

COVID-19 Breakthrough Report

Oregon's Weekly Surveillance Summary



Weekly Vaccine Breakthrough Case Report - March 31, 2022

Background

Weekly breakthrough case reports include data through the most recent Sunday and are published on Thursday.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 Vaccine breakthrough cases that result in hospitalization or death are reported to Centers for Disease Control and Prevention (CDC).

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.³

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.⁴ 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 2.8 million people in Oregon who have completed a primary COVID-19 vaccine series and the more than 1.5 million who have received a booster dose.

¹ The weekly summary, Figure 1, and Figure 2 use the date that cases are reported to 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 CDC's definition, available here: <https://www.cdc.gov/vaccines/covid-19/downloads/COVID-vaccine-breakthrough-case-investigations-Protocol.pdf>.

³ As case counts increased dramatically during the Omicron surge, our database was unable to match the entire volume of reported cases. Oregon Health Authority (OHA) is working towards alternative methods to identify vaccination status for all reported cases in a timely manner regardless of case volume.

⁴ 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

Weekly summary

During the week of March 20–March 26, there were 1,599 cases of COVID-19 reported to OHA. Of these, 850 (53.2%) were unvaccinated, 748 (46.8%) were vaccine breakthrough cases, and 1 (0.1%) had an unknown vaccination status. Of all vaccine breakthrough cases, 433 (57.9%) were fully vaccinated and boosted. The median age of all vaccine breakthrough cases was 48 years. There were 12 (1.6%) breakthrough cases among residents of care facilities, senior living communities or other congregate living settings. There were 188 (25.1%) cases in persons 65 or older. There were 29 (3.9%) cases aged 12-17.

OHA publishes the most up-to-date information available about cases from the most recently completed MMWR week. 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 six weeks.

Table 1. COVID-19 cases by vaccine breakthrough status over the previous 6 weeks

| MMWR week ending | Total cases | Cases with known vaccination status | Percent of cases with known vaccination status | Breakthrough cases | Percent breakthrough cases |
|------------------|-------------|-------------------------------------|--|--------------------|----------------------------|
| 2022-02-19 | 9,863 | 9,846 | 99.8 | 4,659 | 47.3 |
| 2022-02-26 | 5,573 | 5,564 | 99.8 | 2,644 | 47.5 |
| 2022-03-05 | 4,095 | 4,091 | 99.9 | 1,787 | 43.7 |
| 2022-03-12 | 2,520 | 2,517 | 99.9 | 1,124 | 44.7 |
| 2022-03-19 | 1,986 | 1,980 | 99.7 | 901 | 45.5 |
| 2022-03-26 | 1,599 | 1,598 | 99.9 | 748 | 46.8 |

Cumulative summary

Overall, 197,423 vaccine breakthrough cases have been identified in Oregon. Of these, 46,403 (23.5%) 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 2,753 (1.4%) breakthrough

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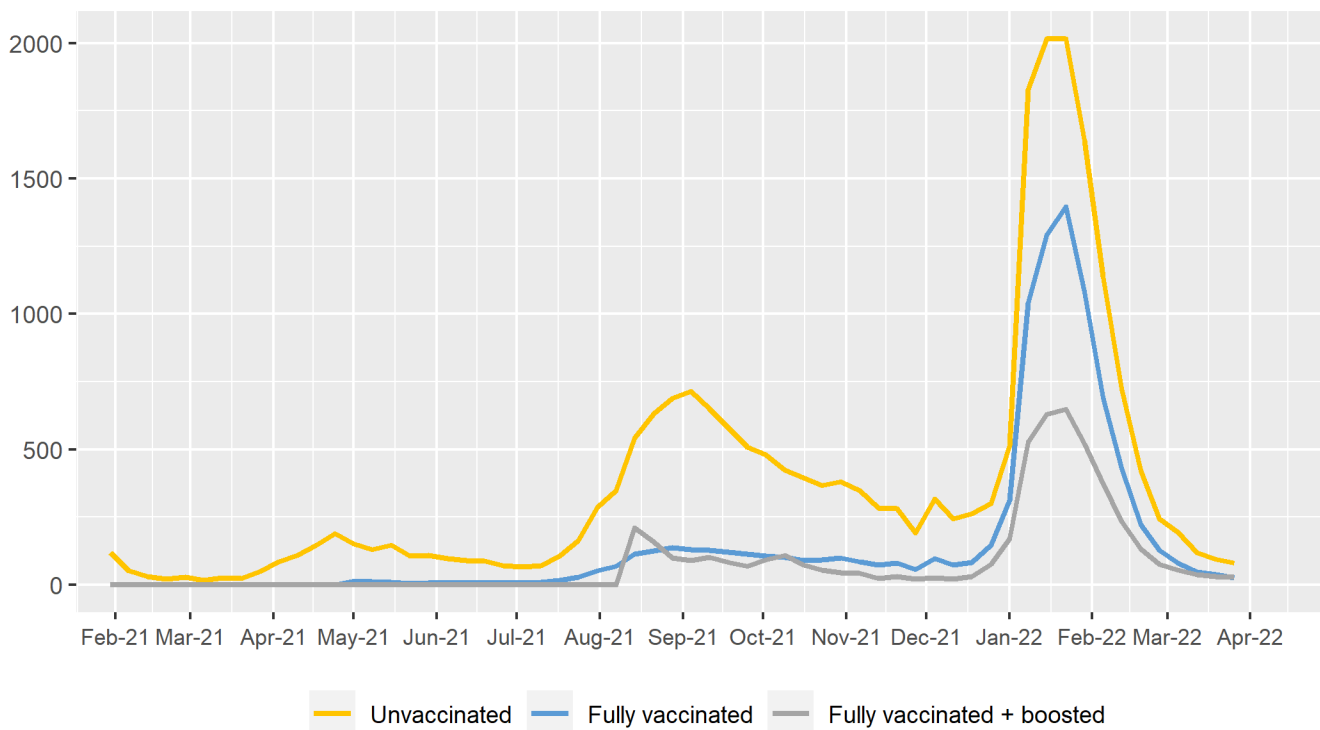
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cases among residents of care facilities, senior living communities or other congregate living settings. 30,797 (15.6%) cases have been 65 or older. There have been a total of 13,163 (6.7%) cases aged 12-17.

The incidence of COVID-19 is much higher in unvaccinated⁵ individuals than in vaccinated individuals (Figure 1). The rate of COVID-19 cases among unvaccinated individuals in the most recent week was approximately 3 times the rate among those who were fully vaccinated and among 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 status⁶



⁵ 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.

⁶ 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).⁷

Table 2. COVID-19 Breakthrough cases by vaccine manufacturer and severity⁸

| Primary series vaccine manufacturer | Primary series completed | Cases | Hospitalizations | Deaths | Cases per 100,000 vaccinated |
|-------------------------------------|--------------------------|---------|------------------|--------|------------------------------|
| Pfizer | 1,666,577 | 116,877 | 2,569 | 618 | 7,013.0 |
| Moderna | 972,211 | 61,252 | 1,748 | 374 | 6,300.3 |
| Johnson & Johnson/Janssen | 244,952 | 19,254 | 755 | 167 | 7,860.3 |

⁷ 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.

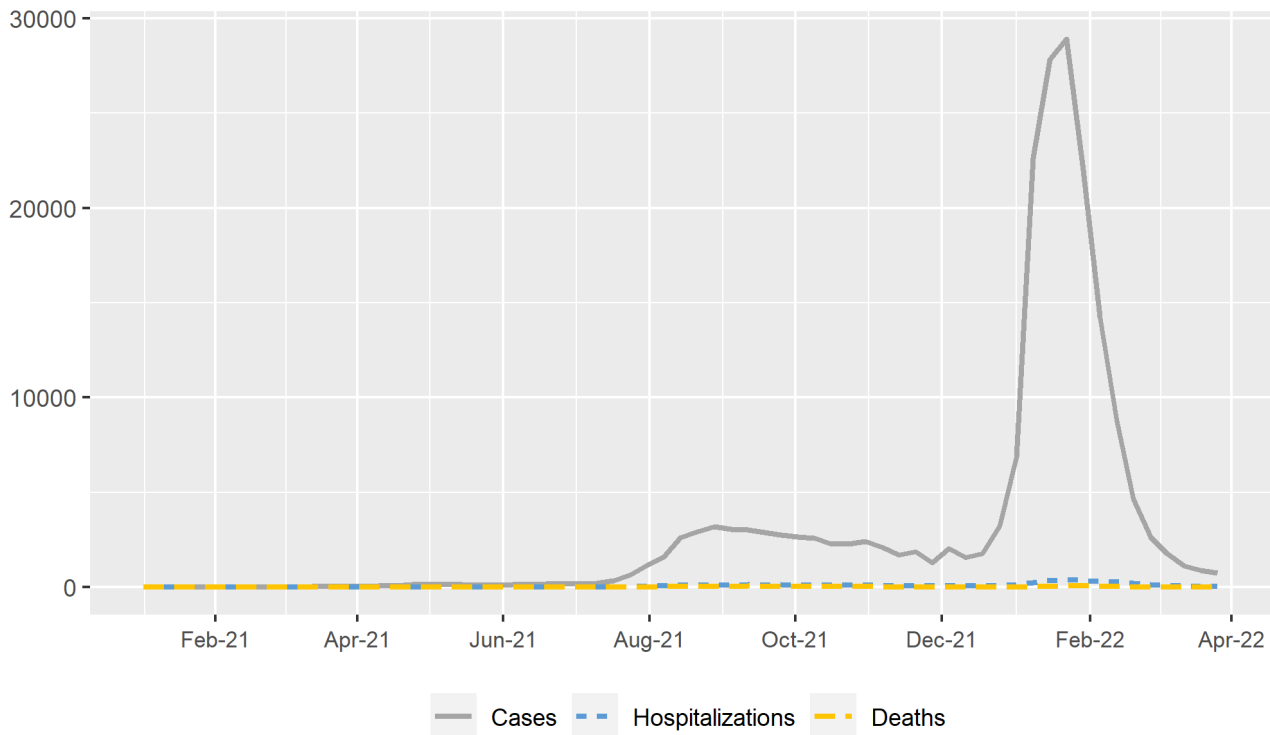
⁸ Table 2 provides the number of cases per 100,000 vaccinated individuals by primary series vaccine manufacturer. Because this figure does not account for the time that each person has been fully vaccinated, it is not a true rate and should not be interpreted as such.

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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.⁹ 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.

⁹ <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 severity since January 2021¹⁰

| Case type | Cases | Hospitalizations | Deaths |
|----------------------------|---------|------------------|--------|
| Fully vaccinated + boosted | 45,502 | 869 | 141 |
| Fully vaccinated | 138,493 | 4,164 | 1,018 |
| Unvaccinated | 259,241 | 14,568 | 3,737 |

To date, 2.6% of all known breakthrough cases have been hospitalized (n=5,077), and only 0.6% have died (n=1159).¹¹ The median age of the people who have died is 80 (range: 23-104). 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.

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

| Age group | Breakthrough cases | Breakthrough hospitalizations | Breakthrough deaths |
|-----------|--------------------|-------------------------------|---------------------|
| 0-9 | 154 | 1 | 0 |
| 10-19 | 19,307 | 49 | 0 |
| 20-29 | 36,430 | 198 | 2 |

¹⁰ 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.

¹¹ 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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| Age group | Breakthrough cases | Breakthrough hospitalizations | Breakthrough deaths |
|-----------|--------------------|-------------------------------|---------------------|
| 30-39 | 38,013 | 287 | 6 |
| 40-49 | 33,799 | 296 | 15 |
| 50-59 | 27,521 | 544 | 54 |
| 60-69 | 21,038 | 1,060 | 178 |
| 70-79 | 13,232 | 1,278 | 309 |
| 80+ | 7,929 | 1,364 | 595 |
| Total | 197,423 | 5,077 | 1,159 |

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Table 5. COVID-19 breakthrough case severity by race¹²

| Race | Breakthrough cases | Breakthrough hospitalizations | Breakthrough deaths |
|-------------------------------|--------------------|-------------------------------|---------------------|
| > 1 race | 1,503 | 40 | 3 |
| American Indian/Alaska Native | 2,524 | 71 | 8 |
| Asian | 6,733 | 129 | 22 |
| Black | 3,993 | 134 | 24 |
| Not Available | 57,547 | 607 | 259 |
| Other | 18,698 | 349 | 89 |
| Pacific Islander | 253 | 7 | 1 |
| White | 106,172 | 3,740 | 753 |
| Total | 197,423 | 5,077 | 1,159 |

Table 6. COVID-19 breakthrough case severity by ethnicity

| Ethnicity | Breakthrough cases | Breakthrough hospitalizations | Breakthrough deaths |
|--------------|--------------------|-------------------------------|---------------------|
| Hispanic | 19,400 | 311 | 34 |
| Not Hispanic | 102,257 | 3,456 | 691 |
| Unknown | 75,766 | 1,310 | 434 |
| Total | 197,423 | 5,077 | 1,159 |

¹² 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 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 received a booster dose.

Table 7. COVID-19 deaths by month, by breakthrough case status¹³

| Month | Total COVID-19 deaths | Breakthrough deaths | Percent breakthrough deaths |
|----------------|-----------------------|---------------------|-----------------------------|
| March 2021 | 127 | 4 | 3.1 |
| April 2021 | 121 | 6 | 5.0 |
| May 2021 | 222 | 19 | 8.6 |
| June 2021 | 116 | 15 | 12.9 |
| July 2021 | 96 | 16 | 16.7 |
| August 2021 | 599 | 134 | 22.4 |
| September 2021 | 919 | 197 | 21.4 |
| October 2021 | 648 | 175 | 27.0 |
| November 2021 | 400 | 93 | 23.2 |
| December 2021 | 337 | 80 | 23.7 |
| January 2022 | 587 | 208 | 35.4 |
| February 2022 | 462 | 178 | 38.5 |

¹³ Data in Table 7 will be updated monthly and will reflect cases from the previous month.

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COVID-19 variants

Table 8. COVID-19 breakthrough cases associated with variants of concern¹⁴

Overall, approximately 6.1% of positive molecular specimens in Oregon have been sequenced. Omicron is currently the dominant variant circulating in Oregon. At this time, 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) | 2,154 |
| Delta (B.1.617.2) | 2,434 |

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 |

¹⁴ 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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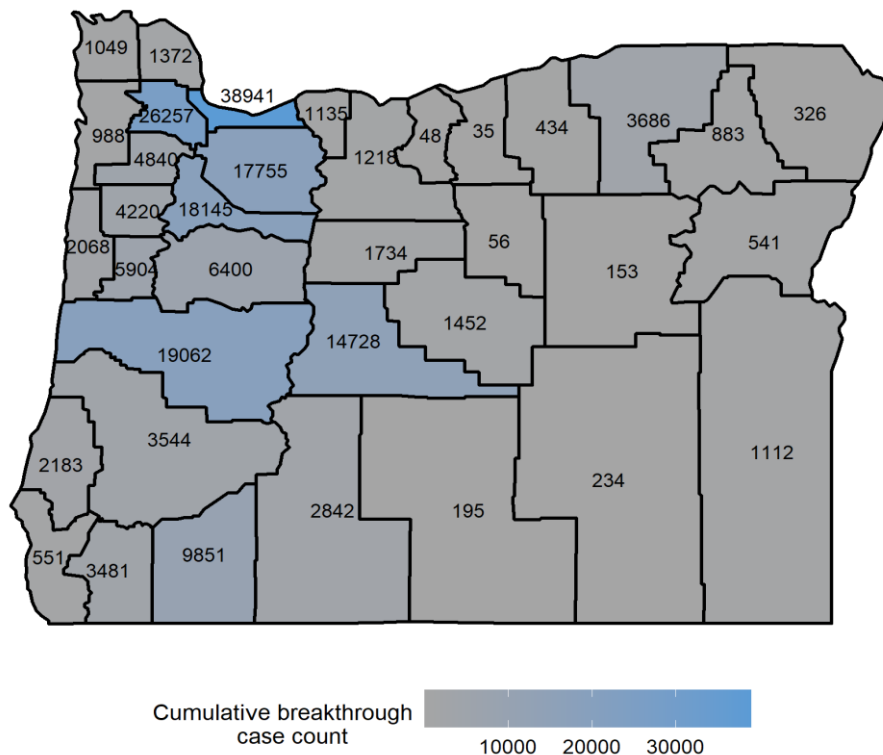
Breakthrough cases by county

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 weekly data. The “Cases in previous week” column references the number of vaccine breakthrough cases newly reported between March 20 and March 26. 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 residence¹⁵



¹⁵ 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 residence¹⁶

| County | Cumulative cases | Cases in previous week |
|------------|------------------|------------------------|
| Baker | 541 | 0 |
| Benton | 5904 | 31 |
| Clackamas | 17755 | 46 |
| Clatsop | 1049 | 1-9 |
| Columbia | 1372 | 1-9 |
| Coos | 2183 | 1-9 |
| Crook | 1452 | 0 |
| Curry | 551 | 1-9 |
| Deschutes | 14728 | 54 |
| Douglas | 3544 | 14 |
| Gilliam | 35 | 0 |
| Grant | 153 | 1-9 |
| Harney | 234 | 0 |
| Hood River | 1135 | 1-9 |
| Jackson | 9851 | 28 |
| Jefferson | 1734 | 1-9 |
| Josephine | 3481 | 11 |
| Klamath | 2842 | 12 |

¹⁶ 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 week |
|------------|------------------|------------------------|
| Lake | 195 | 1-9 |
| Lane | 19062 | 93 |
| Lincoln | 2068 | 1-9 |
| Linn | 6400 | 13 |
| Malheur | 1112 | 0 |
| Marion | 18145 | 26 |
| Morrow | 434 | 0 |
| Multnomah | 38941 | 229 |
| Polk | 4220 | 14 |
| Sherman | 48 | 0 |
| Tillamook | 988 | 1-9 |
| Umatilla | 3686 | 1-9 |
| Union | 883 | 1-9 |
| Wallowa | 326 | 0 |
| Wasco | 1218 | 1-9 |
| Washington | 26257 | 101 |
| Wheeler | 56 | 0 |
| Yamhill | 4840 | 1-9 |