



COVID-19 cases, hospitalizations, and deaths by vaccination status in Montana, February 7, 2021 — September 4, 2021

Key Findings

- From February 7 through September 4, 2021, 3,610 (10.5%) cases, 248 (11.4%) hospitalizations, and 54 (16.5%) deaths were reported among fully vaccinated persons in Montana.
- During the most recent eight weeks, the COVID-19-associated hospitalization and death rates were 5.1 and 3.3 times greater, respectively, among not fully vaccinated persons as compared with fully vaccinated persons
- **COVID-19 vaccination is the best protection against SARS-CoV-2 infection and at preventing severe COVID-19 illness, such as hospitalization and death.**
- DPHHS encourages all Montana residents and visitors to exercise personal responsibility and take precautionary measures to slow the spread of the virus, including wearing a face covering when appropriate, avoiding large crowds, staying home when not feeling well, and washing hands frequently.

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Jennifer Miller, RN CPH
Laura Williamson, MPH

Introduction

In mid-December 2020, Montana residents began getting vaccinated against COVID-19 through a phased approach, beginning with healthcare providers and persons at highest risk for COVID-related complications or death. Vaccinations were opened to all Montanans aged 16 years and older on April 1, 2021 and then to all Montanans aged 12 years and older on May 10, 2021. As of September 17, 2021, DPHHS reported that 477,171 Montanans aged 12 years and older (52%) were fully vaccinated.

Clinical trials have found that the COVID-19 vaccines are safe and effective at preventing severe COVID-19-related outcomes, such as hospitalization or death. However, no vaccines are 100% effective at preventing illness in vaccinated people. It is expected that there will be a small percentage of fully vaccinated people that will become sick, hospitalized, or die from COVID-19.¹ COVID-19 infections among fully vaccinated persons are called “breakthrough” cases. A breakthrough COVID-19 infection is defined as a positive SARS-CoV-2 collected ≥ 14 days after completing the primary COVID-19 vaccine series of an FDA-authorized COVID-19 vaccine. Depending on the specific vaccine administered, completion of series could be one or two doses of vaccine.

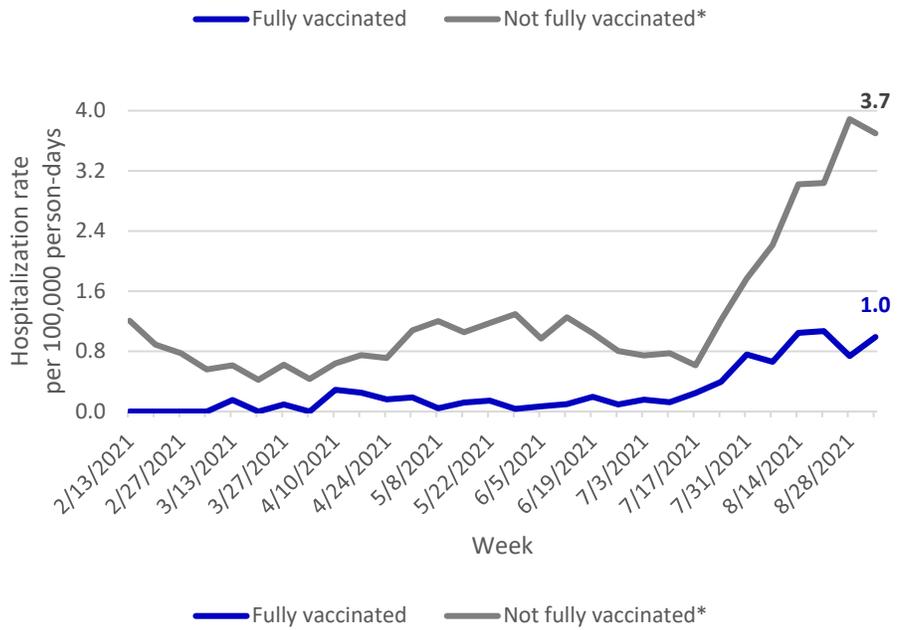
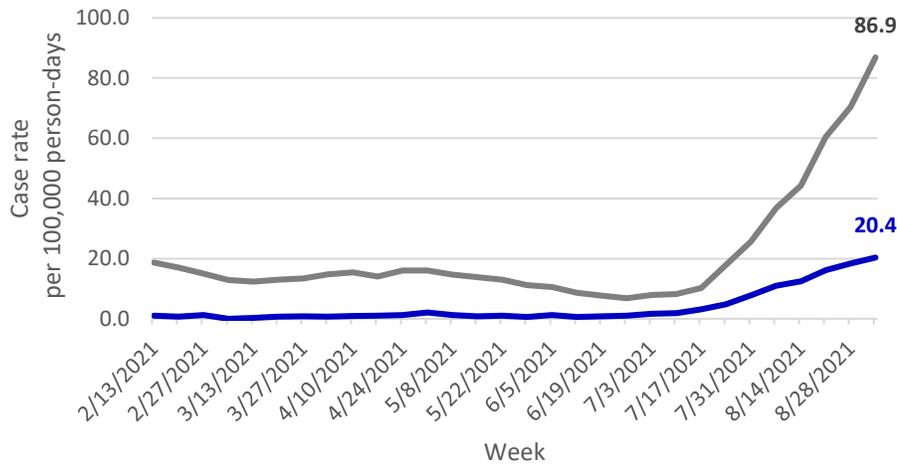
This report describes new COVID-19 cases and COVID-19-associated hospitalizations and deaths by vaccination status in Montana from February 7 – September 4, 2021.

Methods

Case data were derived from information in the Montana Infectious Disease Information System (MIDIS) on September 17, 2021. Montana residents who met the definition of a confirmed or probable case (i.e., having received a positive test result for SARS-CoV-2, the virus that causes COVID-19, from a respiratory specimen, using a molecular amplification test and reported to DPHHS) were included in the analysis. Vaccination status of cases was determined by linkage with the Montana Immunization Information System (imMTrax). Cases were considered fully vaccinated if the positive SARS-CoV-2 viral test occurred ≥ 14 days after completing the primary series of an FDA-authorized or approved COVID-19 vaccine. Cases who were not fully vaccinated were defined in one of two ways: as persons who partially completed or did not start the primary COVID-19 vaccine series authorized or approved by the FDA; or persons for whom 14 days have not passed between the last dose of their vaccine series and their positive test. Data on the number of Montana residents who received COVID-19 vaccination was obtained from the Department of Health and Human Services Tiberius Vaccine Administration Data on September 15, 2021 and includes vaccinations administered through state and federal vaccination programs.



Figure. New COVID-19 case and hospitalization rates by vaccination status by week in Montana among all age groups, February 7, 2021 — September 4, 2021.



* Not fully vaccinated included persons of all age groups and was defined as persons who are not yet eligible (<12 years), have partially completed or did not start the primary COVID-19 vaccine series authorized by the FDA, or persons for whom 14 days have not passed between the last dose of their vaccine series and their positive test.



Results

Time period February 7 – September 4, 2021

From February 7–September 4, 2021, a total of 30,849 (89.5%) COVID-19 cases, 1,920 (88.6%) hospitalizations, and 274 (83.5%) COVID-19-associated deaths were reported among persons not fully vaccinated (including those not yet eligible for vaccination). Conversely, 3,610 (10.5%) cases, 248 (11.4%) hospitalizations, and 54 (16.5%) deaths were reported among fully vaccinated persons in Montana. The first COVID-19 case in Montana among a fully vaccinated person was diagnosed on February 10, 2021.

During this time period, the COVID-19 case and hospitalization rates per 100,000 person-days among persons not fully vaccinated (including those not yet eligible for vaccination) were higher than among fully vaccinated persons. The COVID-19 case and hospitalization rates began increasing in mid-July among both groups, with the largest rate increase among persons not fully vaccinated (Figure). This increase coincided with the emergence of the SARS-CoV-2 Delta variant. Beginning in July, the SARS-CoV-2 Delta variant accounted for greater than 50 percent of samples sequenced in Montana, and among specimens collected during the first two weeks of August, the Delta variant accounted for 98% of samples sequenced.²

Time Period July 11 – September 4, 2021

Data from the most recent 8 weeks (July 11 – September 4, 2021) were assessed to describe COVID-19 cases, hospitalizations, and deaths among people eligible for COVID-19 vaccination (Montana residents 12 years and older). **Among all cases reported in persons eligible for vaccine, the case rate among persons not fully vaccinated was 4.4 times greater than fully vaccinated persons and the COVID-19-associated hospitalization and death rates were 5.1 and 3.3 times greater, respectively, among not fully vaccinated persons as compared with fully vaccinated persons (Table).** By week, the number and rate of COVID-19 cases increased among both fully vaccinated and not fully vaccinated persons; however, rates among persons not fully vaccinated compared with fully vaccinated persons remained at least 3.9 times higher. COVID-19-associated hospitalization rates among fully vaccinated persons remained relatively unchanged by week over the past 8 weeks. **The hospitalization rate among persons not fully vaccinated increased each week and reached a peak of 6.7 times higher among persons not fully vaccinated compared with fully vaccinated person the week ending August 28, 2021 (Table).** There were too few deaths by week to calculate rates or rate ratios by vaccination status.

From July 11 – September 4, 2021, adults aged 18–39 years had the highest number of COVID-19 cases compared with other age groups among both the fully vaccinated and not fully vaccinated, with case rates 4.4 times higher among persons not fully vaccinated compared with fully vaccinated persons in this age group (Table). Children aged 12 to 17 years who were not fully vaccinated had case rates 10.3 times higher than fully vaccinated children. COVID-19-associated hospitalizations and deaths increased with increasing age for both vaccination status groups; however, the number and rate were greater among persons not fully vaccinated compared with fully vaccinated persons. Hospitalizations and deaths among persons not fully vaccinated were younger than fully vaccinated persons. **The median age of not fully vaccinated persons who were hospitalized was 60 years (range 13–97 years) and 75 years (range 29–98 years) for fully vaccinated persons. The median age at death was 71 years (range 26–96 years) for not fully vaccinated persons and 82 years (range 53–94 years) for fully vaccinated persons.** Older adults aged 86 years and older had the highest case and hospitalization rates among fully vaccinated persons, which coincides with the number of active outbreaks in long-term care or assisted living facilities (LTC/ALF). During the week ending July 16, 2021, 12 of 281 (4%) licensed LTC/ALF facilities in Montana reported active COVID-19 outbreaks to DPHHS, this number increased to 70 (25%) the week ending September 3, 2021.

Table. Number of reported COVID-19 cases, hospitalizations, and deaths by vaccination status by week among persons aged 12 years or older in Montana, July 11– September 4, 2021.

	NEW CASES					NEW HOSPITALIZATIONS					DEATHS				
	Fully vaccinated*		Not fully vaccinated [†]			Fully vaccinated*		Not fully vaccinated [†]			Fully vaccinated*		Not fully vaccinated [†]		
	N	Rate [§]	N	Rate [§]	Rate ratio [¶]	N	Rate [§]	N	Rate [§]	Rate ratio [¶]	N	Rate [§]	N	Rate [§]	Rate ratio [¶]
TOTAL	3,162	11.9	12,856	52.0	4.4	199	0.75	931	3.8	5.1	42	0.16	127	0.51	3.3
AGE GROUP (YRS)															
12–17	33	3.3	1,126	33.8	10.3	0	0.0	5	**	**	0	0.0	0	0.0	**
18–39	843	12.5	5,656	54.8	4.4	<5	**	128	1.2	**	0	0.0	5	**	**
40–49	433	13.3	1,869	54.6	4.1	13	**	133	3.9	**	0	0.0	10	**	**
50–64	719	10.8	2,483	49.2	4.6	33	0.5	281	5.6	11.3	<5	**	27	0.5	**
65–74	589	10.9	1,099	69.4	6.4	49	0.9	200	12.6	13.9	10	**	37	2.3	**
75–85	376	13.4	501	99.8	7.4	65	2.3	146	29.1	12.5	16	**	37	7.4	**
≥86	169	21.4	122	25.0	1.2	35	4.4	38	7.8	1.8	13	**	11	**	**
WEEK-END DATE															
7/17/2021	102	3.1	394	12.4	4.0	8	**	52	1.6	**	<5	**	11	**	**
7/24/2021	158	4.8	688	21.9	4.5	13	**	74	2.4	**	<5	**	9	**	**
7/31/2021	258	7.8	961	30.8	3.9	25	0.8	90	2.9	3.8	5	**	11	**	**
8/7/2021	365	11.0	1,351	43.6	4.0	22	0.7	123	4.0	6.0	8	**	20	0.6	**
8/14/2021	415	12.4	1,632	53.0	4.3	36	1.1	124	4.0	3.7	8	**	23	0.7	**
8/21/2021	542	16.1	2,220	72.6	4.5	36	1.1	159	5.2	4.9	8	**	23	0.8	**
8/28/2021	625	18.4	2,566	84.6	4.6	25	0.7	149	4.9	6.7	<5	**	21	0.7	**
9/4/2021	697	20.4	3,044	101.5	5.0	34	1.0	160	5.3	5.4	<5	**	9	**	**

* A positive SARS-CoV-2 collected ≥14 days after completing the primary COVID-19 vaccine series of an FDA-authorized COVID-19 vaccine. Also called a “breakthrough” case.

[†] Not fully vaccinated was defined as persons who have partially completed or did not start the primary COVID-19 vaccine series authorized by the FDA or persons for whom 14 days have not passed between the last dose of their vaccine series and their positive test.

[§] Rates are cumulative incidence per 100,000 person-days. Rates were calculated as the sum of people aged 12 years or older observed with COVID-19 outcomes each day divided by the sum of people aged 12 years or older who were fully vaccinated or not fully vaccinated each day times 100,000. Vaccination data from Tiberius Vaccine Administration Data, Department of Health and Human Services, accessed September 15, 2021.

[¶] Rate ratio was calculated as incidence among not fully vaccinated divided by incidence among fully vaccinated people.

** Rates and rate ratios not calculated for counts less than 20 because the rates may be statistically unstable



Discussion

From July 11 – September 4, 2021, COVID-19 cases were 4.4 times higher among persons not fully vaccinated than fully vaccinated persons. COVID-19-associated hospitalizations and deaths were also 5.1 and 3.3 times higher, respectively, among persons not fully vaccinated as compared with fully vaccinated persons in Montana. This trend was observed by week and across age groups, even as the overall COVID-19 incidence increased beginning mid-July with the emergence of the SARS-CoV-2 Delta variant in Montana. Data in this report demonstrate that the FDA-authorized or approved COVID-19 vaccines provide protection against severe COVID-19 outcomes in Montana, namely hospitalization and death. Similarly, a recent study across 13 U.S. jurisdictions reported that crude rates for COVID-19 cases, hospitalizations, and deaths from late-June through mid-July 2021 were 5.1, 7.6, and 6.1 times higher, respectively, among persons not fully vaccinated compared with fully vaccinated persons after the Delta variant reached predominance in those jurisdictions.³

This analysis was subject to at least three limitations. First, combining partially vaccinated persons with unvaccinated persons may have underestimated the difference between persons not fully vaccinated and fully vaccinated persons. It is documented that partially vaccinated persons have some enhanced immunity to SARS-CoV-2 infection, which suggests that rate ratios might be even greater when comparing fully vaccinated persons to persons who have received no COVID-19 vaccine doses.⁴ Second, small numbers of COVID-19 hospitalizations and deaths were observed among some age groups and by week. Observations with small numbers (< 20) should be interpreted with caution. Third, these data do not allow one to determine if the trends observed in this report are due to waning vaccine-induced immunity, increased SARS-CoV-2 transmission, or both.

These data indicate that COVID-19 vaccination is the best protection against SARS-CoV-2 infection and at preventing severe COVID-19 outcomes, such as hospitalization and death. In addition to encouraging vaccination, DPHHS encourages all Montana residents and visitors to exercise personal responsibility and take precautionary measures to slow the spread of the virus, including wearing a face covering when appropriate, avoiding large crowds, staying home when not feeling well, and washing hands frequently.

References

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2. Montana Department of Public Health and Human Services. COVID-19 Variants Identified in Montana, updated September 7, 2021. <https://dphhs.mt.gov/publichealth/cdepi/diseases/coronavirusmt/VariantWebUpdate090721.pdf>
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