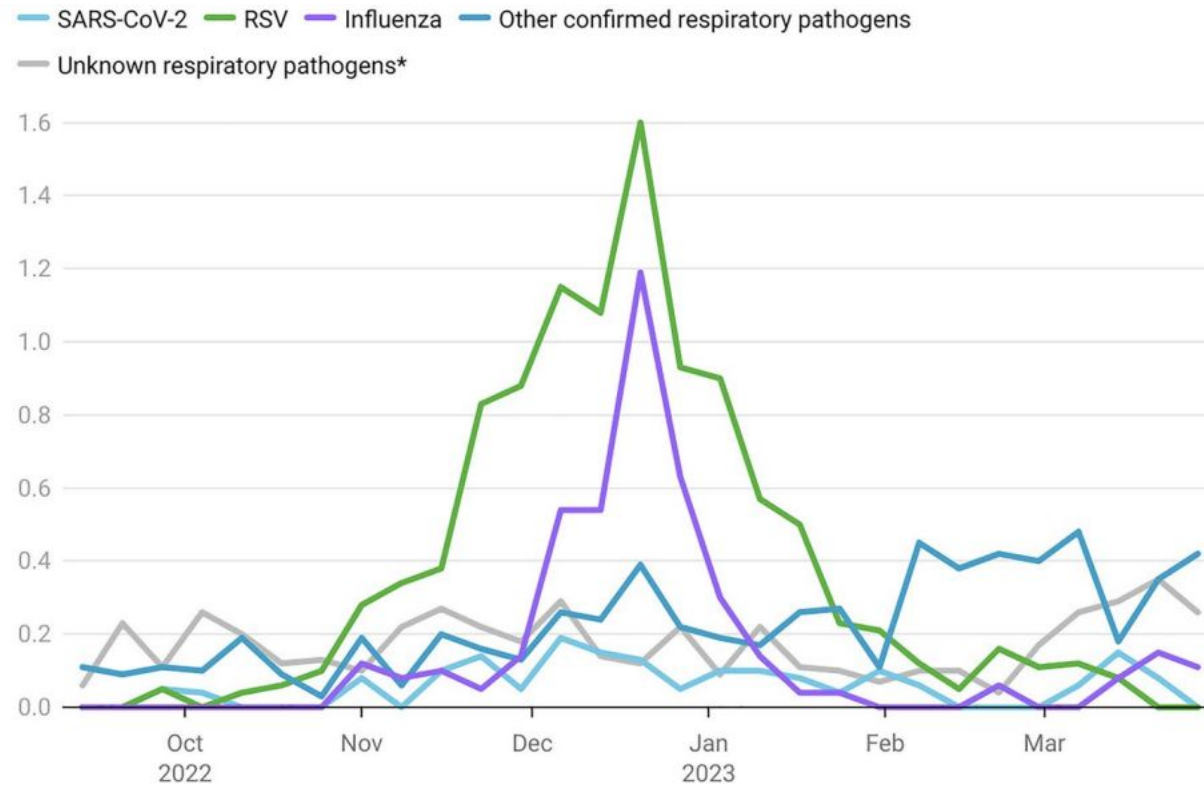
76 centers in  
Germany

Cases/day/hospital



# Respiratory tract infections leading to hospitalization in 2022–2023

ICU admissions



# Effectiveness of two doses of mRNA vaccine in children 5–11 years of age (n=1 368 721)

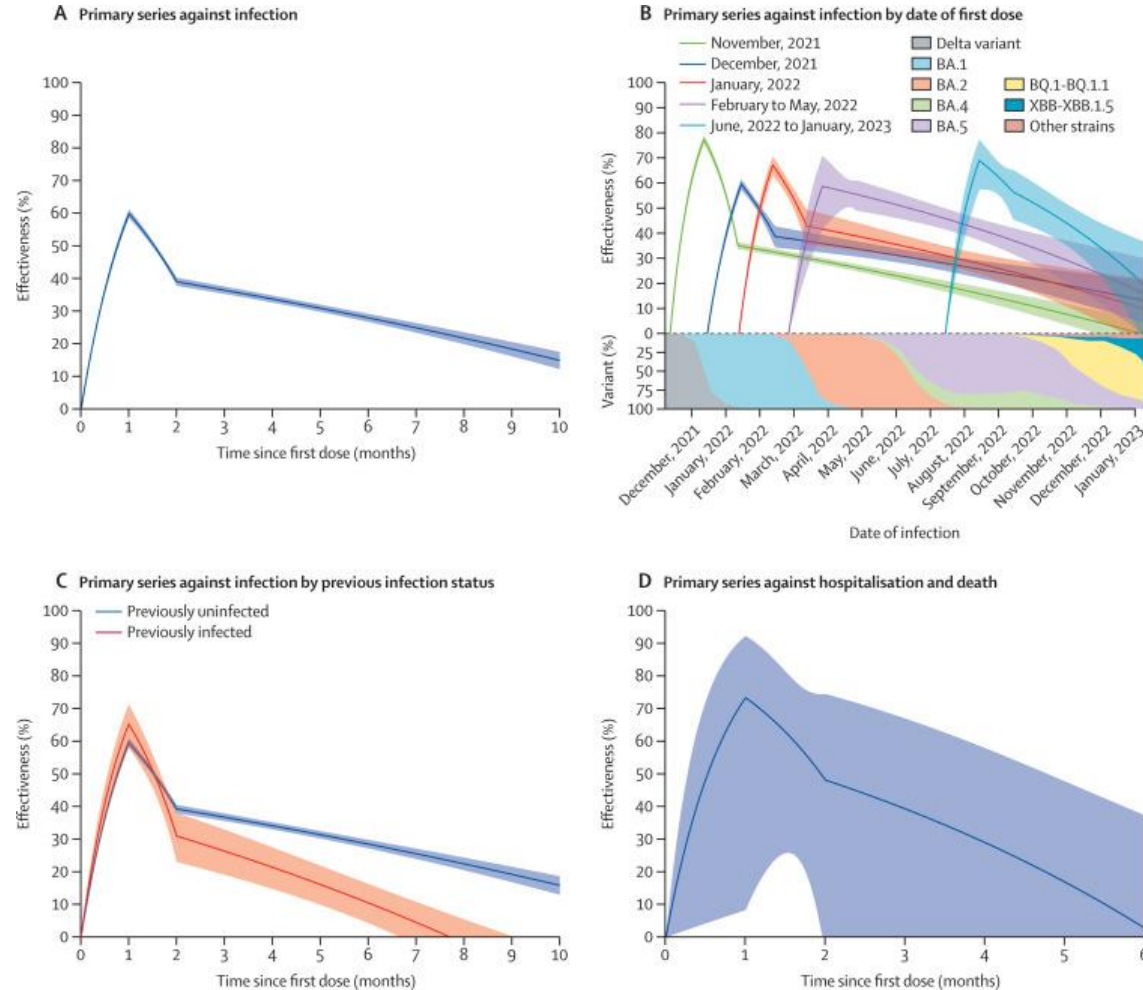
October 2021–January 2023

mRNA-1273 and BNT162b2

60% effectiveness at 1 mo

34% at 4 mo

15% at 10 mo



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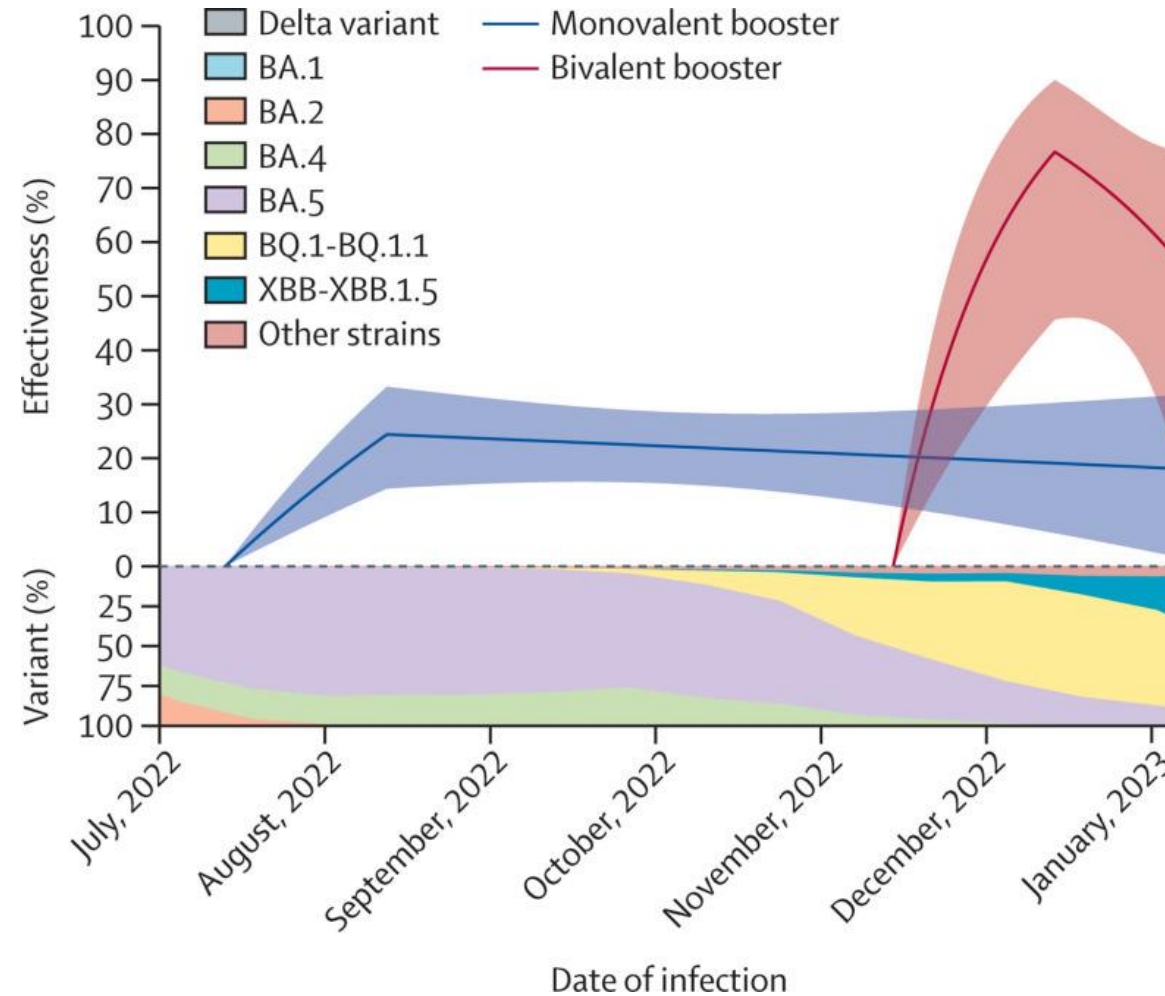
October 2021–January 2023

mRNA-1273 and BNT162b2

Monovalent booster:  
24% effectiveness

Bivalent booster:  
77% effectiveness

Omicron infection:  
80% effectiveness

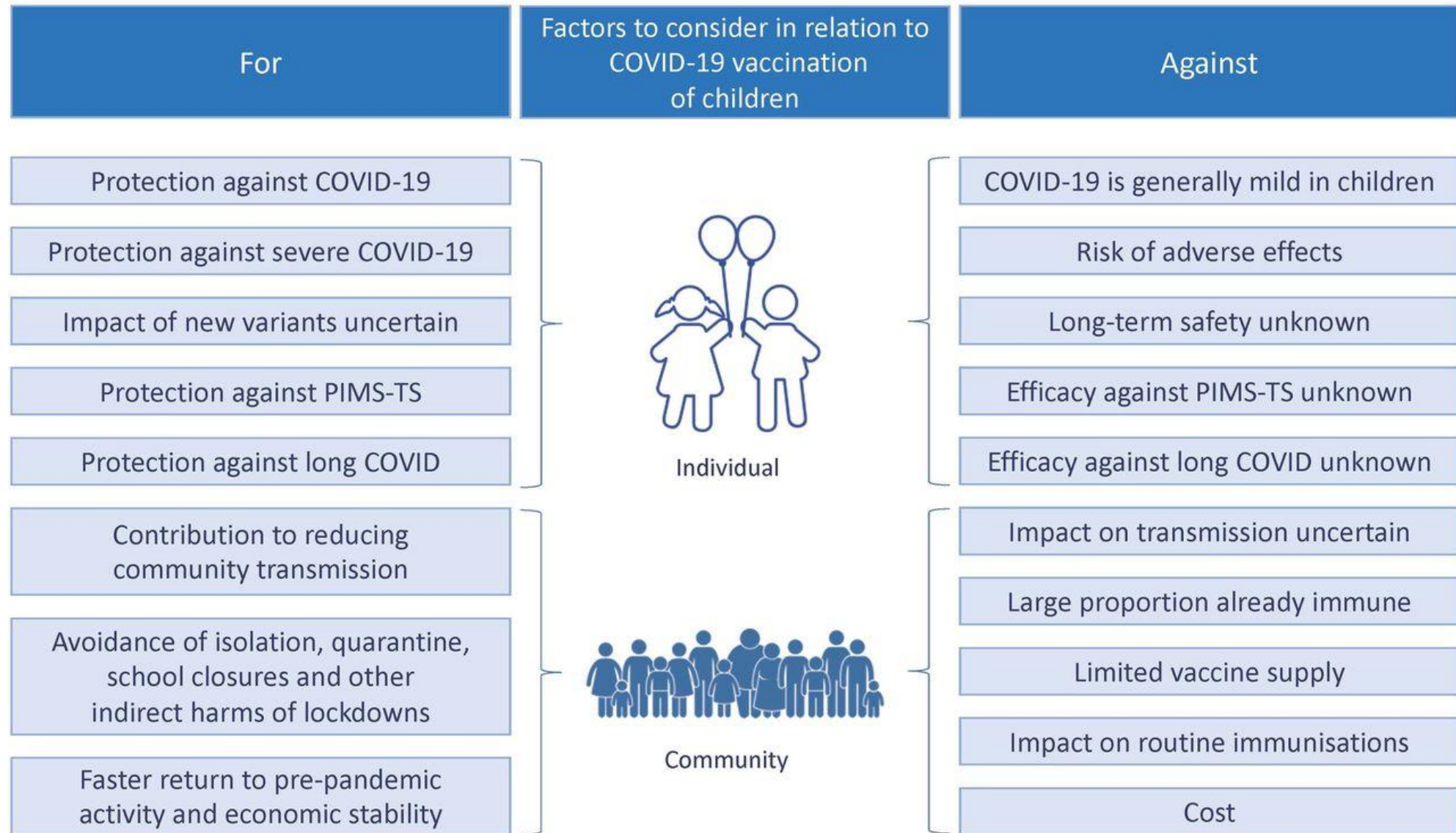


# Vaccinating children against COVID-19

Benefits in preventing the harms of the disease

Known or potential risks associated with vaccination





# WHO recommendation for COVID-19 vaccination



- High priority
  - Children  $\geq$  6 mo with immunocompromising conditions (HIV, transplant, cancer treatment)
  - Boosters every 6–12 months
- Medium priority
  - Children and adolescents with comorbidities
    - Obesity, diabetes, chronic lung diseases, heart, liver and kidney diseases
  - Primary series and first booster dose
- Low priority
  - Healthy children and adolescents aged 6 months – 17 years
  - Vaccines are safe and effective, but the burden of disease is low
  - Countries should base their decisions on contextual factors
    - Disease burden, cost-effectiveness, etc.

who.int

Accessed 29.11.2023

# Should children get COVID-19 vaccine?

“The risks and benefits need continual re-evaluation with the emergence of new variants of concern and new data on effectiveness and adverse effects.”

Zimmermann et al.  
Arch Dis Child 2022





# Take home messages

- Influenza causes a significant burden especially for young children
- Influenza vaccines are effective in preventing symptomatic disease, complications and hospitalizations. By vaccinating children we can also reduce the viral transmission in the community.
- COVID-19 is usually a mild disease in children. This is why COVID-19 vaccination is recommended primarily for children at increased risk of severe disease (immunocompromised, comorbidities)

