SARS-CoV-2 Vaccine Breakthrough Surveillance and Case Information Resource

Washington State Department of Health

August 11, 2021

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COVID-19 vaccines are effective and critical tools to aid in the control of this pandemic. Large-scale clinical studies found that COVID-19 vaccines prevented most people from getting COVID-19 illness, but like most other vaccines, they are not 100 percent effective. This means some fully vaccinated people will still get infected with SARS-CoV-2. These individuals may or may not develop COVID-19 symptoms.

Vaccine breakthrough occurs when someone gets infected with an organism they are fully vaccinated against. For the COVID-19 vaccine, this means someone tests positive for SARS-CoV-2 two weeks or more after receiving the full series of an authorized COVID-19 vaccine. Since millions of people in the United States are getting vaccinated, we expect to see some breakthrough disease. Fortunately, there is evidence from research studies that the COVID-19 vaccine reduces the risk of people getting really sick and needing to go to the hospital or dying from COVID-19.

The Washington State Department of Health (DOH) is closely monitoring and investigating vaccine breakthrough cases in Washington to identify possible patterns of infection and disease in our population. The data in this report may change as we get additional information.

At a Glance (data from January 17, 2021 – July 31, 2021)

- 5879 SARS-CoV-2 vaccine breakthrough cases have been identified in Washington State.
- Of the cases that have data available:
  - 88% reported symptoms
  - 7% were hospitalized
  - 66 people died of COVID-related illness

Criteria for SARS-CoV-2 vaccine breakthrough cases

The criteria for identifying vaccine breakthrough cases include a positive lab test (either a PCR test or an antigen test) at least 14 days after a person received their last recommended dose of an authorized COVID-19 vaccine.

We wait 14 days because some people could get COVID-19 soon after vaccination when their body hasn't had enough time yet to build full protection. These infections are not considered vaccine breakthrough cases because they have not yet fully vaccinated. It typically takes about two weeks after the final dose of vaccine for the body to build a high level of protection against the disease.

One way we identify potential vaccine breakthrough cases is through interviews with people who had a positive PCR or antigen COVID-19 test, where investigators ask if the interviewee was vaccinated. We also find breakthrough cases by checking if people who test positive for SARS-CoV-2 are vaccinated using the state's immunization registry.

We then get documentation of their vaccine doses to verify that at least 14 days passed between the final vaccine administration date and the specimen collection date for the individual's positive test.

The first COVID-19 vaccines were administered in Washington in mid-December 2020, so we started our surveillance for people who meet these case criteria during the week that began on Sunday, January 17, 2021.

From January 17 – July 31, 2021:

- 5879 reports of possible breakthrough met the breakthrough case criteria

Note: The Washington State Department of Health continually receives and investigates reports of potential breakthrough cases. Therefore, the data in this report are subject to change as we obtain additional information on SARS-CoV-2 vaccine breakthrough cases.

Washington State SARS-CoV-2 breakthrough cases by age group

Age group (years)	Number of cases	Percent of cases
≤ 19	136	2%
20-34	1,371	23%
35-49	1,606	27%
50-64	1,349	23%
65-79	1,022	17%
80+	395	7%
Total	**5,879**	**100%**

- Initially, most reported breakthrough cases occurred in adults 65 years of age and older, who were prioritized for vaccination. As younger age groups became eligible for vaccines, the distribution of breakthrough cases also changed to include younger age groups.

Washington State SARS-CoV-2 breakthrough cases by sex

Sex	Number of cases	Percent of cases
Female	3,254	55%
Male	2,522	43%
Unknown	103	2%
Total	**5,879**	**100%**

- A higher percentage of women in Washington State have chosen to get vaccinated than have men; therefore, more women are at risk for vaccine breakthrough than men. This difference is reflected in the table above.

Washington State SARS-CoV-2 breakthrough cases by race/ethnicity

For all race and ethnicity reporting, all those who indicated Hispanic ethnicity are grouped in the Hispanic ethnicity, regardless of race. Racial groups are identified only for those who indicated non-Hispanic ethnicity. Based on this classification, our report includes the following groups:

- Hispanic; and
- non-Hispanic race categorizations for white, Black, Native Hawaiian and Pacific Islander, Asian, and American Indian/Alaska Native.

The multiracial group includes people who chose more than one category. This can include a selection of unknown and one other race category. This method of categorization allows us to assess the data by race and ethnicity. However, the reporting categories are incomplete and do not reflect the diversity of people and experiences across Washington state.

Race and Ethnicity	Number of cases	Percent of cases
American Indian or Alaska Native*	53	1%
Asian*	361	9%
Black*	190	5%
Hispanic	461	11%
Multiracial*	137	3%
Native Hawaiian or Other Pacific Islander*	32	1%
Other Race*	57	1%
White*	2,910	69%

* Non-Hispanic

- Among 5879 COVID-19 breakthrough cases, no race and/or ethnicity information was available for 1678 (29%) people. The lack of data limits our ability to draw firm conclusions about the results provided in the table above.

Washington State SARS-CoV-2 breakthrough cases by symptoms and hospitalization

	Symptomatic		Hospitalizations	
	Number of cases	Percent of cases	Number of cases	Percent of cases
Yes	4,240	88%	333	7%
No	561	12%	4,312	93%

- Most reported breakthrough cases in Washington who had data about symptoms available reported having symptoms.

Note: Among 5879 COVID-19 breakthrough cases, no symptom information was available for 1078 (18%), and no hospitalization information was available for 1234 (21%) persons.

COVID-19 deaths among SARS-CoV-2 breakthrough cases in Washington State

Among breakthrough cases from this surveillance period **66** have died of COVID-related illness.

- The age range of deceased cases was 48 - 100 years (median 80 years).
- Among the **66** deceased:
  - **53** people were known to have one or more underlying conditions. Information was not available for **13** of the people who died.
  - **46** people were hospitalized, and **14** were not. Information was not available for **6** of the people who died.
  - **31** were known to be associated with a long-term care facility. The remaining **35** people were either not associated with a long-term care facility or information was not available regarding facilities.

Washington State SARS-CoV-2 vaccine breakthrough cases - variants

Vaccine breakthrough cases are being prioritized for whole genome sequencing so that the distribution of variants detected among breakthrough cases can be continually monitored. Please refer to the SARS-CoV-2 Sequencing and Variants in Washington State report for more details.

About this SARS-CoV-2 Vaccine Breakthrough Report

This report does not include information about:

- **Geography:** We want to protect individuals' privacy. Due to the small number of cases in some areas, it would be too easy to identify people with vaccine breakthrough.
- **Vaccine brand:** Vaccine breakthrough has been associated with all three current authorized vaccines. It is misleading to look at breakthrough cases by vaccine brand since we have received and administered more of some brands than others. Additionally, each vaccine has a different dosing schedule so some people reach their 14th day after vaccination more quickly than others. These factors make it difficult to directly compare numbers of breakthrough cases among vaccine brands.