Al Analysis of Adverse Events Reported to VAERS (1990-2024): Assessing Vaccine Safety Across Age Groups and Identifying Trends in Serious Outcomes

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Introduction

- Vaccines are among the most rigorously monitored public health interventions in modern medicine.
- VAERS is a national passive surveillance system collecting U.S. reports of health events following vaccination.
- While VAERS cannot confirm causation, longterm trend analysis helps detect patterns and potential safety signals.
- This study evaluates 34 years (1990–2024) of VAERS reports, with focus on serious outcomes and their timing.
- Recent vaccine administration data is incorporated to contextualize reported events within appropriate safety expectations.

Methods

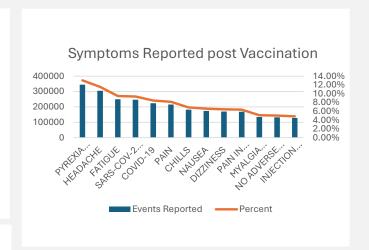
- VAERS reports from 1990–2024 were analyzed using Al-assisted methods to identify key trends.
- Serious outcomes (death, hospitalization, lifethreatening illness, disability, ER visits) were quantified.
- Reports were analyzed by symptom type, vaccine product, and patient age.
- Timing of serious outcomes post-vaccination was categorized into 0 days, 1–30 days, and 31+ days.
- For 2020–2024, U.S. vaccine administration data were used to estimate reporting rates per dose.

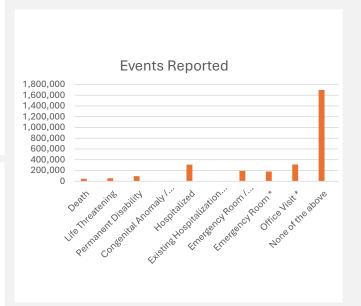
Results

- Serious Events Are Rare: Life-threatening outcomes, deaths, and disabilities are infrequent—even in higher-risk groups.
- COVID-Era Surge Reflects Reporting Behavior: Report volume rose in 2021–2022, largely due to heightened public awareness and digital access—not increased risk.
- Side Effect Patterns Are Consistent: Common symptoms (e.g., fever, fatigue, injection site pain) have remained stable across decades.
- Age Trends Shifted Post-2020: Earlier reports focused on children; post-2020 reports shifted to adults, reflecting the COVID-19 vaccine rollout.
- Many Reports Occur Long After Vaccination: A substantial portion of events—especially for less-specific outcomes—were reported more than 31 days after vaccination, making a direct link to the vaccine less certain.

Discussion

- Over 34 years of data confirm the strong safety profile of U.S.-licensed vaccines.
- Despite increased reporting during COVID-19 vaccine distribution, serious outcomes per dose remained consistent with or below historical averages.
- The stability of symptom reporting, including common reactions such as fever and fatigue, further underscores the reliability of the data.
- The integration of 2020–2024 administration data reinforces the low rate of serious effects per millions of doses and highlights VAERS' role in maintaining transparency, identifying rare signals, and sustaining public confidence in vaccination programs.
- This poster represents my independent work and does not reflect the views or opinions of PDPH or any other affiliated organizations. There are no conflicts of interest to disclose.





Age Group	Death	Life Threatening	Permanent Disability	Congenital Anomaly / Birth Defect	Hospitalized	Existing Hospitalizat ion Prolonged	Emergency Room / Office Visit	Emergency Room	Office Visit	None of the Above
< 6 months	2,966	2,441	1,163	27	16,880	611	13,944	1,292	2,030	28,43
6-11 months	510	647	532	7	4,567	192	7,360	529	1,119	13,906
1-2 years	687	1,432	1,858	13	10,357	477	27,281	1,800	4,593	47,159
3-5 years	176	758	602	4	3,930	174	18,836	1,368	4,574	43,816
6-17 years	747	2,370	3,588	19	14,448	712	27,219	8,158	15,068	115,158
18-29 years	706	3,493	6,448	159	18,215	604	20,216	18,296	25,486	131,862
30-39 years	776	4,163	9,029	353	18,342	499	14,583	22,838	38,826	148,29
40-49 years 50-59	1,198	5,007	9,967	112	19,344	436	13,161	22,477	40,830	144,75
/ears	2,405	5,690	10,102	68	24,550	478	12,421	23,548	46,345	165,53
60-64 /ears	2,057	2,934	4,311	25	14,263	262	7,020	11,596	23,653	86,48
65-79 years	10,077	7,635	9,015	69	46,800	727	17,312	31,440	59,250	202,27
B0+ years Unknown	10,142 16,134		2,304 36.115	15 762	25,838 92,649	303 1.437	3,536 11.778	11,191 25.831	11,739 37.645	42,990 526.00
Total	69,785	.,	69,785	69.785	69,785	69.785	69,785	69,785	69,785	69.78