



**Neurodevelopmental  
Disorders (NDDs)  
Episode 26 Feb. 2025**



***Science, Public Health Policy,  
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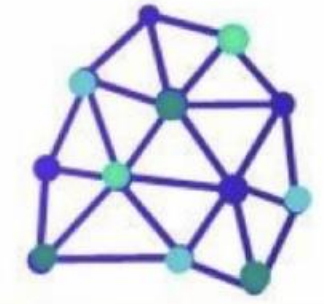
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# **Vaccination and Neurodevelopmental Disorders: A Study of Nine-Year-Old Children Enrolled in Medicaid**

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# Vaccinated vs Unvaccinated Children

## Key Concepts

- By age 8, 24% of children diagnosed with one or more NDDs
- ADHD most common
- Boys 2 fold risk greater than girls
- Greater in non-whites
- Greater in preterm births
- ASD 1 in 36 (CDC)
- 94% of US school children are vaccinated

# Objective of the Study

## Objective

Determine the association between vaccination and NDDs in 9 y/o children enrolled in the FL Medicaid program between 1999–2011.

## Vaccination Status

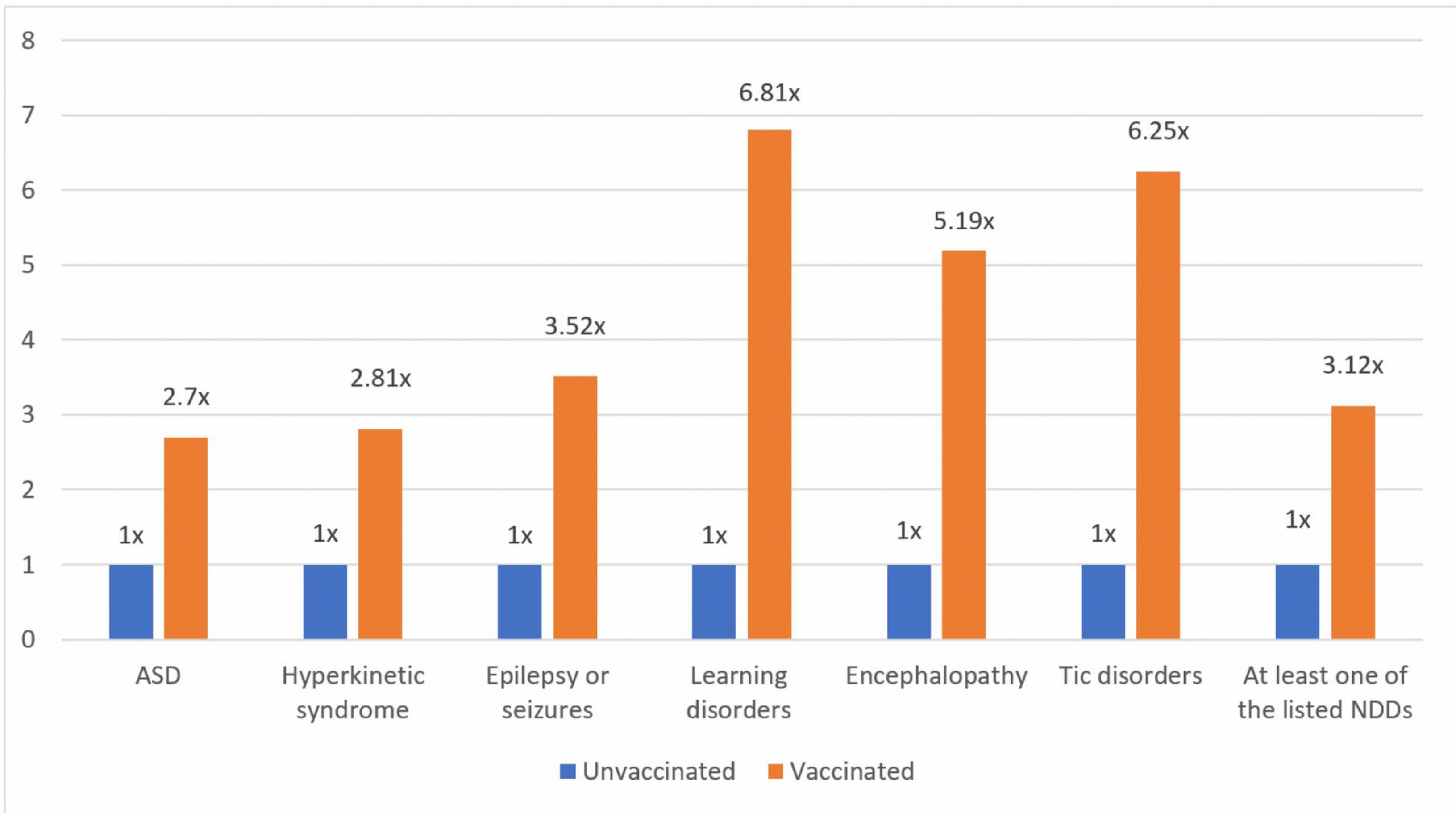
- Vaccinated are defined as having a healthcare visit with 1 or more vaccination-related diagnostic codes
- FL Medicaid is the 4th largest Medicaid population in the US

# A Few Statistical Definitions

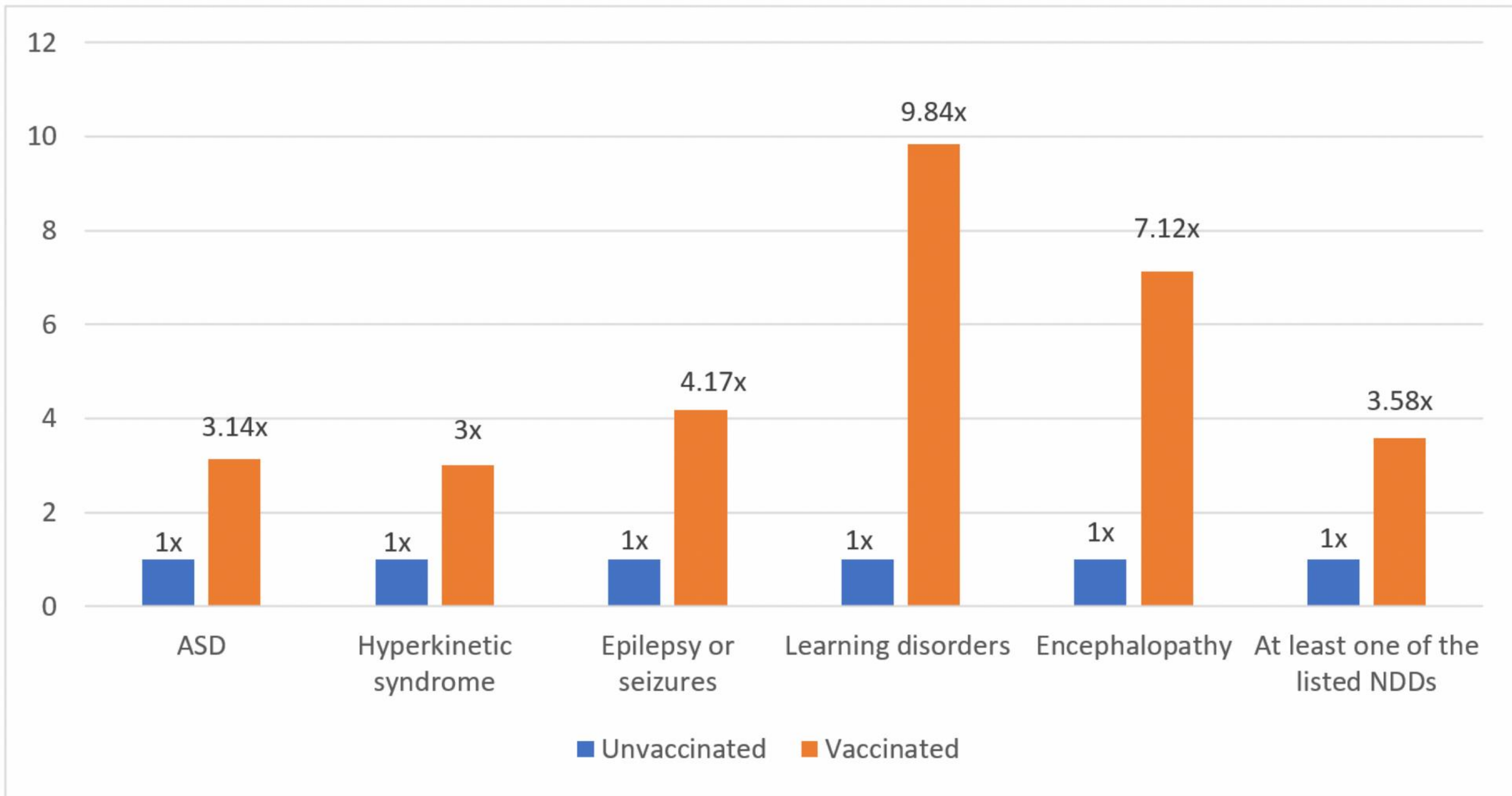
## Odds Ratios

- Odds Ratio (OR): A measure of association between two events.
- Purpose: Indicates how much more likely an event is to occur in one group compared to another.
- Calculation: Ratio of the odds of the event in the exposed group to the odds in the unexposed group.
- Interpretation:
  - $OR = 1 \rightarrow$  No difference between groups.
  - $OR > 1 \rightarrow$  Higher odds of the event with exposure.
  - $OR < 1 \rightarrow$  Lower odds of the event with exposure.





*Figure 2. Odds Ratios of NDDs by Vaccination Status in 9-year-old Medicaid children.*



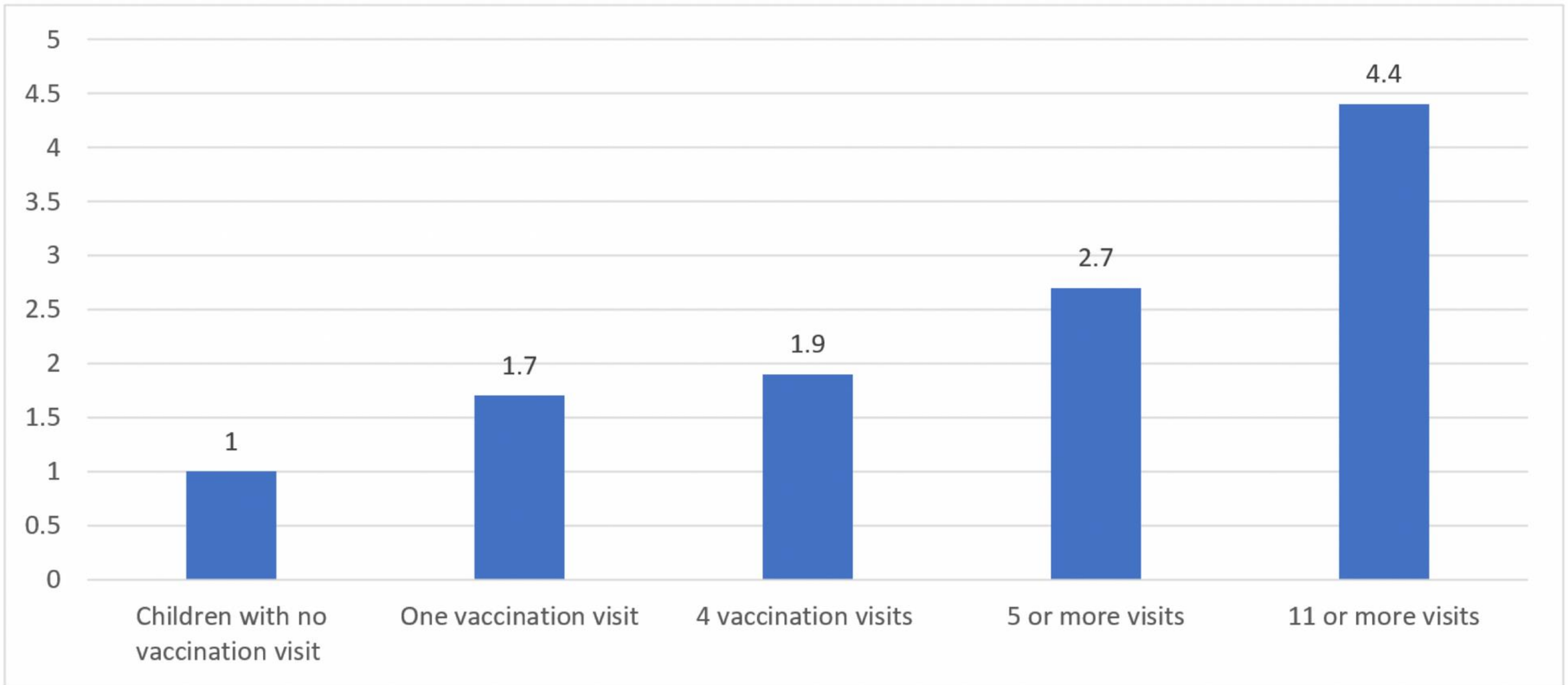
*Figure 3. Odds Ratios of NDDs by Vaccination Status in 9-year-old Medicaid Children Born Preterm.*

# A Few Statistical Definitions

## Relative Risks

- **Relative Risk (RR):** A measure of the likelihood of an event occurring in one group compared to another.
- **Purpose:** Indicates how much more (or less) likely an event is to occur in the exposed group compared to the unexposed group.
- **Calculation:** Ratio of the probability (risk) of the event in the exposed group to the probability in the unexposed group.
- **Interpretation:**
  - $RR = 1 \rightarrow$  No difference in risk between groups.
  - $RR > 1 \rightarrow$  Higher risk of the event with exposure.
  - $RR < 1 \rightarrow$  Lower risk of the event with exposure.





*Figure 4. Relative risks of the diagnosis of ASD and increasing numbers of visits that included vaccinations.*

# Discussion



47,155 children show significant associations between visits for vaccinations and diagnoses of NDDs



Vaccinated were significantly more likely than unvaccinated to have ASD, hyperkinetic syndrome, learning disorders, seizures,, encephalopathy, and tic disorders



Limitations of the study: Medicaid as a billing claims research tool, validation of vaccine uptake, geographics, no full access to proprietary database

## Conclusion

- ✓ Vaccinated children were significantly more likely than unvaccinated children to be diagnosed with NDDs
- ✓ Healthcare visits that included 1 or more vaccinations were associated with higher risks of ASD, suggesting a dose-response relationship
- ✓ Preterm birth and vaccination increased the odds of being diagnosed with all measured NDDs beyond the effects for only preterm birth and vaccination alone
- ✓ Preterm and unvaccinated children were no more likely than term and unvaccinated children to be diagnosed with NDDs, except they did have higher odds of seizures