COVID-19 Update

Hospitalizations, Deaths, and Vaccine Breakthrough Infections

Through August 2021

The Section of Epidemiology, Alaska Division of Public Health

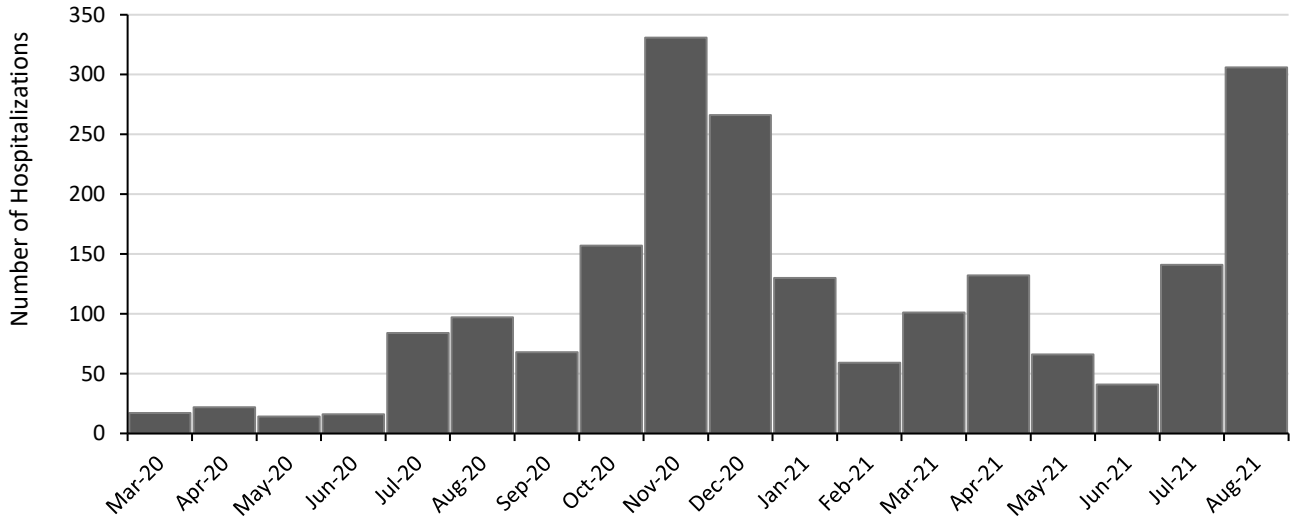
Introduction

This document is intended to provide routine updates on COVID-19 hospitalizations, deaths, repeat and vaccine breakthrough infections in Alaska. Hospitalization and death data are those displayed on the Alaska Cases Dashboard. Vaccine breakthrough infections and multisystem inflammatory syndrome in children statistics are produced with additional data collected by the Section of Epidemiology (SOE). This report is not designed to track the burden of COVID-19 on hospitals; other data sources, such as HHS Protect or facility-level statistics may be more appropriate for those questions. It is likely that some hospitalizations are missing from these data, particularly more recent events. Data included are not final; efforts to increase completion and ensure data quality are ongoing and these numbers will change. Additionally, more detailed summaries and reports will be produced in the future. Data are for cases from March 2020 through August 2021.

Hospitalizations

SOE removes hospitalizations that are not due to COVID-19; for example, asymptomatic behavioral health patients or laboring mothers tested on admission are excluded. A total of 2,048 COVID-19 hospitalizations with a known admission date among Alaska residents were included in this analysis (Figure 1). For people with multiple admissions, the most severe/longer admission was counted. Regions were assigned by each patient's home region, not hospital location.

Figure 1. COVID-19 hospital admissions among Alaska residents by month of admission — March 2020 through August 2021



Demographics

During March 2020 through August 2021, the mean age of COVID-19 hospitalized persons was 60 years (range: newborn to 98 years). For patients admitted in 2020, the mean age was 62 years (range: 1 month to 98 years). For patients admitted in 2021, the mean age was 5 years younger at 57 years (range: newborn to 98 years). Hospitalizations by sex and race are shown in Table 1.

Table 1. Sex and race among COVID-19 hospitalized Alaska residents — March 2020 through August 2021

Characteristic	Count (%)	Statewide population N (%)	Rate*
Sex			
Female	935 (46)	375,017 (51)	249.3
Male	1,113 (54)	353,886 (49)	314.5
Race			
American Indian and Alaska Native (AIAN)	500 (24)	113,010 (16)	442.4
Asian	146 (7)	48,382 (7)	301.8
Black	65 (3)	26,408 (4)	246.1
Native Hawaiian and Other Pacific Islander (NHOPI)	171 (8)	11,706 (2)	1460.8
White	762 (37)	472,386 (65)	161.3
Other	90 (4)		
Multiple	91 (4)	57,011 (8)	159.6
Unknown	223 (11)		

**Rate is per 100,000 people within each group.*

Severity Indicators

This summary includes 1,599 hospitalizations among Alaska residents. Only hospitalization records for which both admission and discharge date had been entered are included. This restriction allows severity indicators and length of stay to be more adequately described but results in an undercount of total hospitalizations, especially those that occurred more recently. Tables 2 and 3 show severity indicators by all hospitalizations and hospitalizations with a fatality.

Table 2. COVID-19 hospitalizations (n=1,599) among Alaska residents with severity indicators — March 2020 through August 2021

	Yes N (%)	No N (%)	Unknown N (%)
ICU	462 (29)	863 (54)	274 (17)
Ventilator	227 (14)	998 (62)	374 (23)

Table 3. COVID-19 hospitalizations with fatality (n=361), among Alaska residents with severity indicators — March 2020 through August 2021

	Yes N (%)	No N (%)	Unknown N (%)
ICU	195 (54)	99 (27)	67 (19)
Ventilator	149 (41)	141 (39)	71 (20)

Length of Stay

Table 4 describes the amount of time patients stayed in the hospital. This analysis is restricted to 1,599 patients for whom both an admission and discharge date have been entered. Patients who were admitted and discharged on the same day were counted as one day of hospitalization. Similarly, patients who were intubated and extubated on the same day were counted as one day of ventilation. Data for 2021 are likely missing patients who have been admitted for a long time, as they do not yet have a discharge date.

Table 4. Duration of COVID-19 hospital stay — March 2020 through August 2021

	2020			2021 to date		
	N	**Mean**	**Range**	**N**	**Mean**	**Range**
All hospitalizations	982	9.4 days	1–124 days	617	7.9 days	1–50 days
Non-ICU patients	584	7 days	1–124 days	271	5.8 days	1–44 days
ICU patient (total duration of hospital stay)	296	14.6 days	1–75 days	154	11.2 days	1–50 days
ICU patient (duration of ICU stay)	244*	9.4 days	1–75 days	114	7 days	1–50 days
Ventilator days	104	9.9 days	1–44 days	50	9.7 days	1–41 days

**Duration of ICU stay was not available at the time of this report for 93 patients who were known to have been in the ICU at some point during their hospital stay.*

Multisystem inflammatory syndrome in children

Thirteen children hospitalized with multisystem inflammatory syndrome in children (MIS-C) have been reported to the Alaska Section of Epidemiology since the beginning of the pandemic. MIS-C is defined by fever, laboratory evidence of inflammation, and evidence of clinically severe illness requiring hospitalization with multisystem organ involvement. The definition requires that the patient is <21 years of age with current or recent SARS-CoV-2 infection or exposure to a suspected or confirmed COVID-19 case within the 4 weeks prior to the onset of symptoms and no alternative plausible diagnoses.

Five of the 13 children met the MIS-C case definition because of a positive antibody test, so they are not included in the above desciption of SARS-CoV-2 positive hospitalized patients; the other eight were included in analysis of that patient population provided above because they had a positive COVID diagnostic test (e.g., PCR or antigen). Seven of the 13 children were female. Eight were aged 0–4 years at the time of admission, three were aged 5–10 years, and two were aged 11–20 years. Three children had a pre-existing condition. All children were admitted to the hospital, and eight were admitted to an intensive care unit. None of the children have died.

Deaths

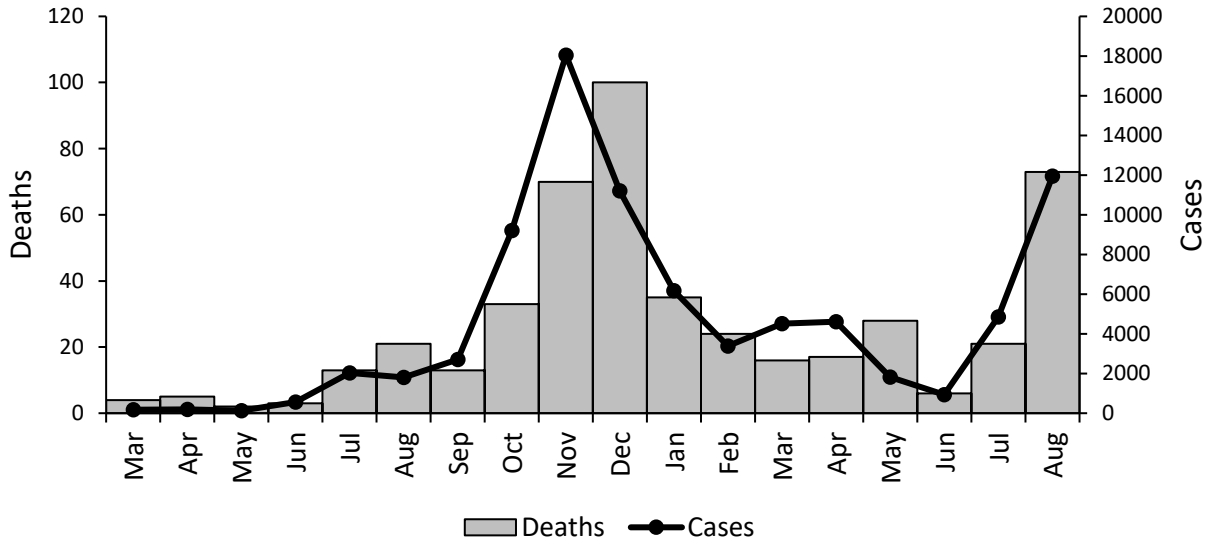
Methods

Deaths are counted as COVID-19-related in accordance with national standards. This process includes auditing death certificates to verify that COVID-19 was included as a primary or contributory cause of death, medical records review, or provider determination that the cause of death was COVID-19 based on laboratory testing and a consistent clinical presentation (e.g., respiratory signs and symptoms, fever or chills, and fatigue). Rates were calculated using Alaska Department of Labor and Workforce Development population estimates and are listed per 100,000 person-years. Cases are attributed geographically to their permanent residence, which may or may not correlate to location of exposure, illness, or death. All data are preliminary, subject to change, and were congruent with public state data displays as of October 1, 2021.

Results

From January 1, 2020 through August 31, 2021, Alaska recorded 484 COVID-19-related deaths for a statewide death cumulative incidence of 66.4 per 100,000 persons (Figure 2). For this same period, the US death cumulative incidence was 195 per 100,000 persons, which was 2.9-times higher than the Alaska death rate. Of these 484 deaths, 382 (78.9%) were known to have been hospitalized and 199 (41.1%) had been admitted to an intensive care unit.

Figure 2. COVID-19 deaths and cases, by month among Alaska residents — January 2020 through August 2021



Note: Data are shown beginning in March, which was the first month in which there was a death in an Alaska resident that was attributed to COVID-19.

Demographic characteristics

Table 5. Sex of Alaska residents with a COVID-19-related death — January 2020 through August 2021

Sex	Deaths N (%)	Statewide population N (%)	Deaths per 100,000 person-years
Male	295 (61.0)	375,017 (51.4)	47.2
Female	189 (39.0)	353,886 (48.6)	32.1
AK total	484	728,903	39.9

Table 6. Age of Alaska residents with a COVID-19-related death — January 2020 through August 2021

Age in Years	Deaths N (%)	Statewide population N (%)	Deaths per 100,000 person-years
19 and under	0 (0)	199,809 (27.4)	0.0
20–29	10 (2.1)	98,606 (13.5)	6.1
30–39	14 (2.9)	111,831 (15.3)	7.5
40–49	24 (5.0)	85,855 (11.8)	16.8
50–59	42 (8.7)	90,703 (12.4)	27.8
60–69	91 (18.8)	85,259 (11.7)	64.1
70–79	153 (31.6)	41,509 (5.7)	221.3
80+	150 (31.0)	15,331 (2.1)	587.4
AK total	484	728,903	39.9

Table 7. Race of Alaska residents with a COVID-19-related death — January 2020 through August 2021

Race/Ethnicity	Deaths n (%)	Statewide population n (%)	Deaths per 100,000 person-years
AIAN	153 (31.6)	113,010 (15.5)	81.3
Asian	46 (9.5)	48,382 (6.6)	57.1
Black	11 (2.3)	26,408 (3.6)	25.0
NHOPI	30 (6.2)	11,706 (1.6)	153.9
White	217 (44.8)	472,386 (64.8)	27.6
Multiple races	10 (2.1)	57,011 (7.8)	10.5
Race other/unknown	9 (1.9)	n/a	n/a
Hispanic (of any race)	20 (4.1)	53,202 (7.3)	22.6
Ethnicity unknown	41 (8.5)	n/a	n/a
AK total	484	728,903	39.9

Vaccine Breakthrough Infections and Reinfections

Key Points

- COVID-19 vaccines continue to provide strong protection, especially against hospitalization and death.
- Most COVID-19 hospitalizations in Alaska could be prevented by vaccination.
- COVID-19 cases have become more common among fully vaccinated persons than they were in the initial months after vaccine roll-out.
- CDC recommends that fully vaccinated persons wear masks in public indoor settings in areas with substantial to high community transmission.
- While people can be infected with SARS-CoV-2 multiple times, prior infection confers partial protection against COVID-19. Vaccination provides additional protection in those who have been infected and is recommended regardless of history of prior infection.

Introduction

COVID-19 vaccines were first administered in Alaska in mid-December 2020. In March 2021, all persons who lived or worked in Alaska and were ≥16 years old became eligible for vaccination. After the Pfizer/BioNTech vaccine was authorized for persons aged ≥12 years, eligibility was expanded accordingly in May 2021 to anyone aged ≥12 years. Randomized clinical trials showed conclusively that COVID-19 vaccines provide strong protection against symptomatic COVID-19. Subsequent observational studies have confirmed this finding in numerous real-world settings and have further demonstrated that COVID-19 vaccines reduce the risk of infection with SARS-CoV-2 and prevent COVID-19 hospitalizations and deaths.[1] While reinfections with SARS-CoV-2 are known to occur, they can be difficult to diagnose due to a lack of a widely accepted definition. Analysis of other human coronaviruses suggest that coronavirus infections confer partial immunity.[2] There is evidence that even in persons with a history of SARS-CoV-2 infection, vaccination provides an added layer of protection.[3]

Methods

A vaccine recipient is considered fully vaccinated 14 days after receiving the second dose in a two-dose series (e.g., Pfizer/BioNTech or Moderna) or a single dose in a one-dose series (e.g., Johnson & Johnson/Janssen). Cases of COVID-19 that occur in fully vaccinated persons are classified as “vaccine breakthrough” (VB) cases.

All case and hospitalizations data were obtained from the Section of Epidemiology’s case-based surveillance system. Hospitalization and death data were identified as described above. This analysis is limited to data on Alaska residents;

vaccination status of non-residents diagnosed in Alaska cannot be consistently ascertained. All data and analyses are preliminary and subject to change.

Cases, hospitalizations, and deaths were attributed to date of specimen collection in all analyses. This date was used because it corresponds most closely to the definition of vaccine breakthrough. For example, if a person tested positive 12 days after completing the vaccination series, that would not be counted as a vaccine breakthrough case and, consequently, neither would a subsequent hospitalization due to COVID-19, even if the hospitalization itself occurred 14 or more days after series completion. When specimen collection date was unknown, confirmation date (i.e., the date the case was counted) was used instead.

VacTrAK data were linked to COVID-19 case records to determine vaccination status of cases and to estimate the amount of person-time at risk stratified by vaccination status (including vaccine manufacturer and time since completion of primary vaccine series), history of prior SARS-CoV-2 infection (including time since most recent prior infection), geographic region of residence (11 behavioral health regions), calendar day (January 16 through August 31, 2021), and age group (0-4, 5-9, 10-11, 12-14, 15-19, … 85-89, and ≥90 years). Reports from case investigators on the vaccination status of COVID-19 cases was used to supplement VacTrAK data. The number of persons in each demographic group with no documented history of either SARS-CoV-2 infection or COVID-19 vaccination was inferred by subtracting the number of persons with a history of vaccination and/or infection from 2020 Alaska Department of Labor and Workforce Development population estimates. Cases were excluded from the analysis if the geographic region of residence (n = 5) or the date of birth (n = 1) were missing. None of the 6 excluded cases had a documented history of vaccination.

COVID-19 cases are classified as reinfections if positive specimen collection occurred ≥90 days after the specimen collection date of the prior case. Very rarely, the Section of Epidemiology may revise a classification based on health care provider input. For this analysis, all person-time <90 days from a case's first specimen collection date was excluded because per the surveillance definition of reinfection used here, reinfections occur at least 90 days after a prior infection. (Note that surveillance definitions may differ from clinical judgements; persons who develop symptoms compatible with COVID-19 within 90 days of a prior infection are advised to consult with a health care provider.)

Age-standardized COVID-19 case and hospitalization rates were calculated by direct standardization to the Alaska resident population age 12 years and older using the age categories as above, except the 12–14 and 15–19 categories were combined.[4] Ninety-five percent confidence intervals were calculated using gamma distributions.[5]

Adjusted incidence rate ratios were calculated using the Mantel-Haenszel method.[6] Estimates were adjusted for age group, region, and calendar day.

Results

Vaccine breakthrough cases over time

Through the end of August 2021, a total of 6,223 vaccine breakthrough COVID-19 cases were documented among Alaska residents (Table 8). An additional 1,867 cases occurred among Alaska residents who were partially vaccinated. The incidence of COVID-19 among vaccinated persons has remained consistently lower than among persons who were not unvaccinated (Figure 3).

Table 8. Reported COVID-19 vaccine breakthrough cases by month of specimen collection among Alaska residents aged ≥12 years — January 16, 2021 through August 31, 2021

	Total cases	VB cases (% of total monthly cases)	Proportion of AK residents aged ≥12 years who were fully vaccinated*
January	2,002	2 (0.1)	1.2%[±]
February	2,946	44 (1.5)	6.1%
March	3,954	119 (3.0)	18.9%
April	3,949	205 (5.2)	31.8%
May	1,527	134 (8.8)	43.2%
June	790	180 (22.8)	47.9%
July	4,143	1228 (29.6)	51.5%
August	12,816	4311 (33.6)	53.4%

**Mean daily estimated percentage of Alaska residents aged ≥12 years who were fully vaccinated.*

[±]January data are from the period January 16, 2021 through January 31, 2021. January 16, 2021 was the first date that any Alaska residents were fully vaccinated.

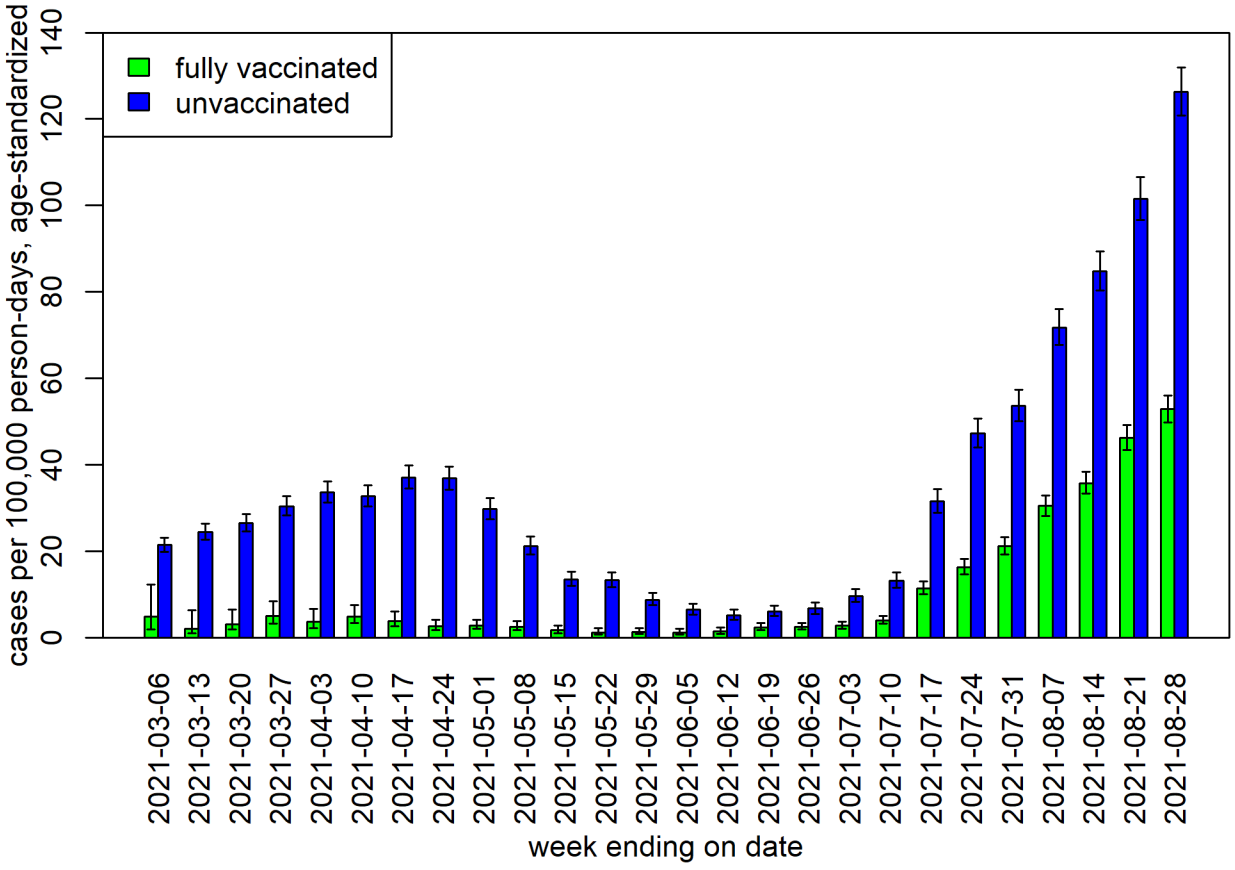


Figure 3. Weekly age-adjusted per capita incidence of COVID-19 among Alaska residence ≥12 years-old by vaccination status (fully vaccinated versus unvaccinated). *Data are shown beginning the week of February 28, 2021, which was the first week in which at least 20 vaccine breakthrough cases were documented. Incidence rate estimates from weeks with very few or no VB cases are imprecise.*

Vaccine breakthrough hospitalizations over time

Among vaccine breakthrough cases with specimen collection date on or prior to August 31, 2021, 114 hospitalizations due to COVID-19 were documented (Table 9). While the number of hospitalizations among fully vaccinated persons in August was almost double the number for July, the proportion of hospitalizations among fully vaccinated persons was nearly identical. Fully vaccinated persons were much less likely to be hospitalized due to COVID-19 than persons who were unvaccinated (Figure 4). Based on COVID-19 cases with specimen collection date in August and hospitalizations documented as of October 3, 2021 and adjusted for age, region, and calendar day, the incidence of hospitalization among persons aged ≥12 years who were not vaccinated was 10.7 times higher (95% CI: 7.9, 14.7) than the incidence among fully vaccinated persons. Among Alaska residents aged ≥12 years with specimen collection dates in August who were hospitalized due to COVID-19, the median age among those who were fully vaccinated was 76.2 years, and the median age of those who were not fully vaccinated was 20.1 years younger (56.1 years).

Table 9. Reported hospitalizations due to COVID-19 vaccine breakthrough infections, by month of specimen collection among Alaska residents aged ≥12 years — January 16, 2021 through August 31, 2021

	Total hospitalizations	VB hospitalizations (% of total monthly hospitalizations)
January-March*	205	2 (1.0)
April	128	8 (6.2)
May	68	3 (4.4)
June	42	5 (11.9)
July	173	33 (19.1)
August	332	63 (19.0)

**Data are from January 16, 2021 onwards. January, February, and March data have been aggregated to protect patient privacy.*

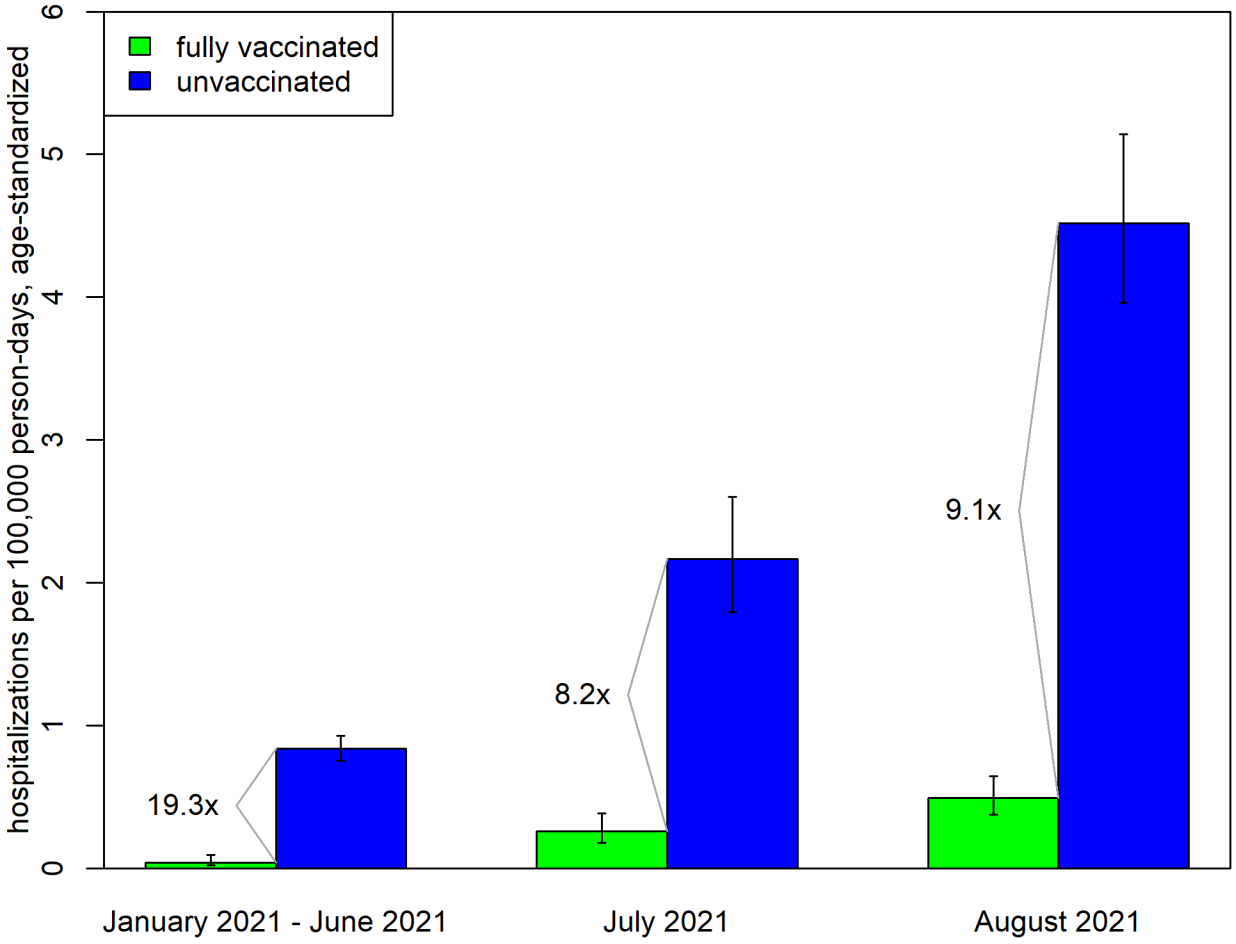


Figure 4. Age-adjusted incidence of hospitalization due to COVID-19 among Alaska residents aged ≥12 years by vaccination status (unvaccinated versus fully vaccinated), stratified by hospitalizations among COVID-19 cases with first positive specimen collected from January 16 through June 30, during July, or during August 2021.

Vaccine breakthrough cases and hospitalizations by age

Vaccine breakthrough cases occurred during August 2021 among Alaskans of all ages (Table 10). The proportion of cases who were fully vaccinated increased with age, which primarily reflects the higher vaccination coverage at higher ages. The adjusted incidence rate ratios comparing unvaccinated to fully vaccinated persons were similar across ages categories, though possibly somewhat higher among adolescents. Younger persons may mount more protective immune responses to vaccines.

Table 10. Reported COVID-19 vaccine breakthrough cases by age group among Alaska residents and adjusted incidence rate ratios — August 2021

Age group	Total cases	VB cases (% of total cases per age group)	Proportion of AK residents who were fully vaccinated*	Incidence rate ratio⁺ (unvaccinated v. fully vaccinated)
12–19	1,799	284 (15.8)	34	3.1 (2.7, 3.5)
20–34	3,923	986 (25.1)	44	2.7 (2.5, 2.9)
35–49	3,348	1178 (35.2)	53.4	2.4 (2.2, 2.6)
50–64	2,414	1073 (44.4)	60.3	2.2 (2.0, 2.4)
65+	1,332	790 (59.3)	74.7	2.5 (2.2, 2.8)

**Mean of the daily estimated percentage for each day in August 2021 of Alaska residents who are fully vaccinated, by age group.*

[+]Incidence rate ratio for cases among unvaccinated persons versus fully vaccinated persons, adjusted for age, region, and calendar day with 95% confidence intervals.

Vaccination greatly reduced the incidence of COVID-19 hospitalizations across all age groups, though the effect appears to be somewhat attenuated in persons aged ≥65 years (Table 11). Data were aggregated for July and August and younger age categories were combined to improve statistical precision.

Table 11. Reported hospitalizations due to COVID-19 vaccine breakthrough infections and adjusted incidence rate ratio, by age group among Alaska residents — July and August 2021

Age group	Total hospitalizations	VB hospitalizations (% of total hospitalizations per age group)	Proportion of AK residents who were fully vaccinated*	Incidence rate ratio[+] (unvaccinated v. fully vaccinated)
12–49	164	13 (7.9)	44.3	15.9 (8.6, 29.5)
50–64	143	17 (11.9)	59.7	14.6 (8.6, 24.7)
65+	198	66 (33.3)	74	7.2 (5.3, 9.8)

[*]Mean of the daily estimated percentage for each day in August 2021 of Alaska residents who are fully vaccinated, by age group.

[+]Incidence rate ratio for hospitalizations among unvaccinated persons versus fully vaccinated persons, adjusted for age, region, and calendar day with 95% confidence intervals.

Vaccine breakthrough cases by manufacturer and time since completion of vaccine series

Among Alaska residents aged 20–64 years, the incidence of COVID-19 during July and August 2021 was lower among persons who were fully vaccinated with each of the three FDA-authorized or approved vaccines compared to persons who were unvaccinated, regardless of time since vaccination. However, the largest differences in COVID-19 case incidence rates between unvaccinated and fully vaccinated persons were observed for the Moderna COVID-19 vaccine, followed by the Pfizer and Janssen vaccines (Figure 5). For all three brands of vaccine, this analysis indicates that protective immunity against COVID-19 decreases over time.

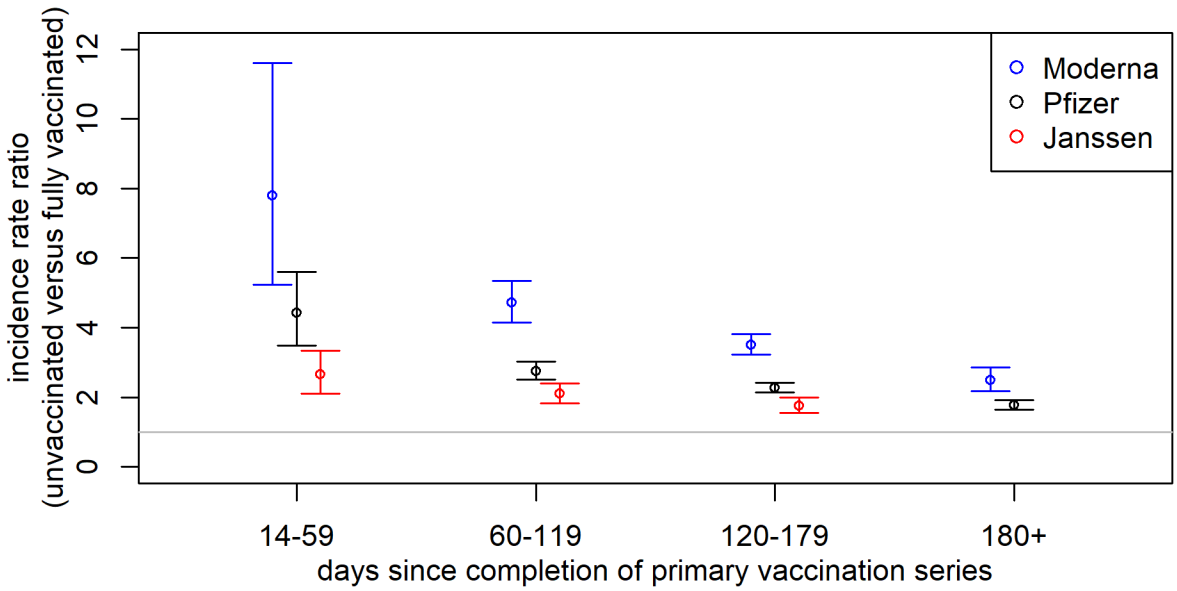


Figure 5. Adjusted incidence rate ratios comparing the incidence of COVID-19 during July and August 2021 among unvaccinated persons to fully vaccinated persons, by vaccine manufacturer and time since completion of the primary vaccination series. *This analysis is restricted to persons aged 20–64 years. Incidence rate ratios are adjusted for age, region, and calendar day. The Janssen vaccine began distribution after the Moderna and Pfizer vaccines; consequently, an incidence rate ratio for persons who received the Janssen vaccine 180 or more days ago is not yet available. 95% confidence intervals are shown. The grey horizontal line corresponds to a rate ratio of 1, which would mean that persons who were fully vaccinated and those who were unvaccinated were equally likely to have COVID-19. All estimates and all error bars are above this line, indicating that the incidence of COVID-19 is consistently higher in persons who are unvaccinated compared to those who are fully vaccinated, regardless of vaccine manufacturer and how long-ago vaccination occurred. However, the point estimates are highest for the Moderna vaccine and among those vaccinated more recently, suggesting that the Moderna vaccine confers stronger protection and that the strength of protection decreases over time.*

Vaccine breakthrough deaths

As of October 3, 2021, among cases with specimen collection dates during or prior to August 2021, 37 COVID-19 deaths were documented among fully vaccinated persons. Of these, 31 (84%) occurred in July or August. During that same period, 86 COVID-19 deaths occurred in unvaccinated persons and 3 COVID-19 deaths occurred in partially vaccinated persons. Accounting for age, calendar day, and region, unvaccinated persons died from COVID-19 at 9.8 times the rate of fully vaccinated persons (95% CI: 6.1, 15.7). These numbers may change as death certificates are completed and processed.

Reinfection

A total of 884 SARS-CoV-2 reinfections were documented among Alaska residents since the beginning of the pandemic. Six persons were reinfected twice (i.e., counted as a case 3 times).

In July and August 2021, the incidence of COVID-19 in persons without a prior documented history of SARS-CoV-2 infection was 4.1 times higher (95% CI: 3.8, 4.5) than the incidence in persons with a history of infection. The estimated incidence rate ratios were similar regardless of the number of days since infection (Figure 6). The evidence also suggests that a prior infection is protective against subsequent COVID-19 hospitalization (IRR: 0.12), though small numbers preclude precise estimates.

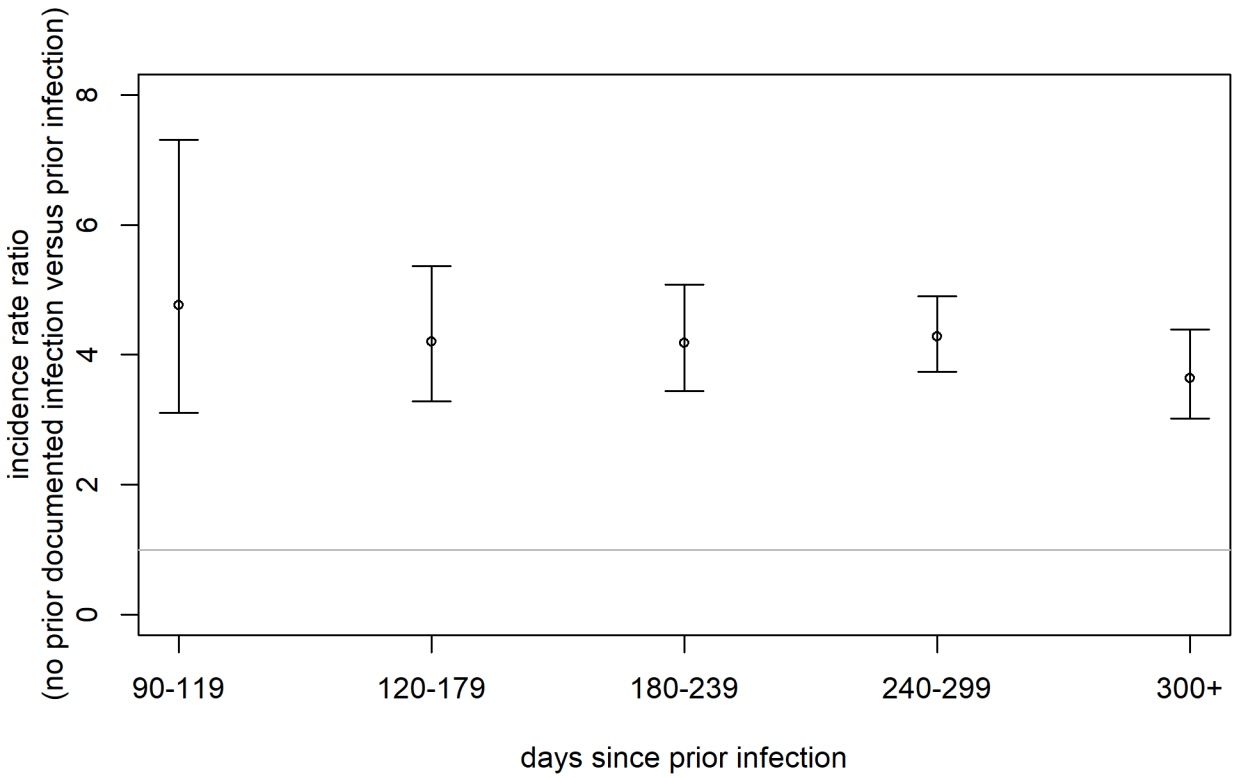


Figure 6. Adjusted incidence rate ratios comparing the incidence of COVID-19 during July and August 2021 among persons without a prior documented infection versus those with a prior documented infection, by time since prior infection. *Incidence rate ratios are adjusted for age, region, and calendar day and 95% confidence intervals are shown. The grey horizontal line corresponds to a rate ratio of 1, which would mean that persons with and without a prior documented history of COVID-19 were equally likely to have COVID-19. All estimates and all error bars are above this line, indicating that the incidence of COVID-19 was consistently higher in persons without a prior documented history of COVID-19 compared to those who previously had COVID-19.*

Reinfection and Vaccination

Of the 87,836 Alaska residents with at least 1 documented case of COVID-19, 27,938 became fully vaccinated after their first infection. In July and August 2021 among persons aged ≥12 years with a prior history of COVID-19, the incidence of COVID-19 reinfection was 24% higher among persons who were unvaccinated compared to those who were fully vaccinated (IRR: 1.2, 95% CI: 1.0, 1.5). The number of hospitalizations and deaths due to reinfections was too small to reliably assess an effect of vaccination, though the available evidence is suggestive that vaccination confers additional protection in persons who have been previously infected: 5 hospitalizations that occurred due to reinfection cases in July and August were in unvaccinated persons (incidence rate: 2.6 per 1 million person-days) and 1 was in a fully vaccinated person (incidence rate: 0.66 per 1 million person-days). Likewise, of the 2 COVID-19 deaths in persons with a prior infection, both were unvaccinated.

Discussion

COVID-19 vaccines continue to be our single most important tool to prevent COVID-19 cases, hospitalizations, and deaths.

The proportion of COVID-19 cases that occurred in fully vaccinated persons was modestly larger in August 2021 compared to July 2021. Multiple factors determine the proportion of documented COVID-19 cases among fully vaccinated persons. When the proportion of the population that is fully vaccinated is higher, the expected proportion of cases among fully vaccinated persons is also larger. Another important factor is that waning immunity occurs over time. Waning immunity tends to occur more quickly in older people, which might contribute to increasing VB hospitalization rates because older people are known to be at increased risk for COVID hospitalization. Also, older persons may mount a less-strong initial immune response to vaccination. Additionally, moderately or severely immunocompromised people do not always build the same level of immunity after vaccination the way non-immunocompromised people do, and they are now advised to receive an additional dose to ensure adequate protection against COVID-19. These individuals might also disproportionately contribute to higher VB hospitalizations in recent months. Finally, declines in vaccine effectiveness can lead to an increasing proportion of COVID-19 cases among fully vaccinated persons. The Delta variant rapidly became the dominant SARS-CoV-2 variant in Alaska during June and July and reductions in vaccine effectiveness against the Delta variant likely contributed to the increased proportion of vaccine breakthrough cases. Notably, since the Delta variant became dominant, the proportion of vaccine breakthrough cases has been more consistent over time.

The data presented here were collected for public health surveillance purposes and may be subject to unmeasured confounding and bias. For example, persons who were fully vaccinated and not fully vaccinated may differ in their adherence to COVID-19 mitigation measures (e.g., mask wearing and avoiding indoor crowded spaces). Moreover, the magnitude of these differences may vary over time. Additionally, COVID-19 cases among fully vaccinated persons may be more likely to be detected than COVID-19 cases among persons who are not fully vaccinated (e.g., health care workers are more likely to be vaccinated than the general population and may be more likely to get tested), which would artificially increase the proportion of detected cases among fully vaccinated persons. Finally, infection-induced immunity may build up in the unvaccinated population faster than in the vaccinated population (due to increased susceptibility to infection), thereby making vaccination appear less effective over time.[7]

The magnitude of bias and confounding may differ across settings; consequently, direct comparisons to data from other jurisdictions or to prospective evaluations of vaccine effectiveness are difficult. Additionally, this analysis is not a formal evaluation of vaccine effectiveness. It does not account for differential testing rates that might occur between vaccinated and unvaccinated people. It is biologically implausible that COVID-19 vaccines would perform differently in Alaska compared to other parts of the United States.

Interpreting differences in COVID-19 incidence by vaccine manufacturer is challenging because persons who received one type of COVID-19 vaccine may systematically differ from persons who received a different type. For example, the Pfizer vaccine was available before the Moderna vaccine and so health care workers and persons in long-term care facilities may have been more likely to have received it. However, restricting the comparison of manufacturers to persons aged 20–64 years should limit the extent to which bias may reflect the use of a particular vaccine in long-term care facilities.

COVID-19 vaccines in Alaska remain protective against COVID-19 illness and provide highly effective protection against hospitalization and death. The level of protection of vaccination against hospitalization observed among Alaskans in August is similar to recent estimates from a large national COVID-19 hospitalization case-control study.[8] The vast majority of COVID-19 hospitalizations among Alaska residents since COVID-19 vaccines became widely available could have been prevented through vaccination.

Considering emerging evidence on vaccine breakthrough cases and the potential for onward transmission from breakthrough infections, the Centers for Disease Control and Prevention (CDC) recommended on July 27, 2021, that all persons, including fully vaccinated persons, wear a mask when in public indoor settings in locations experiencing substantial or high levels of community transmission.[9] The Advisory Committee on Immunization Practices and CDC recommend that persons who are moderately or severely immunocompromised receive a third dose of an mRNA vaccine at least 28 days after receiving the second dose.[10] Additionally, CDC recommends booster doses for certain persons who completed the Pfizer COVID-19 vaccine primary series at least 6 months ago: Persons age 65 and over and persons age 50 to 64 with underling medical conditions should receive a booster dose. Persons 18 to 49 with underlying medical conditions and persons 18 to 64 with high risk of exposure may receive a booster dose based on individual risks and benefits.[11]

Prior infection with SARS-CoV-2 confers substantial but not complete protection against subsequent infection. COVID-19 hospitalizations and deaths have been documented among Alaska residents who previously had COVID-19. Vaccination is safe in persons who have previously been infected and evidence from Alaska and published analyses indicate that vaccination confers additional protection among persons with a prior history of SARS-CoV-2 infection.[3]

References

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Additional Resources

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