

COVID-19 Breakthrough Report

Oregon's Monthly Surveillance Summary



Monthly Vaccine Breakthrough Case Report - May 2022

Background

Monthly breakthrough case reports include data through the last day of the most recent complete calendar month and are published on the first or second Thursday of every month.¹ Vaccine breakthrough cases are defined as instances in which an individual tests positive for COVID-19 at least 14 days following the completion of any primary COVID-19 vaccine series.²

This report includes only those vaccine breakthrough cases that are reported to public health following a positive test result. People who have tested positive through at-home tests are not included in this report. Reported cases are automatically matched with our statewide immunization database to verify COVID-19 vaccination status.

Many vaccine breakthrough cases are believed to experience no symptoms or minimal symptoms and, therefore, are unlikely to undergo testing for COVID-19 and be reported to public health.³ For this reason, the true number of vaccine breakthrough cases is unknown. The number of reported vaccine breakthrough cases must be interpreted within the context of the more than 2.9 million people in Oregon who have completed a primary COVID-19 vaccine series and the more than 1.6 million people who have received a booster dose.

¹ The monthly summary, Figure 1, and Figure 2 use the date that cases are reported to Oregon Health Authority (OHA), to provide information on the most recently identified cases. All other dates in this report use specimen collection date to align with the breakthrough case definition.

² This definition is consistent with the Center for Disease Control and Prevention (CDC) definition, available here: <https://www.cdc.gov/vaccines/covid-19/downloads/COVID-vaccine-breakthrough-case-investigations-Protocol.pdf>.

³ Bergwerk, M., Gonen, T., Lustig, Y., Amit, S., Lipsitch, M., Cohen, C., Mandelboim, M., Gal Levin, E., Rubin, C., Indenbaum, V. and Tal, I., 2021. Covid-19 breakthrough infections in vaccinated health care workers. *New England Journal of Medicine*.

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COVID-19 cases by vaccination status

Monthly summary

During the month of May 2022, there were 44,363 cases of COVID-19 reported to OHA. Of these, 21,100 (47.6%) were unvaccinated, 23,246 (52.4%) were vaccine breakthrough cases, and 17 (0%) had an unknown vaccination status. Of all vaccine breakthrough cases in May, 14,506 (62.4%) were fully vaccinated and boosted. The median age of all vaccine breakthrough cases was 49 years. There were 275 (1.2%) breakthrough cases among residents of care facilities, senior living communities or other congregate living settings. There were 5,116 (22%) cases in persons 65 or older. There were 1,012 (4.4%) cases aged 12-17.

OHA publishes the most up-to-date information available about cases from the most recently completed calendar month. However, not all information about a case's vaccination status may be available at the time of publication. Table 1 includes updated totals of COVID-19 cases by vaccine breakthrough status for the previous three months.

Table 1. COVID-19 cases by vaccine breakthrough status in the previous 3 months

Month	Total cases	Cases with known vaccination status	Percent of cases with known vaccination status	Breakthrough cases	Percent breakthrough cases
March 2022	10,664	10,645	99.8	4,874	45.8
April 2022	18,559	18,537	99.9	10,055	54.2
May 2022	44,363	44,346	100.0	23,246	52.4

Cumulative summary

Overall, 233,873 vaccine breakthrough cases have been identified in Oregon. Of these, 69,105 (29.5%) were fully vaccinated and boosted at the time of infection. The median age of breakthrough cases is 41 years (range: 5-108). There have been 3,195 (1.4%) breakthrough cases among residents of care facilities, senior living communities or other congregate living settings. 38,627 (16.5%) cases have been 65 or older. There have been a total of 14,775 (6.3%) cases aged 12-17.

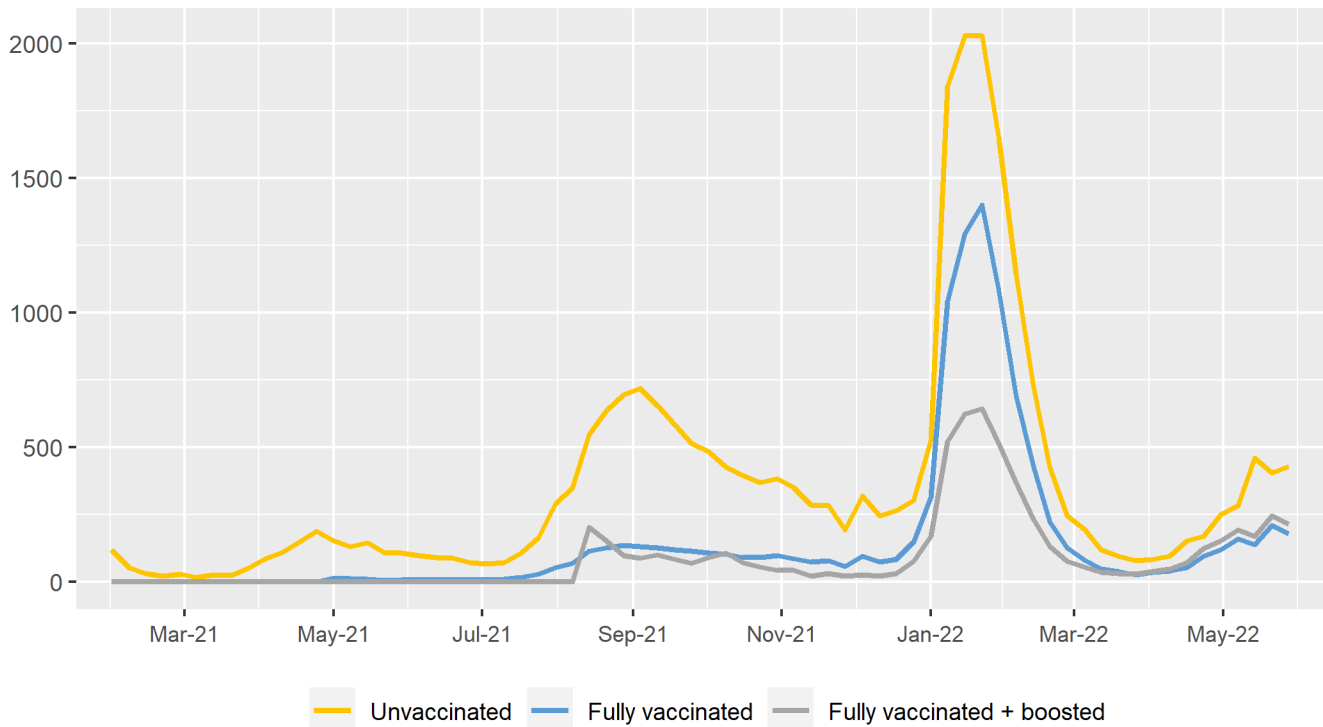
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The incidence of COVID-19 is much higher in unvaccinated⁴ individuals than in vaccinated individuals (Figure 1). The rate of COVID-19 cases among unvaccinated individuals in May was approximately two times the rate among those who were fully vaccinated and those who were fully vaccinated and boosted. COVID-19 continues to circulate throughout Oregon. Vaccination, including boosting, remains the most effective tool to reduce the spread of COVID-19.

Figure 1. Incident COVID-19 cases per 100,000 per week in adults, by vaccination status⁵



⁴ Unvaccinated persons are defined as people who have not received an approved COVID-19 vaccine, or who have not completed a COVID-19 vaccine series.

⁵ Cases with unknown vaccination status were excluded from this figure.

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Vaccine breakthrough cases and severity

The Pfizer, Moderna and Johnson & Johnson COVID-19 vaccines are all highly effective at preventing severe COVID-19 illness and death. Table 2 includes totals of breakthrough cases by vaccine manufacturer and severity. Relatively few breakthrough cases have been hospitalized, and even fewer have died (Figure 2).⁶

Table 2. COVID-19 breakthrough cases by vaccine manufacturer and severity⁷

Primary series vaccine manufacturer	Primary series completed	Cases	Hospitalizations	Deaths	Cases per 100,000 vaccinated
Pfizer	1,689,955	139,676	3,094	732	8,265.1
Moderna	982,294	72,576	2,061	450	7,388.4
Johnson & Johnson/Janssen	246,580	21,566	851	187	8,746.0

⁶ A death is considered to be related to COVID-19 in any of the following circumstances: a) death of a confirmed or probable COVID-19 case within 60 days of the earliest available date among exposure to a confirmed case, onset of symptoms, or date of specimen collection for the first positive test; b) death from any cause in a hospitalized person during admission or in the 60 days following discharge AND a COVID-19-positive laboratory diagnostic test at any time since 14 days prior to hospitalization; or c) death of someone with a COVID-19-specific ICD-10 code listed as a primary or contributing cause of death on a death certificate, regardless of the dates of diagnosis or death.

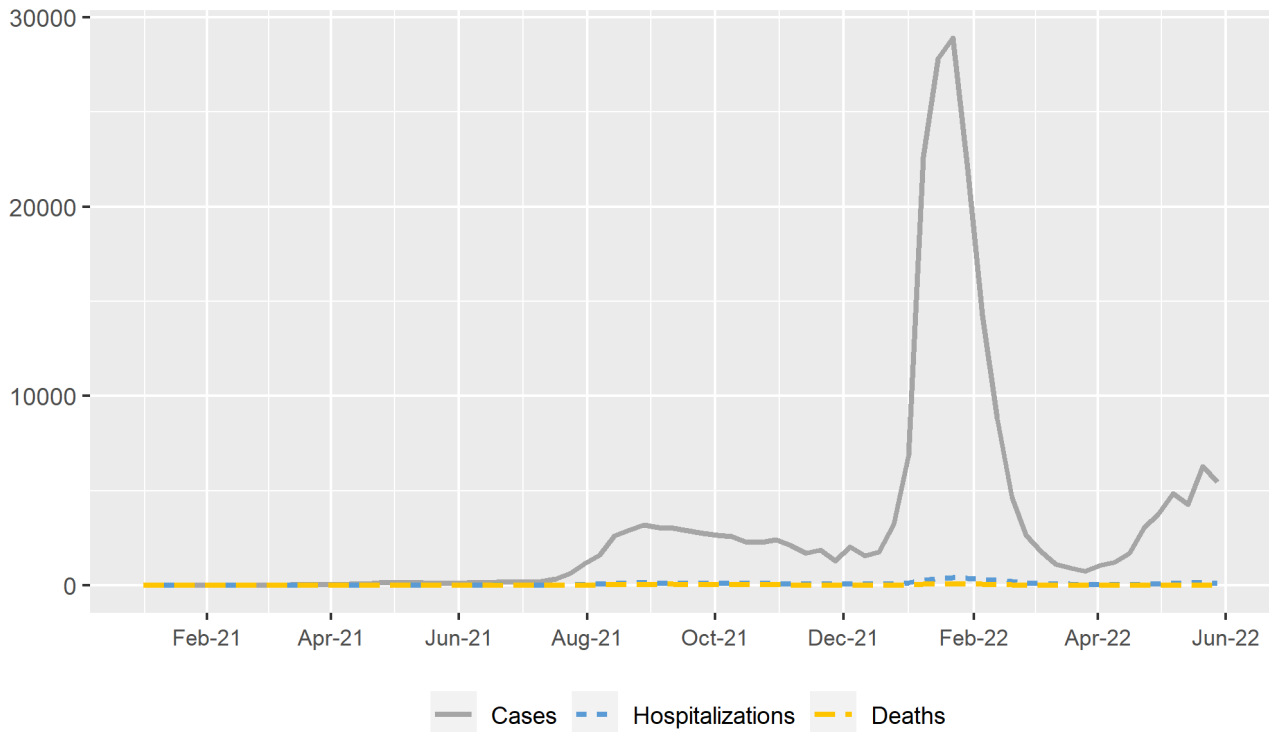
⁷ Table 2 provides the number of cases per 100,000 vaccinated individuals by primary series vaccine manufacturer. Because this figure does not account for the time that each person has been fully vaccinated, it is not a true rate and should not be interpreted as such.

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Figure 2. COVID-19 breakthrough cases, hospitalizations and deaths, by week



Individuals who are fully vaccinated and boosted have the lowest risk of severe illness and death.⁸ Table 3 shows the total number of cases, hospitalizations, and deaths by vaccination status. An individual is considered fully vaccinated and boosted if they received an additional dose of any COVID-19 vaccine at least 5 months after completing a Pfizer or Moderna primary series or at least 2 months after completing a Johnson & Johnson initial dose. If a person has completed a primary series but has not received a valid booster at the time of infection, the individual is categorized as fully vaccinated.

⁸ <https://covid.cdc.gov/covid-data-tracker/#covidnet-hospitalizations-vaccination>.

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Table 3. COVID-19 cases in adults, by vaccination status and severity⁹

Case type	Cases	Hospitalizations	Deaths
Fully vaccinated + boosted	67,676	1,372	233
Fully vaccinated	151,053	4,588	1,136
Unvaccinated	280,714	15,547	4,060

To date, 2.6% of all known breakthrough cases have been hospitalized (n=6,018), and only 0.6% have died (n=1,369).¹⁰ The median age of the people who have died is 80 (range: 23-108). It is important to note that not all vaccine breakthrough cases are reported to public health, which may cause the proportions in the following section to appear higher than in reality. These figures are not vaccine breakthrough hospitalization or death rates and should not be interpreted as such.

Tables 4, 5 and 6 provide detailed vaccine breakthrough severity data by age, race and ethnicity. The risk of both hospitalization and death increases with age.

⁹ Cases with unknown vaccination status are excluded from this table. This table also excludes unvaccinated cases prior to January 1, 2021. Based on vaccine rollout in Oregon, this approximates the first date that a breakthrough case could have occurred.

¹⁰ Cumulative deaths reported here reflect all breakthrough cases known to have died since January 1, 2021. There may be a lag of several weeks between when an individual dies and when their death appears in this report. Increases in cumulative deaths between this and subsequent reports should not be interpreted as individuals who have died within the past week.

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Table 4. COVID-19 breakthrough cases by age group and severity

Age group	Breakthrough cases	Breakthrough hospitalizations	Breakthrough deaths
0-9	225	1	0
10-19	21,712	64	0
20-29	42,167	238	2
30-39	44,753	360	7
40-49	39,991	356	19
50-59	32,679	633	68
60-69	25,425	1,212	204
70-79	16,792	1,502	357
80+	10,128	1,652	712
Total	233,873	6,018	1,369

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Table 5. COVID-19 breakthrough case severity by race¹¹

Race	Breakthrough cases	Breakthrough hospitalizations	Breakthrough deaths
> 1 race	3,601	42	3
American Indian/Alaska Native	2,981	83	10
Asian	8,830	158	26
Black	4,755	165	26
Not Available	65,880	691	284
Other	20,879	409	101
Pacific Islander	292	8	1
White	126,655	4,462	918
Total	233,873	6,018	1,369

¹¹ During the case investigation, people are asked to self-report their race, ethnicity, tribal affiliation, country of origin or ancestry. As of October 2021, 42,423 (80.8%) of the 52,483 persons who identified as "Other" race also self-identified as Hispanic or Latino.

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Table 6. COVID-19 breakthrough case severity by ethnicity

Ethnicity	Breakthrough cases	Breakthrough hospitalizations	Breakthrough deaths
Hispanic	21,576	362	44
Not Hispanic	125,168	4,203	844
Unknown	87,129	1,453	481
Total	233,873	6,018	1,369

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Table 7 provides the proportion of vaccine breakthrough cases who have died with COVID-19. Approximately 80% of vaccine breakthrough deaths have occurred in patients 70 years and older. The proportion of vaccine breakthrough cases who have died with COVID-19 has increased over time. This trend is expected as the proportion of the population which is fully vaccinated increases and may also be associated with waning immunity and the proportion of the population which has not received a booster dose.

Table 7. COVID-19 deaths by month, by breakthrough case status

Month	Total COVID-19 deaths	Breakthrough deaths	Percent breakthrough deaths
April 2021	121	6	5.0
May 2021	223	19	8.5
June 2021	117	15	12.8
July 2021	97	16	16.5
August 2021	605	134	22.1
September 2021	930	196	21.1
October 2021	658	175	26.6
November 2021	409	93	22.7
December 2021	340	80	23.5
January 2022	602	210	34.9
February 2022	628	238	37.9
March 2022	232	106	45.7
April 2022	79	26	32.9
May 2022	86	50	58.1

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COVID-19 variants

Table 8. COVID-19 breakthrough cases associated with variants of concern¹²

Overall, approximately 6.9% of positive molecular specimens in Oregon have been sequenced. Omicron is currently the dominant variant circulating in Oregon. Vaccine breakthrough cases appear to reflect the variants circulating in the community. Additional information on variants can be found here:

<https://public.tableau.com/app/profile/oregon.health.authority.covid.19/viz/GISAIDVariantDashboardUpdated/OregonVariantDashboard>.

Subtype	Breakthrough Cases
Omicron (B.1.1.529)	2,583
Delta (B.1.617.2)	2,532

Table 9. COVID-19 breakthrough cases associated with variants being monitored

Subtype	Breakthrough Cases
Alpha (B.1.1.7)	153
Beta (B.1.351)	17
Gamma (P.1)	63
Epsilon (B.1.427/B.1.429)	40
Iota (B.1.526)	30

¹² As of September 29, 2021, OHA will align with CDC's classification of SARS-CoV-2 variants. Variant classification scheme defines four classes of SARS-CoV-2 variants: variants of concern, variants of interest, variants being monitored and variants of high consequence.

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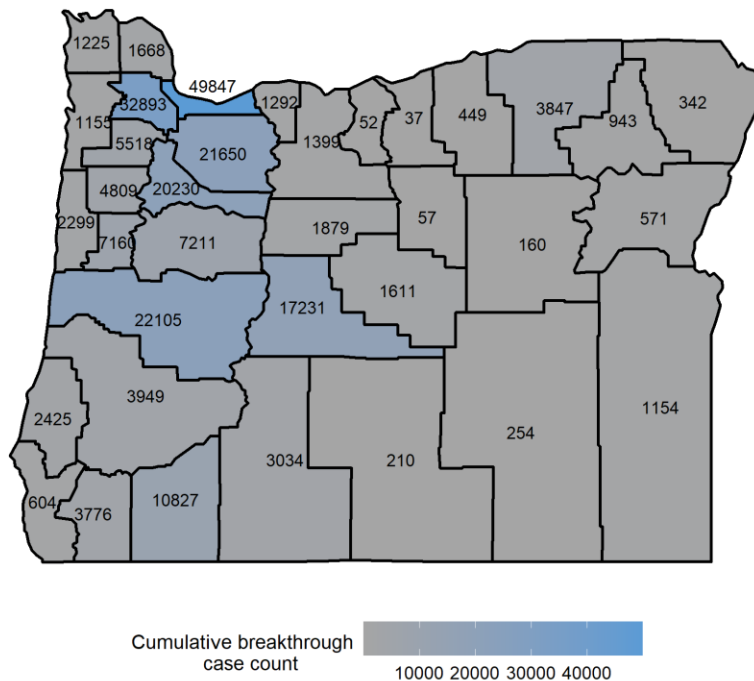
Breakthrough cases by county

Figure 3 and Table 10 show breakthrough cases by county. In general, cumulative breakthrough case counts correspond with the population size of each county. Additional information on cumulative cases can be found here:

<https://public.tableau.com/app/profile/oregon.health.authority.covid.19/viz/OregonCOVID-19TestingandOutcomesbyCounty/OregonsCOVID-19TestingandOutcomesbyCounty>.

Table 10 provides both cumulative and monthly data. The “Cases in previous month” column references the number of vaccine breakthrough cases newly reported during the month of May. This count may not reflect the full number of vaccine breakthrough cases that occurred during this time, as breakthrough case ascertainment may lag up to several weeks.

Figure 3. Map of COVID-19 breakthrough case cumulative counts, by county of residence¹³



¹³ Counties that have a total of fewer than 10 cases will appear grey without a data label.

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Table 10. COVID-19 breakthrough cases by county of residence¹⁴

County	Cumulative cases	Cases in previous month
Baker	571	18
Benton	7160	681
Clackamas	21650	2630
Clatsop	1225	106
Columbia	1668	200
Coos	2425	163
Crook	1611	115
Curry	604	29
Deschutes	17231	1712
Douglas	3949	290
Gilliam	37	0
Grant	160	1-9
Harney	254	17
Hood River	1292	98
Jackson	10827	639
Jefferson	1879	116
Josephine	3776	187
Klamath	3034	107

¹⁴ Counties that have a total of fewer than 10 cases will be reported as 1-9 cases.

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County	Cumulative cases	Cases in previous month
Lake	210	1-9
Lane	22105	2032
Lincoln	2299	156
Linn	7211	491
Malheur	1154	24
Marion	20230	1388
Morrow	449	10
Multnomah	49847	6428
Polk	4809	390
Sherman	52	1-9
Tillamook	1155	110
Umatilla	3847	92
Union	943	46
Wallowa	342	1-9
Wasco	1399	129
Washington	32893	4336
Wheeler	57	1-9
Yamhill	5518	482