



Health Analytics and Vital Records

Division of Public Health
Department of Health and Social Services
HealthAnalytics@Alaska.gov



Alaska Facts and Figures

Excess Hospitalizations, Alaska Residents, January–December 2020

Background

This data brief presents an analysis of excess hospitalizations during the COVID-19 pandemic period in Alaska. Estimates of excess hospital stays and emergency department (ED) visits can provide information about hospital utilization both directly and indirectly related to the COVID-19 pandemic. Excess hospitalizations can be defined as the difference between the observed numbers of hospital encounters in a specific time period (January – December 2020) and expected numbers of encounters for the same time period (January – December) based on an average for the previous three years' experience (2017 – 2019).

Methods

Excess hospitalization counts and rates were estimated for all hospitalizations and for 10 selected causes of hospitalization that may be related to or affected by the COVID-19 pandemic.^{i,ii,iii} The source of the data was the Alaska Health Facilities Data Reporting Program (HFDR), which collects hospital billing records from non-military hospitals in Alaska. The selected causes of hospitalization were based on the principal diagnosis identified for that bill, which assures that each hospital encounter is only counted once in the analysis.

The average counts and rates were calculated for 2017 to 2019 from January to December, which represent the expected hospitalizations. These expected counts and rates were then subtracted from the 2020 counts and rates, the current observed hospitalizations, to estimate the excess hospitalizations (Table 1a). Counts and rates for the same set of 10 selected causes were calculated for both inpatient hospitalizations (Table 1a) and outpatient emergency department visits (Table 2a).

Additionally, 4 selected external causes of morbidity columns that capture how an injury happened, the intent, or the activity of the patient when they were injured were evaluated in Table 1b and 2b. The external causes were identified using secondary diagnosis codes because external cause codes cannot be used as the principal diagnosis; therefore, a single encounter can appear in more than one of these 4 external cause columns.

Hospitalization rates were calculated using Alaska Department of Labor and Workforce Development Research and Analysis Section population estimates as the denominator. The estimate for 2017-2019 used an average of the population for those 3 years.

Limitations

Note that 2020 data in general are provisional and are subject to adjustment. Hospitals submit discharge data quarterly and are permitted to submit adjustments to previous quarters within the respective year. For comparability, Wrangell Medical Center data have been removed from all years because data are not available for all quarters. Military hospitals are not included in the counts as they do not submit hospital billing discharge data to HFDR. **Differences between values were not tested for statistical significance.** An individual *patient* will be counted separately for each different hospital encounter, so a person can appear in the counts more than once if they have more than one hospital visit within the same year. The individual *encounters* (stays or visits) are mutually exclusive in tables 1a and 2a, but not in tables 1b and 2b.

Summary:

- Overall statewide HFDR hospital inpatient discharge rates for all twelve months of 2020 are down 7% compared to the January-to-December average from 2017 to 2019. Outpatient emergency department (ED) discharge rates for 2020 are down 23% compared to the 2017 – 2019 average.
- Increases in 2020 compared to 2017-2019
 - Of principle diagnoses shown in Table 1a, rates appear to be increased for hospitalizations related to chronic liver disease/cirrhosis and for kidney disease.
 - Of diagnoses shown in Table 2a, rates appear increased for outpatient ED visits related to aortic aneurysm and dissection and for kidney disease.
 - For the external causes of morbidity shown in Table 1b and 2b, no category showed an increase in rates.
- Decreases in 2020 compared to 2017-2019
 - In Table 1a, hospitalizations rates appear substantially lower for influenza and pneumonia, chronic lower respiratory diseases, and other major cardio-vascular diseases. In Table 1b, hospitalization rates appear lower for intentional self-harm (suicide), and motor vehicle accidents.
 - In Table 2a, outpatient ED visits appear lower for influenza and pneumonia, cancer, chronic lower respiratory disease, stroke, diabetes, and chronic liver disease/cirrhosis. In Table 2b, ED visits appear lower for assaults and all unintentional injuries, specifically motor vehicle accidents.
- Not shown separately in the tables are the hospital discharges where the principal diagnosis was identified as COVID-19 confirmed cases (U07.1 ICD-10-CM diagnosis code). In January – December 2020, there were 822 hospitalizations and 2,970 outpatient ED visits in the HFDR data. COVID-19 discharges are included in the “All Causes” category.
- This analysis did not control for socio-economic and demographic characteristics, nor for external factors related to the pandemic, such as possible changes to healthcare seeking behavior or health orders, etc.^{iv}

Table 1a. Excess Hospitalizations from January through December, 2017-2019 compared to 2020, Alaska Residents, based on the principal diagnosis

| | ALL CAUSES | INFLUENZA AND PNEUMONIA | DISEASES OF HEART | CANCER | CHRONIC LOWER RESPIRATORY DISEASES | STROKE | AORTIC ANEURYSM AND DISSECTION | OTHER MAJOR CARDIO-VASCULAR DISEASES | DIABETES MELLITUS | KIDNEY DISEASE | CHRONIC LIVER DISEASE AND CIRRHOSIS |
|--------------------------------|---------------|-------------------------|-------------------|-------------|------------------------------------|--------------|--------------------------------|--------------------------------------|-------------------|----------------|-------------------------------------|
| Discharge Counts ¹ | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec |
| 2017 | 60,207 | 1,229 | 3,921 | 1,311 | 1,045 | 1,353 | 83 | 158 | 818 | 497 | 207 |
| 2018 | 59,327 | 1,175 | 4,094 | 1,225 | 904 | 1,372 | 86 | 129 | 767 | 475 | 254 |
| 2019 | 58,798 | 1,122 | 4,184 | 1,281 | 898 | 1,419 | 77 | 142 | 844 | 556 | 236 |
| Avg. 2017-19 | 59,444 | 1,175 | 4,066 | 1,272 | 949 | 1,381 | 82 | 143 | 810 | 509 | 232 |
| 2020 ² | 55,121 | 603 | 3,948 | 1,256 | 461 | 1,290 | 76 | 118 | 787 | 566 | 295 |
| Excess (2020-Avg) | -4,323 | -572 | -118 | -16 | -488 | -91 | -6 | -25 | -23 | 57 | 63 |
| Crude Rates per 100,000 | | | | | | | | | | | |
| Rate 2017-2019 ³ | 8,095.5 | 160.0 | 553.7 | 173.2 | 129.2 | 188.1 | 11.2 | 19.5 | 110.3 | 69.3 | 31.6 |
| Rate 2020 ² | 7,562.2 | 82.7 | 541.6 | 172.3 | 63.2 | 177.0 | 10.4 | 16.2 | 108.0 | 77.7 | 40.5 |
| Excess (2020-Avg) | -533.3 | -77.3 | -12.1 | -0.9 | -66.0 | -11.1 | -0.8 | -3.3 | -2.3 | 8.4 | 8.9 |
| | -7% | -48% | -2% | -1% | -51% | -6% | -7% | -17% | -2% | 12% | 28% |

Table 1b. Excess Hospitalizations from January through December, 2017-2019 compared to 2020, Alaska Residents, based on external causes secondary coding

| | ALL CAUSES | INTENTIONAL SELF-HARM | ASSAULT | MOTOR VEHICLE ACCIDENTS | ALL UNINTENTIONAL INJURIES (including Motor Vehicle Accidents) |
|--------------------------------|---------------|-----------------------|-------------|-------------------------|--|
| Discharge Counts ¹ | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec |
| 2017 | 60,207 | 304 | 312 | 594 | 3,895 |
| 2018 | 59,327 | 261 | 299 | 629 | 4,496 |
| 2019 | 58,798 | 252 | 272 | 639 | 4,385 |
| Avg. 2017-19 | 59,444 | 272 | 294 | 621 | 4,259 |
| 2020 ² | 55,121 | 202 | 289 | 567 | 4,169 |
| Excess (2020-Avg) | -4,323 | -70 | -5 | -54 | -90 |
| Crude Rates per 100,000 | | | | | |
| Rate 2017-2019 ³ | 8,095.5 | 37.0 | 40.0 | 84.6 | 580.0 |
| Rate 2020 ² | 7,562.2 | 27.7 | 39.6 | 77.8 | 572.0 |
| Excess (2020-Avg) | -533.3 | -9.3 | -0.4 | -6.8 | -8.0 |
| | -7% | -25% | -1% | -8% | -1% |

¹Counts do not include discharges for Wrangell Medical Center because data are not available for all quarters.

²2020 estimates are provisional and subject to change.

³Used 2017-2019 average population for denominator for 2017-2019 average rate.

Table 2a. Excess Outpatient Emergency Department Visits from January through December, 2017-2019 compared to 2020, Alaska Residents, based on the principal diagnosis

| | ALL CAUSES | INFLUENZA AND PNEUMONIA | DISEASES OF HEART | CANCER | CHRONIC LOWER RESPIRATORY DISEASES | STROKE | AORTIC ANEURYSM AND DISSECTION | OTHER MAJOR CARDIO-VASCULAR DISEASES | DIABETES MELLITUS | KIDNEY DISEASE | CHRONIC LIVER DISEASE AND CIRRHOSIS |
|--------------------------------|-----------------|-------------------------|-------------------|--------------|------------------------------------|-------------|--------------------------------|--------------------------------------|-------------------|----------------|-------------------------------------|
| Discharge Counts ¹ | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec |
| 2017 | 292,969 | 5,307 | 3,453 | 310 | 6,337 | 309 | 40 | 104 | 1,505 | 225 | 208 |
| 2018 | 283,745 | 5,597 | 3,454 | 400 | 5,547 | 376 | 40 | 105 | 1,604 | 263 | 208 |
| 2019 | 284,429 | 8,415 | 3,481 | 335 | 5,870 | 364 | 51 | 117 | 1,674 | 260 | 221 |
| Avg. 2017-19 | 287,048 | 6,440 | 3,463 | 348 | 5,918 | 350 | 44 | 109 | 1,594 | 249 | 212 |
| 2020 ² | 219,648 | 3,778 | 3,414 | 253 | 3,503 | 313 | 52 | 110 | 1,296 | 262 | 194 |
| Excess (2020-Avg) | -67,400 | -2,662 | -49 | -95 | -2,415 | -37 | 8 | 1 | -298 | 13 | -18 |
| Crude Rates per 100,000 | | | | | | | | | | | |
| Rate 2017-2019 ³ | 39,092.4 | 877.0 | 471.6 | 47.4 | 806.0 | 47.7 | 6.0 | 14.8 | 217.1 | 33.9 | 28.9 |
| Rate 2020 ² | 30,134.1 | 518.3 | 468.4 | 34.7 | 480.6 | 42.9 | 7.1 | 15.1 | 177.8 | 35.9 | 26.6 |
| Excess (2020-Avg) | -8,958.3 | -358.7 | -3.2 | -12.7 | -325.4 | -4.8 | 1.1 | 0.3 | -39.3 | 2.0 | -2.3 |
| | -23% | -41% | -1% | -27% | -40% | -10% | 18% | 2% | -18% | 6% | -8% |

Table 2b. Excess Emergency Department Visits from January to December, 2017-2019 compared to 2020, Alaska Residents, based on external causes secondary coding

| | ALL CAUSES | INTENTIONAL SELF-HARM | ASSAULT | MOTOR VEHICLE ACCIDENTS | ALL UNINTENTIONAL INJURIES (including Motor Vehicle Accidents) |
|--------------------------------|-----------------|-----------------------|---------------|-------------------------|--|
| Discharge Counts ¹ | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec | Jan-Dec |
| 2017 | 292,969 | 494 | 4,156 | 6,081 | 52,475 |
| 2018 | 283,745 | 430 | 3,971 | 5,927 | 51,762 |
| 2019 | 284,429 | 403 | 3,759 | 5,265 | 50,246 |
| Avg. 2017-19 | 287,048 | 442 | 3,962 | 5,758 | 51,494 |
| 2020 ² | 219,648 | 409 | 3,027 | 4,741 | 41,223 |
| Excess (2020-Avg) | -67,400 | -33 | -935 | -1,017 | -10,271 |
| Crude Rates per 100,000 | | | | | |
| Rate 2017-2019 ³ | 39,092.4 | 60.2 | 539.6 | 784.2 | 7,012.8 |
| Rate 2020 ² | 30,134.1 | 56.1 | 415.3 | 650.4 | 5,655.5 |
| Excess (2020-Avg) | -8,958.3 | -4.1 | -124.3 | -133.8 | -1,357.3 |
| | -23% | -7% | -23% | -17% | -19% |

¹Counts do not include discharges for Wrangell Medical Center are not available for all quarters.

²2020 estimates are provisional and subject to change.

³Used 2017-2019 average population for denominator for 2017-2019 average rate.

NOTE: The 14 diagnosis categories in the tables are defined based on ICD-10-CM code ranges that begin with the following.

Diagnoses categories are defined based on principal ICD-10-CM code ranges that begin with the following.

- Influenza and Pneumonia: J09-J18
- Diseases of the Heart: I00-I09, I11, I13, I20-I51
- Cancer (Malignant Neoplasms): C00-C96
- Chronic Lower Respiratory Diseases: J40-J47
- Stroke: I60-I69
- Aortic Aneurysm and Dissection: I71
- Other Major Cardiovascular Diseases: I70, I72-I78
- Diabetes mellitus: E10-E14
- Kidney Disease (Nephritis, Nephrotic Syndrome, and Nephrosis): N00-N07, N17-N19, N25-N27
- Chronic Liver Disease and Cirrhosis: K70, K73-K74
- COVID-19: U07.1

External cause categories are defined based on secondary ICD-10-CM code ranges that begin with the following.

- Intentional Self-Harm (other than poisoning and asphyxiation): X60-X84
- Assault: X85-Y09
- Motor Vehicle Accidents: V02-V04, V09.0, V09.2, V12-V14, V19.0-V19.2, V19.4-V19.6, V20-V79, V80.3-V80.5, V81.0-V81.1, V82.0-V82.1, V83-V86, V87.0-V87.8, V88.0-V88.8, V89.0, V89.2
- All Unintentional Injuries (including Motor Vehicle Accidents): V01-X59

NOTE: Statistical significance was not estimated between 2020 and 2017-2019 average estimates

Source: Alaska Division of Public Health, Health Facilities Data Reporting, Outpatient Emergency Department Discharges 2017v6, 2018v4, 2019v3, and 2020v1. Last updated on 04/06/2021.

ⁱ https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm

ⁱⁱ <https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html>

ⁱⁱⁱ <https://hms.harvard.edu/news/distinctive-features>

^{iv} <http://epibulletins.dhss.alaska.gov/Document/Display?DocumentId=2059>