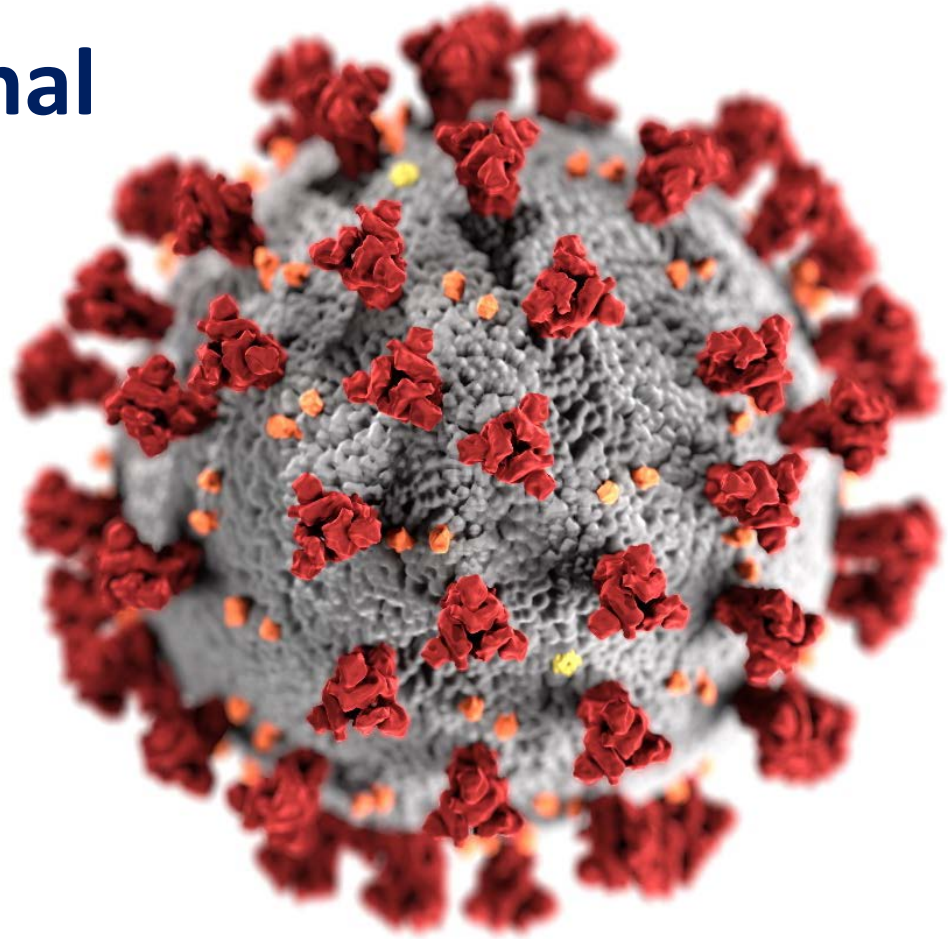
Early safety monitoring for additional COVID-19 vaccine doses: Reports to VAERS and v-safe

Advisory Committee on Immunization Practices

October 21, 2021



Anne M. Hause, PhD MSPH
v-safe Team Co-Lead
COVID-19 Vaccine Task Force

cdc.gov/coronavirus

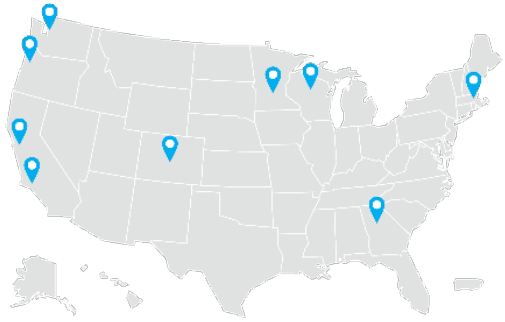
CDC vaccine safety monitoring

- COVID-19 vaccines are being administered under **the most intensive vaccine safety monitoring effort in U.S. history**
- Strong, complementary systems are in place—both new and established

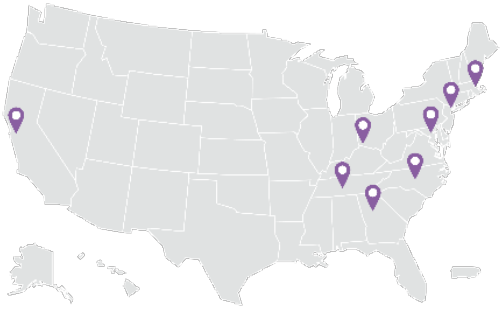
v-safe

VAERS

VSD



CISA Project



Full list of U.S. COVID-19 vaccine safety monitoring systems

https://www.cdc.gov/coronavirus/2019-ncov/vaccines/safety.html

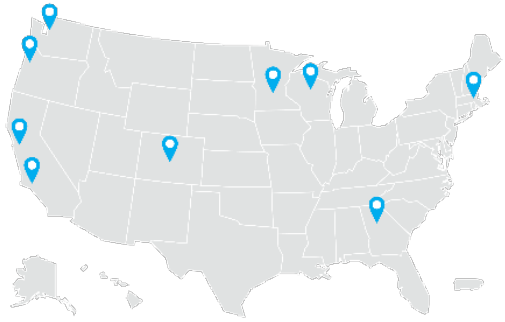
CDC vaccine safety monitoring

- COVID-19 vaccines are being administered under **the most intensive vaccine safety monitoring effort in U.S. history**
- Strong, complementary systems are in place—both new and established

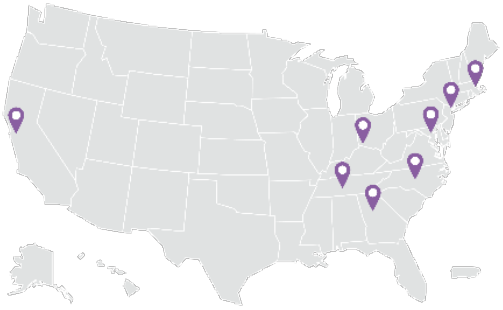
v-safe

VAERS

VSD



CISA Project



Full list of U.S. COVID-19 vaccine safety monitoring systems

https://www.cdc.gov/coronavirus/2019-ncov/vaccines/safety.html

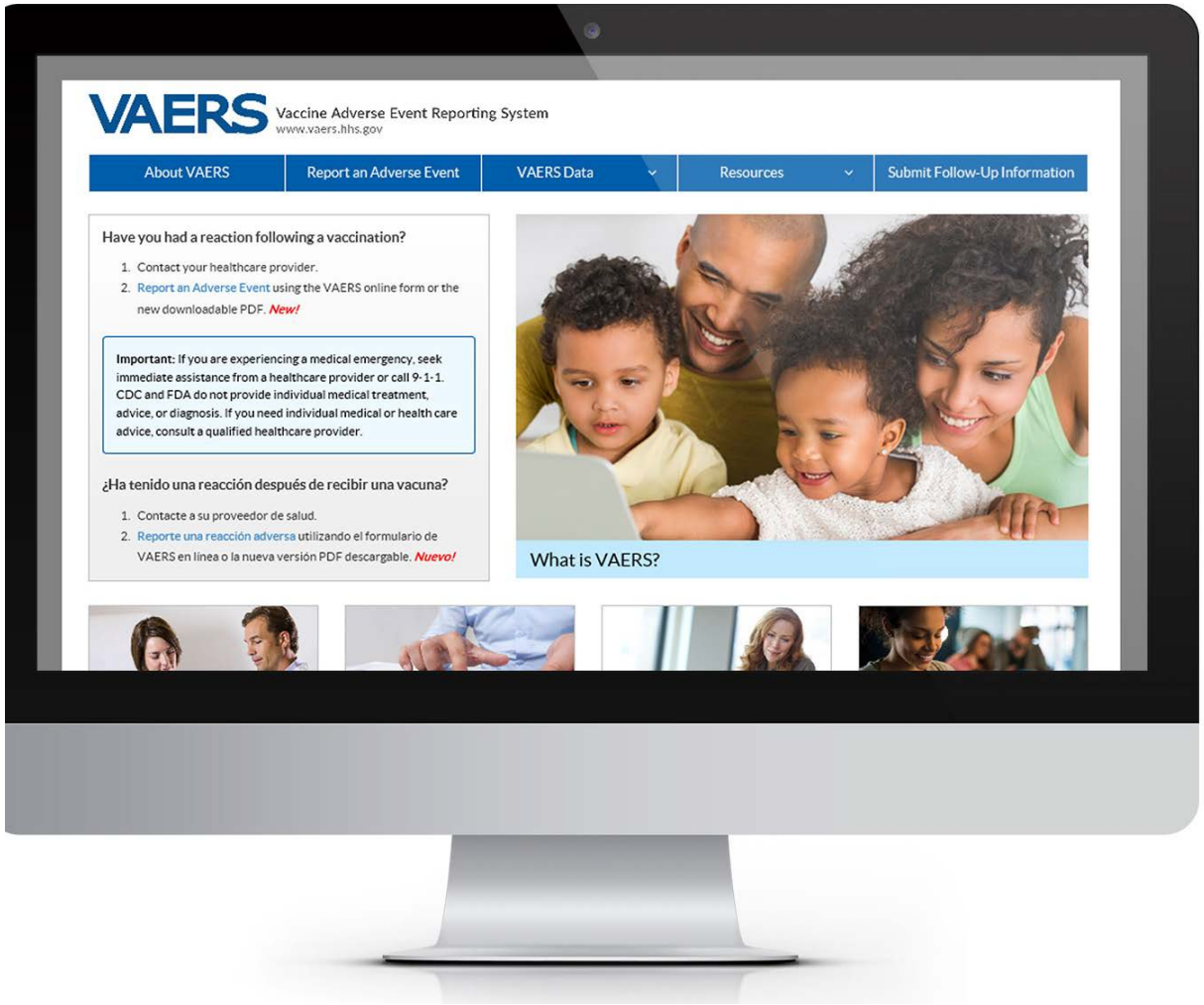
VAERS is the nation's early warning system for vaccine safety

CDC + FDA

VAERS

Vaccine Adverse Event Reporting System

http://vaers.hhs.gov



VAERS accepts reports from everyone

Regardless of the plausibility of the vaccine causing the event or the clinical seriousness of the event

Key strengths

- Rapidly detects potential safety problems
- Can detect rare adverse events

Key limitations

- Passive surveillance system
- Inconsistent quality and completeness of information
- Reporting biases
- Generally, cannot determine cause and effect

Reports to VAERS following dose 3 mRNA or dose 2 Janssen COVID-19 vaccination, by age group and sex

Age group, years	n (%)
12–17	34 (1)
18–49	1,225 (25)
50–64	1,304 (26)
≥65	2,427 (49)
Total	**4,990**

Sex	n (%)
Male	1,823 (37)
Female	3,153 (63)
Unknown	14 (<1)
Total	**4,990**

- Median age 64 years (interquartile range: 49-73)
- Majority (63%) among women

Includes data collected during August 12–October 10, 2021

Reports to VAERS following dose 3 mRNA or dose 2 Janssen COVID-19 vaccination, by race and ethnicity

- Most reports either
  - Unknown/not reported race or ethnicity (49%)
  - White, non-Hispanic race and ethnicity (41%)

Race or ethnicity	mRNA, dose 3 (%)	Janssen, dose 2 (%)
Hispanic or Latino	207 (4)	4 (10)
Non-Hispanic		
AI/AN	21 (<1)	0 (0)
Asian	101 (2)	1 (3)
Black or AA	115 (2)	4 (10)
NHPI	3 (<1)	1 (3)
White	2,011 (41)	12 (31)
Multiracial	28 (1)	1 (3)
Other	24 (<1)	0 (0)
Unknown/ not reported	2,441(49)	16 (41)
Total	**4,951**	**39**

Includes data collected during August 12–October 10, 2021 for persons aged 12 years and older. Hispanic also includes persons identified of Hispanic ethnicity of unknown race.
Abbreviations: AI/AN = American Indian/Alaska Native; AA = African American; NHPI = Native Hawaiian or other Pacific Islander.

Reports to VAERS following dose 3 mRNA or dose 2 Janssen COVID-19 vaccination

Manufacturer	Non-serious reports	Serious reports*	Total reports
Pfizer-BioNTech	3,351 (95%)	160 (5%)	3,511
Moderna	1,325 (92%)	115 (8%)	1,440
Janssen	39 (100%)	0 (0%)	39
Total	**4,715 (94%)**	**275 (6%)**	**4,990**

- Regardless of manufacturer, ≥92% of reports non-serious

Includes data collected during August 12–October 10, 2021 for persons aged 12 years and older.
* Per federal law, includes reports of hospitalization, prolongation of existing hospitalization, life threatening condition, permanent disability, congenital deformity or birth defect, or death.

Most frequently reported adverse events to VAERS following dose 3 mRNA or dose 2 Janssen COVID-19 vaccination, by seriousness

Serious* (n = 275)

Rank	Adverse event**	n (%)
1	Extra dose administered	40 (23)
2	Fever	38 (14)
3	Shortness of breath	37 (14)
4	Blood test	33 (12)
5	Fatigue	32 (12)

Non-serious (n= 4,715)

Rank	Adverse event**	n (%)
1	Interchange of vaccine products	1,110 (24)
2	Extra dose administered	969 (21)
3	Fever	764 (16)
4	Headache	697 (15)
5	Fatigue	665 (14)

Includes data collected during August 12–October 10, 2021 for persons aged 12 years and older. * Per federal law, includes reports of hospitalization, prolongation of existing hospitalization, life threatening condition, permanent disability, congenital deformity or birth defect, or death. ** Not mutually exclusive.

Reports of death to VAERS following dose 3 mRNA or dose 2 Janssen COVID-19 vaccination

Preliminary impression of cause of death*	mRNA, dose 3
No cause specified	8
Found dead	4
Respiratory and/or cardiac arrest	3
Stroke	3
COVID-19 disease	3
Pneumonia; sepsis	2
Pulmonary embolism	2
Miscellaneous other†	5
Total	**30**

- Median age = 79 years (IQR: 69 – 88)
- Median time from third dose to death = 2 days (IQR: 0 – 9)

Includes data collected during August 12–October 10, 2021. Abbreviations: IQR = interquartile range. * Based upon physician review of initial report and available documentation, including death certificates. † Cardiomyopathy, congestive heart failure, acute leukemia, renal failure/end stage renal disease, general decompensation/end stage disease.

Reports to VAERS of co-administration of COVID-19 and other vaccines

- Most common vaccines co-administered with COVID-19 vaccines*
  - Vaccine not specified (n = 442)
  - Influenza (total = 204; inactivated = 127)
  - Zoster (n = 61)
- Most commonly reported adverse events
  - Typically “extra dose” or “expired product” administered
  - Systemic symptoms: reflect known adverse events (headache, fatigue, fever, etc.)
  - Unique to zoster: “herpes zoster”, “vaccination failure”
- Surveillance for adverse events is ongoing

Includes data collected during December 14, 2020–October 10, 2021.
* 605,095 reports were of COVID-19 vaccine with no other vaccine administered

Active safety monitoring for COVID-19 vaccines

v-safe is a CDC smart phone-based monitoring program for COVID-19 vaccine safety in the U.S.

- Uses text messaging and web surveys to check in with vaccine recipients after vaccination
- Can register at any time: after first, second, or third dose
- Solicits participants' reports on how they feel after COVID-19 vaccination
  - Local injection site reactions (i.e., pain, redness, swelling)
  - Systemic reactions (i.e., fatigue, headache, joint pain)
  - Health impacts (unable to perform normal daily activities, missed school or work, or received care)

v-safe after vaccination health checker

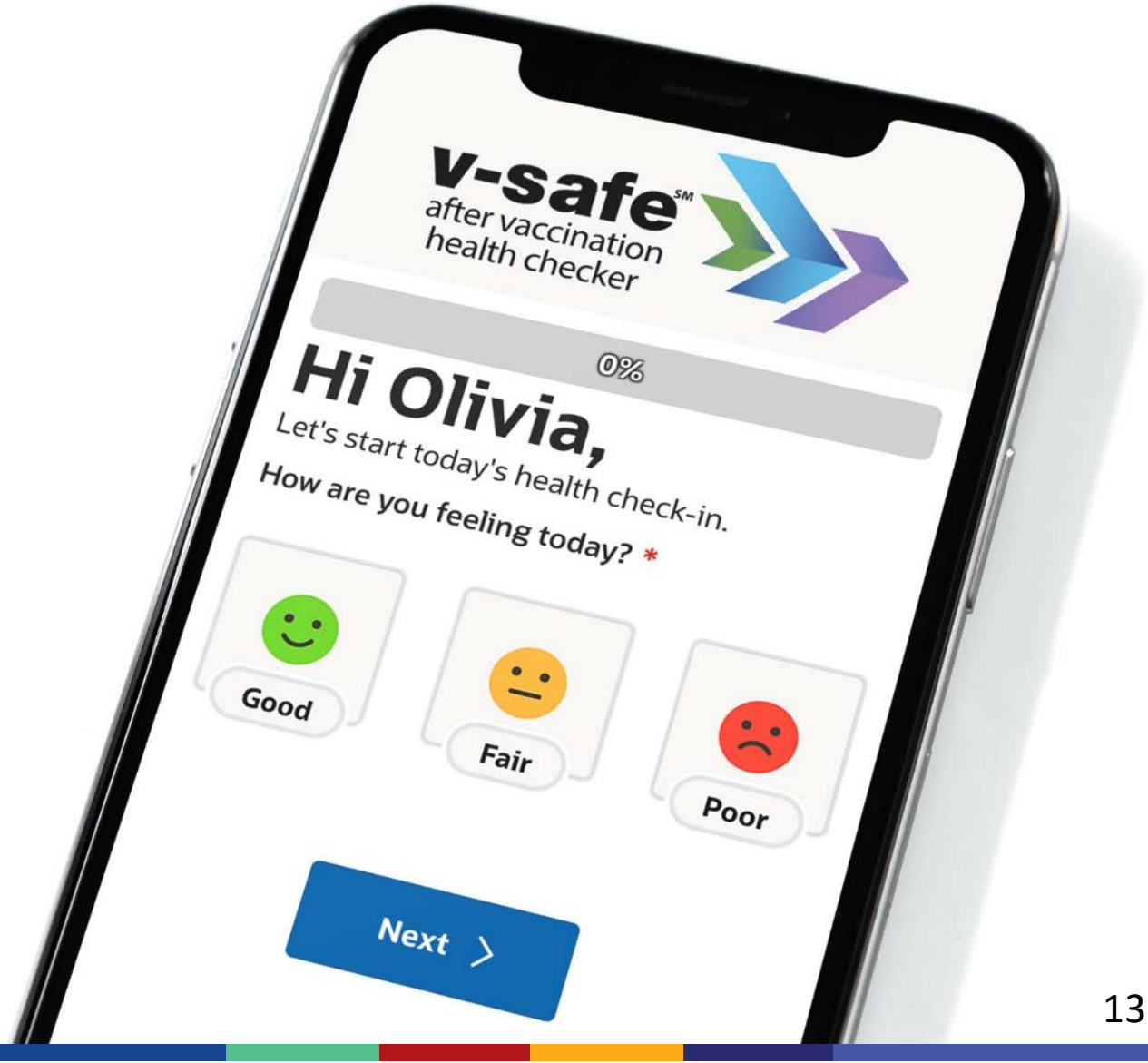
Smartphone-based active safety monitoring

Key strengths

- Easy and quick
- Active outreach
- Longitudinal data

Key limitations

- Voluntary enrollment
- Requires smartphone
- Generally, cannot determine cause and effect



Demographic summary of 274,167 v-safe participants who reported an additional dose

Characteristic	% of participants
Sex	
Female	61.8
Male	37.3
Unknown	0.9
Age group (years)	
0-17	0.05
18-49	26.6
50-64	23.0
65-74	38.9
75-84	10.5
≥85	0.9

Characteristic	% of participants
Ethnicity	
Hispanic or Latino	6.3
Not Hispanic/ Latino	90.1
Unknown	3.5
Race	
AI/AN	0.4
Asian	5.6
Black or AA	5.0
NHPI	0.3
White	83.7
Multiracial	1.4
Other	1.8
Unknown	1.9

Includes participants who completed at least one survey in the first week after additional dose, data collected during August 12–October 10, 2021
Abbreviations: AI/AN = American Indian/Alaska Native; NHPI = Native Hawaiian or other Pacific Islander; AA=African American.

Patterns of vaccination for 274,167 v-safe participants who reported an additional dose

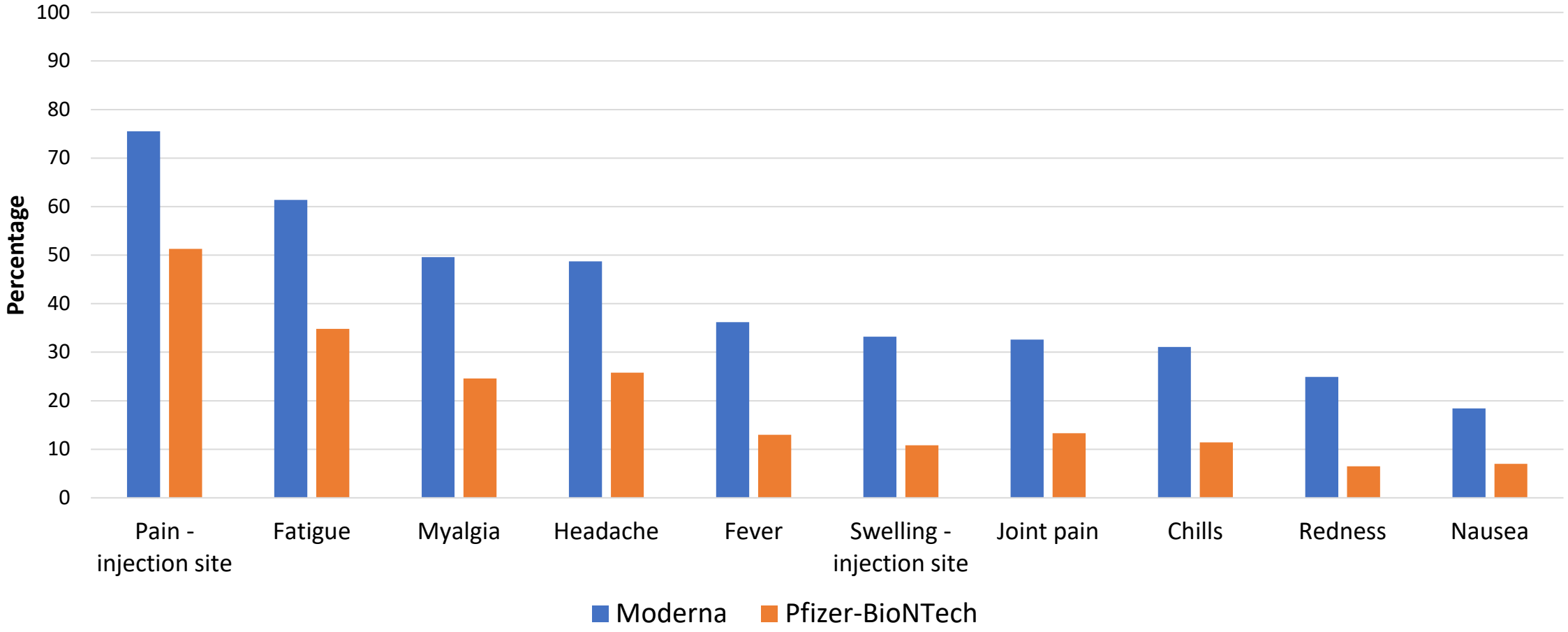
Primary series

Additional dose	Moderna (%)	Pfizer-BioNTech (%)	Janssen (%)*	Total
Moderna	**13,719 (98.5)**	583	89	14,391
Pfizer-BioNTech	207	**259,327 (>99.9)**	83	259,617
Janssen	7	70	**82 (32.3)**	159
Total	13,933	259,980	254	**274,167**

Includes participants who completed at least one survey in the first week after additional dose, data collected during August 12–October 10, 2021

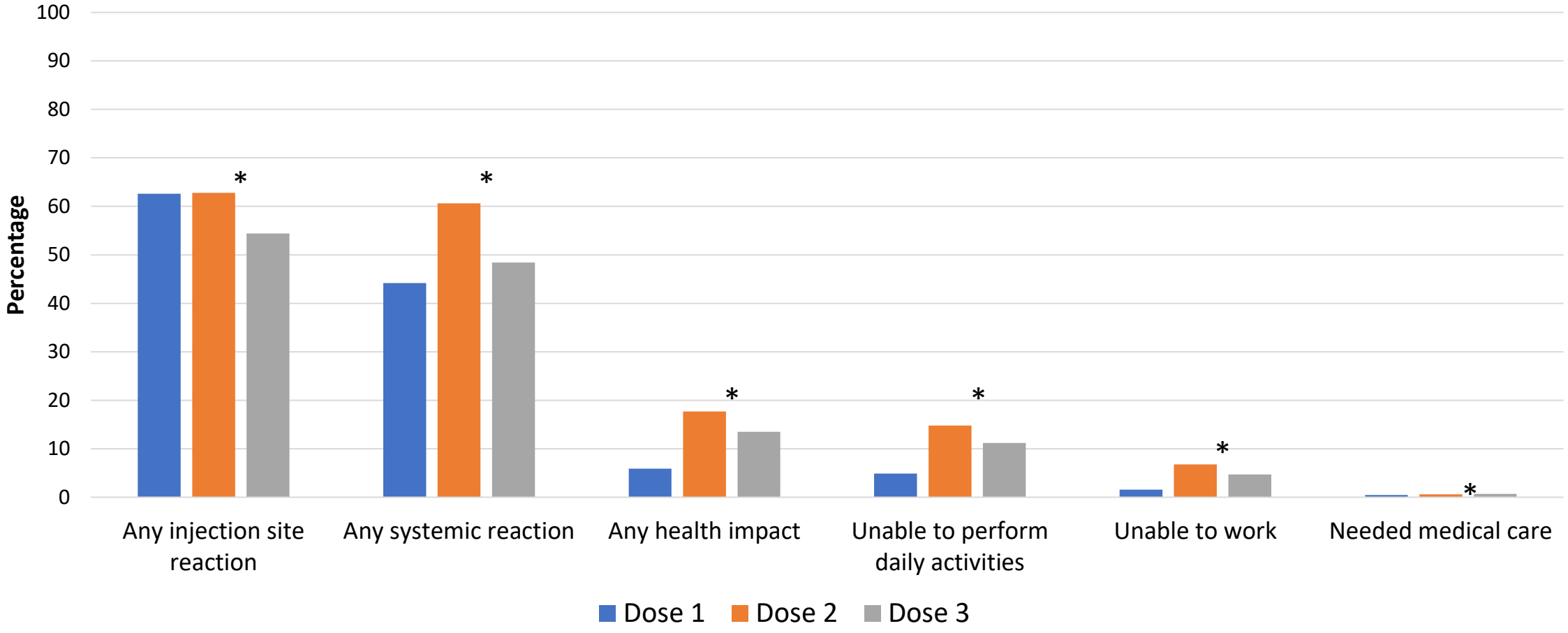
* Includes persons who received Janssen as their primary series and one additional dose of vaccine from the listed manufacturers

Top 10 solicited reactions reported at least once 0-7 days after dose 3 of Moderna or Pfizer-BioNTech vaccine



Includes 273,046 participants who completed at least one survey in the first week after additional dose, data collected during August 12–October 10, 2021

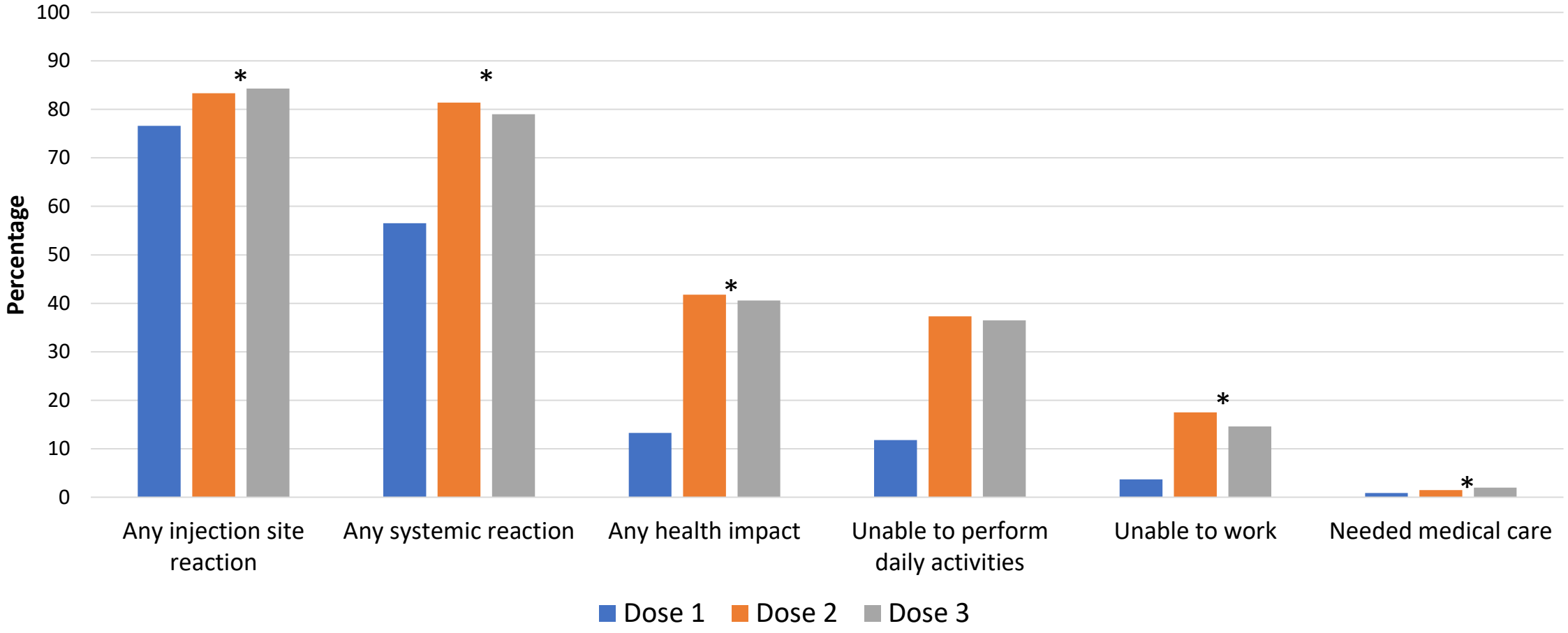
Reactions and health impact events reported at least once in days 0-7 after Pfizer-BioNTech vaccination, by dose



Includes 188,514 participants who completed at least one survey in the first week after each dose, data collected during August 12–October 10, 2021

* Dose 2 compared to dose 3: statistically significant difference (p-value <0.05) using multivariable generalized estimating equations model that accounted for the correlation between registrants and adjusted for demographic variables.

Reactions and health impact events reported at least once in days 0-7 after Moderna vaccination, by dose



Includes 8,153 participants who completed at least one survey in the first week after each dose, data collected during August 12–October 10, 2021
* Dose 2 compared to dose 3: statistically significant difference (p-value <0.05) using multivariable generalized estimating equations model that accounted for the correlation between registrants and adjusted for demographic variables.

Summary of v-safe 65,247 v-safe participants who reported co-administration of COVID-19 and other vaccines

- Most (89.9%) participants were aged 18-74 years
- 89.8% of co-administration occurred with dose 3 COVID-19 vaccine
- Surveillance is ongoing

Age group	% of participants
0-17	1.4
18-49	31.8
50-64	23.9
65-74	34.2
75-84	8.0
≥85	0.8

Dose number	% of participants
1	6.3
2	3.8
3	89.8

Includes 65,247 participants who completed at least one survey in the first week after each dose, data collected during June 19–October 10, 2021. Collection of co-administration data in v-safe began June 19, 2021.

Limitations of early safety monitoring for an additional COVID-19 vaccine dose

- v-safe population likely not representative of the vaccinated U.S. population
- Additional dose recipients likely included immunocompromised and non-immunocompromised persons
- Approximately half of mRNA third doses are among persons aged ≥65 years
- At this time, data are limited to:
  - Determine patterns of adverse events after dose 2 Janssen or an additional dose from a manufacturer different from the primary series
  - Identify rare adverse events
- Complete medical review of deaths following vaccination reported to VAERS is dependent on availability of medical records, death certificates, and autopsy reports, which may be delayed or not available

Summary

- No unexpected patterns of adverse events were identified
- ≥92% of VAERS reports following dose 3 of COVID-19 vaccination were non-serious
  - Vaccination errors and systemic symptoms were most commonly reported
- Over 270,000 v-safe registrants reported an additional dose
  - Most reported a primary mRNA vaccine series followed by dose 3 from the same manufacturer
  - For Pfizer-BioNTech, local and systemic reactions were reported less frequently following dose 3 than dose 2
  - For Moderna, local reactions were reported slightly more frequently and systemic reactions slightly less frequently following dose 3 than dose 2

[1] https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-biontech-initiate-rolling-submission

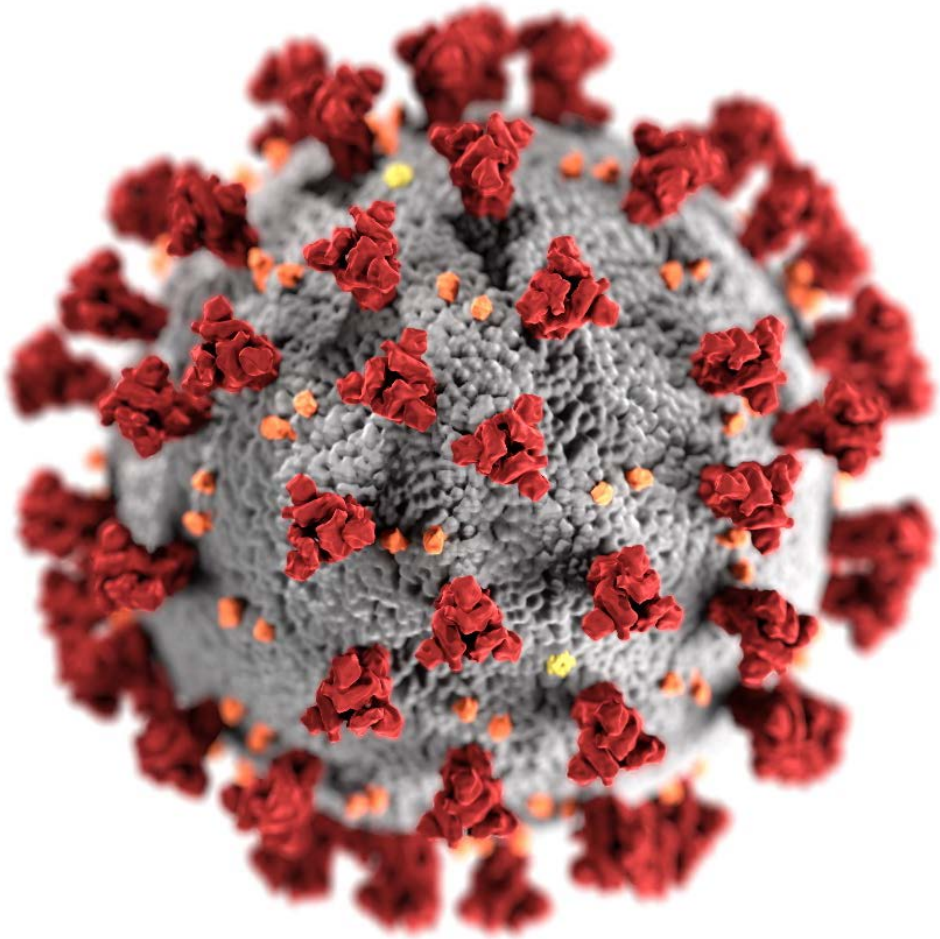
Next steps

- VAERS and v-safe will continue to monitor safety of additional doses of COVID-19 vaccination
- The Vaccine Safety Datalink (VSD) will incorporate additional doses of COVID-19 vaccination into its ongoing safety monitoring
- The Clinical Immunization Safety Assessment (CISA) Project will continue to be available to consult on clinically complex adverse events following additional dose of COVID-19 vaccination
- CDC will update the Advisory Committee on Immunization Practices (ACIP) as additional data become available

Acknowledgements

- **VAERS and v-safe teams**
- James Baggs
- Paige Marquez
- John Su
- Tanya Myers
- David Shay
- Tom Shimabukuro
- Julianne Gee

Thank you!



For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.