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Alaska Facts and Figures

2020-2021 Excess Hospitalizations and Emergency Department Visits Report

Background

This report presents an analysis of excess hospitalizations and emergency department (ED) visits since the COVID-19 pandemic in Alaska. Estimates of excess hospitalizations can provide information about health facility utilization and morbidity both directly and indirectly related to the COVID-19 pandemic. Excess hospitalizations are defined as the difference between the observed numbers of hospitalizations over a specified time period (2020 and 2021) and the baseline number of events for the same period, in this case, based on a simple pre-pandemic three-year average (2017-2019).

Methods

The Alaska Health Facilities Data Reporting (HFDR) program's inpatient and outpatient discharge databases, which collect billing records from all non-military health facilities in Alaska, were queried for Alaska resident hospitalizations and ED visit discharges occurring between 2017 and 2021.¹ HFDR hospitalization data may differ from other hospital data reporting systems such as the Alaska Section of Epidemiology's COVID-19 case and hospitalization surveillance dashboards.

Discharge counts and rates per 100,000 population were calculated for all diagnoses and for ten selected categories of morbidity, based on the principal diagnosis (defined as the condition that was chiefly responsible for the patient's admission) International Classification of Disease, 10th Revision, Clinical Modification (ICD-10-CM) code assigned by the facility.² This ensures that each discharge is only tabulated once per category in the analysis.

Additionally, four selected external cause of morbidity categories were analyzed. Because external causes are not identified in the principal diagnosis, these categories were tabulated using secondary diagnosis (defined as all other conditions responsible for admission) ICD-10-CM codes. Therefore, a single discharge can be tabulated in more than one external cause category.

Average discharge counts and rates were calculated for the years 2017-2019, which represent the baseline for expected pre-pandemic hospitalization levels in each morbidity category. The expected counts and rates were then subtracted from the observed post-pandemic counts and rates in 2020 and 2021 to estimate excess hospitalizations. Counts and rates for each set of selected causes were calculated for both inpatient hospitalizations (Table and Figure 1) and outpatient ED visits (Table and Figure 2). Each table also shows the percent change between 2020 rates and the 2021 rates, to compare year-to-year rates observed within the pandemic.

¹ [Alaska Department of Health, Health Analytics and Vital Records Section. Health Facilities Data Reporting Program. Inpatient and Outpatient Emergency Department Discharge Database: 2017 V7, 2018 V7, 2019 V6, 2020 V3, and 2021 V2. Accessed 09/12/2022.](#)

² [Alaska Department of Labor and Workforce Development, Research and Analysis Section. Alaska Population Estimates. Accessed 09/12/2022.](#)

Limitations

2021 data are provisional and subject to change. Wrangell Medical Center discharges have been excluded for comparability because data were not available for all years. Military facilities are not included, as these hospitals do not submit billing data to the HFDR program. An individual *patient* is counted separately for each unique hospital *encounter*, so a person can be counted more than once if they had multiple hospitalizations or ED visits during the same discharge year.

Results have not been tested for statistical significance. This analysis does 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. Because excess hospitalizations are estimated by comparing post-pandemic levels to a pre-pandemic three-year average, this analysis also does not account for any pre-existing trends in morbidity. Small sample sizes (<20 observations) for certain select categories may also result in statistically unreliable estimates, which should be interpreted with caution.

Summary

- Inpatient hospitalization rates for **all diagnoses** in 2020 were 7% lower than expected, compared to the average from 2017-2019, while rates were 4% lower than expected in 2021 (Table 1). Outpatient ED visit rates in 2020 were 23% lower compared to the 2017-2019 average, while rates were 17% lower in 2021 (Table 2).
- Use of the **COVID-19** ICD-10-CM code (U07.1) started in April 2020. COVID-19 was the principal diagnosis for 820 inpatient hospitalizations in 2020 and 2,520 in 2021, a 207% increase (Table 1). COVID-19 was also the principal diagnosis code for 2,968 ED visits in 2020 and 8,930 visits in 2021, a 201% increase (Table 2).
- Several categories of morbidity experienced notable increases in discharge rates relative to the 2017-2019 average. However, results vary depending on the type of disease or injury, comparison of 2020 vs 2021 rates, and comparison of inpatient hospitalization vs ED visit rates.
 - In 2020 and 2021, **chronic liver disease and cirrhosis** experienced the largest percent increases in inpatient hospitalization rates compared to the 2017-2019 average, at +28% and +58%, respectively (Table 1).
 - In 2020, **aortic aneurysm and dissection** experienced the largest percent increase in ED visit rates compared to the 2017-2019 average at +18%, while **chronic liver disease and cirrhosis** experienced the largest increase in 2021 at +41% (Table 2).
 - Other categories of morbidity in 2021 that experienced notable increases in inpatient hospitalization rates included **stroke (11% higher than expected)** and **kidney disease (+10%)** (Table 1). For ED visit rates, other categories that increased in 2021 included **intentional self-harm (+10%)**, **stroke (+12%)**, **kidney disease (+25%)**, and **other major cardio-vascular diseases (+28%)** (Table 2).
- Conversely, some morbidity categories experienced notable decreases in discharge rates.
 - In 2020, **chronic lower respiratory disease** experienced the largest percent decrease in inpatient hospitalization rates compared to the 2017-2019 average, at -51%, while **influenza and pneumonia** experienced the largest decrease in 2021 at -61% (Table 1).
 - In 2020, **chronic lower respiratory disease** and **influenza and pneumonia** tied for the largest percent decrease in ED visit rates compared to the 2017-2019 average at -41%, while **influenza and pneumonia** experienced the largest decrease in 2021 at -70% (Table 2).
 - Other categories of morbidity in 2021 that experienced notable decreases in inpatient hospitalization rates included, **motor vehicle accidents (-16%)**, **intentional self-harm (-22%)**, and **assault (-29%)** (Table 1). For ED visit rates, other categories that decreased in 2021 included **unintentional injuries (incl. motor vehicle accidents) (-14%)**, **motor vehicle accidents alone (-14%)**, **chronic lower respiratory disease (-39%)**, **assault (-25%)**, and **diabetes mellitus (-10%)** (Table 2).

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Table 1. Alaska Resident Excess Hospitalization Counts (Rates): 2017-2019 Pre-Pandemic Average to Post-Pandemic^{1,2}

Diagnosis Group ³ and ICD-10-CM Code(s)	2017- 2019 Avg (Baseline)				2020 Excess	Baseline vs 2020 Percent Change in Rates	2021 (table sorted by rates)	2021 Excess	Baseline vs 2021 Percent Change in Rates	2020 vs 2021 Percent Change in Rates	
	2017	2018	2019	2020							
All Encounters	60,207 (8,119.5)	58,884 (7,975.6)	58,353 (7,928.3)	59,148 (8,008.0)	54,648 (7,449.5)	-4,500 (-558.5)	-7%	56,512 (7,695.8)	-2,636 (-312.2)	-4%	3%
Unintentional Injuries including MVA V01-X59 (in any secondary diagnosis)	3,895 (525.3)	4,412 (597.6)	4,312 (585.9)	4,206 (569.5)	4,150 (565.7)	-56 (-3.8)	-1%	4,099 (558.2)	-107 (-11.3)	-2%	-1%
Diseases of the Heart I00-I09, I11, I13, I20-I51	3,921 (528.8)	4,071 (551.4)	4,143 (562.9)	4,045 (547.7)	3,924 (534.9)	-121 (-12.8)	-2%	4,053 (551.9)	8 (4.2)	1%	3%
COVID-19 U071	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	820 (111.8)	820 (111.8)	NA	2,520 (343.2)	2,520 (343.2)	NA	207%
Stroke I60-I69	1,353 (182.5)	1,357 (183.8)	1,402 (190.5)	1,371 (185.6)	1,286 (175.3)	-85 (-10.3)	-6%	1,511 (205.8)	140 (20.2)	11%	17%
Cancer C00-C96	1,311 (176.8)	1,216 (164.7)	1,270 (172.6)	1,266 (171.4)	1,245 (169.7)	-21 (-1.7)	-1%	1,150 (156.6)	-116 (-14.8)	-9%	-8%
Diabetes Mellitus E10-E14	818 (110.3)	762 (103.2)	838 (113.9)	806 (109.1)	784 (106.9)	-22 (-2.2)	-2%	868 (118.2)	62 (9.1)	8%	11%
Kidney Disease N00-N07, N17-N19, N25-N27	497 (67.0)	471 (63.8)	554 (75.3)	507 (68.7)	564 (76.9)	57 (8.2)	12%	556 (75.7)	49 (7.0)	10%	-2%
Chronic Lower Respiratory Diseases J40-J47	1,045 (140.9)	901 (122.0)	898 (122.0)	948 (128.3)	459 (62.6)	-489 (-65.7)	-51%	527 (71.8)	-421 (-56.5)	-44%	15%
Motor Vehicle Accidents (MVA) ⁴ (in any secondary diagnosis)	594 (80.1)	611 (82.8)	618 (84.0)	608 (82.3)	566 (77.2)	-42 (-5.1)	-6%	505 (68.8)	-103 (-13.5)	-16%	-11%
Influenza and Pneumonia J09-J18	1,229 (165.7)	1,171 (158.6)	1,113 (151.2)	1,171 (158.5)	603 (82.2)	-568 (-76.3)	-48%	450 (61.3)	-721 (-97.2)	-61%	-25%
Chronic Liver Disease and Cirrhosis K70, K73-K74	207 (27.9)	251 (34.0)	234 (31.8)	231 (31.2)	293 (39.9)	62 (8.7)	28%	361 (49.2)	130 (18.0)	58%	23%
Intentional Self-Harm X60-X84 (in any secondary diagnosis)	304 (41.0)	259 (35.1)	251 (34.1)	271 (36.7)	202 (27.5)	-69 (-9.2)	-25%	210 (28.6)	-61 (-8.1)	-22%	4%
Assault X85-Y09 (in any secondary diagnosis)	312 (42.1)	295 (40.0)	271 (36.8)	293 (39.6)	289 (39.4)	-4 (-0.2)	-1%	208 (28.3)	-85 (-11.3)	-29%	-28%
Other Major Cardio-Vascular Diseases I70, I72-I78	158 (21.3)	128 (17.3)	138 (18.7)	141 (19.1)	118 (16.1)	-23 (-3.0)	-16%	143 (19.5)	2 (0.4)	2%	21%
Aortic Aneurysm and Dissection I71	83 (11.2)	86 (11.6)	77 (10.5)	82 (11.1)	76 (10.4)	-6 (-0.7)	-6%	88 (12.0)	6 (0.9)	8%	15%

1. Rates are events per 100,000 population.

2. Counts do not include discharges for Wrangell Medical Center because data are not available for all years.

3. The diagnosis groups are based on only the first listed diagnosis code, except for the four external cause groups that look at any listed diagnosis code in the record.

4. MVA: 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.

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Table 2. Alaska Resident Excess Emergency Department Visit Counts (Rates): 2017-2019 Pre-Pandemic Average to Post-Pandemic^{1,2}

Diagnosis Group ³ and ICD-10-CM Code(s)	2017- 2019 Avg (Baseline)				2020	2020 Excess	Baseline vs 2020 Percent Change in Rates	2021 (table sorted by rates)	2021 Excess	Baseline vs 2021 Percent Change in Rates	2020 vs 2021 Percent Change in Rates
	2017	2018	2019	2019							
All Encounters	292,969 (39,509.8)	283,129 (38,348.8)	284,040 (38,591.8)	286,713 (38,818.0)	218,938 (29,845.2)	-67,775 (-8,972.8)	-23%	236,249 (32,172.4)	-50,464 (-6,645.6)	-17%	8%
Unintentional Injuries including MVA V01-X59 (in any secondary diagnosis)	52,475 (7,076.8)	51,668 (6,998.2)	50,174 (6,817.0)	51,439 (6,964.3)	41,014 (5,591.0)	-10,425 (-1,373.3)	-20%	44,149 (6,012.2)	-7,290 (-952.1)	-14%	8%
COVID-19 U071	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2,968 (404.6)	2,968 (404.6)	NA	8,930 (1,216.1)	8,930 (1,216.1)	NA	201%
Motor Vehicle Accidents (MVA) ⁴ (in any secondary diagnosis)	6,081 (820.1)	5,917 (801.4)	5,245 (712.6)	5,748 (778.2)	4,704 (641.2)	-1,044 (-137.0)	-18%	4,886 (665.4)	-862 (-112.8)	-14%	4%
Chronic Lower Respiratory Diseases J40-J47	6,337 (854.6)	5,544 (750.9)	5,876 (798.4)	5,919 (801.4)	3,489 (475.6)	-2,430 (-325.8)	-41%	3,605 (490.9)	-2,314 (-310.5)	-39%	3%
Diseases of the Heart I00-I09, I11, I13, I20-I51	3,453 (465.7)	3,457 (468.2)	3,485 (473.5)	3,465 (469.1)	3,408 (464.6)	-57 (-4.5)	-1%	3,597 (489.8)	132 (20.7)	4%	5%
Assault X85-Y09 (in any secondary diagnosis)	4,156 (560.5)	3,968 (537.5)	3,763 (511.3)	3,962 (536.5)	3,023 (412.1)	-939 (-124.4)	-23%	2,940 (400.4)	-1,022 (-136.1)	-25%	-3%
Influenza and Pneumonia J09-J18	5,307 (715.7)	5,597 (758.1)	8,411 (1,142.8)	6,438 (871.7)	3,772 (514.2)	-2,666 (-357.5)	-41%	1,891 (257.5)	-4,547 (-614.2)	-70%	-50%
Diabetes Mellitus E10-E14	1,505 (203.0)	1,610 (218.1)	1,673 (227.3)	1,596 (216.1)	1,292 (176.1)	-304 (-40.0)	-19%	1,421 (193.5)	-175 (-22.6)	-10%	10%
Intentional Self-Harm X60-X84 (in any secondary diagnosis)	494 (66.6)	432 (58.5)	406 (55.2)	444 (60.1)	409 (55.8)	-35 (-4.3)	-7%	487 (66.3)	43 (6.2)	10%	19%
Stroke I60-I69	309 (41.7)	377 (51.1)	369 (50.1)	352 (47.6)	310 (42.3)	-42 (-5.3)	-11%	391 (53.2)	39 (5.6)	12%	26%
Cancer C00-C96	310 (41.8)	397 (53.8)	335 (45.5)	347 (47.0)	253 (34.5)	-94 (-12.5)	-27%	358 (48.8)	11 (1.8)	4%	41%
Kidney Disease N00-N07, N17-N19, N25-N27	225 (30.3)	263 (35.6)	262 (35.6)	250 (33.8)	262 (35.7)	12 (1.9)	6%	311 (42.4)	61 (8.6)	25%	19%
Chronic Liver Disease and Cirrhosis K70, K73-K74	208 (28.1)	206 (27.9)	224 (30.4)	213 (28.8)	194 (26.4)	-19 (-2.4)	-8%	299 (40.7)	86 (11.9)	41%	54%
Other Major Cardio-Vascular Diseases I70, I72-I78	104 (14.0)	106 (14.4)	118 (16.0)	109 (14.8)	111 (15.1)	2 (0.3)	2%	139 (18.9)	30 (4.1)	28%	25%
Aortic Aneurysm and Dissection I71	40 (5.4)	40 (5.4)	52 (7.1)	44 (6.0)	52 (7.1)	8 (1.1)	18%	48 (6.5)	4 (0.5)	8%	-8%

1. Rates are events per 100,000 population.

2. Counts do not include discharges for Wrangell Medical Center because data are not available for all years.

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Figure 1. Hospitalization Rates for Select Diagnosis Groups: 2017-2019 Average to Post-Pandemic Years

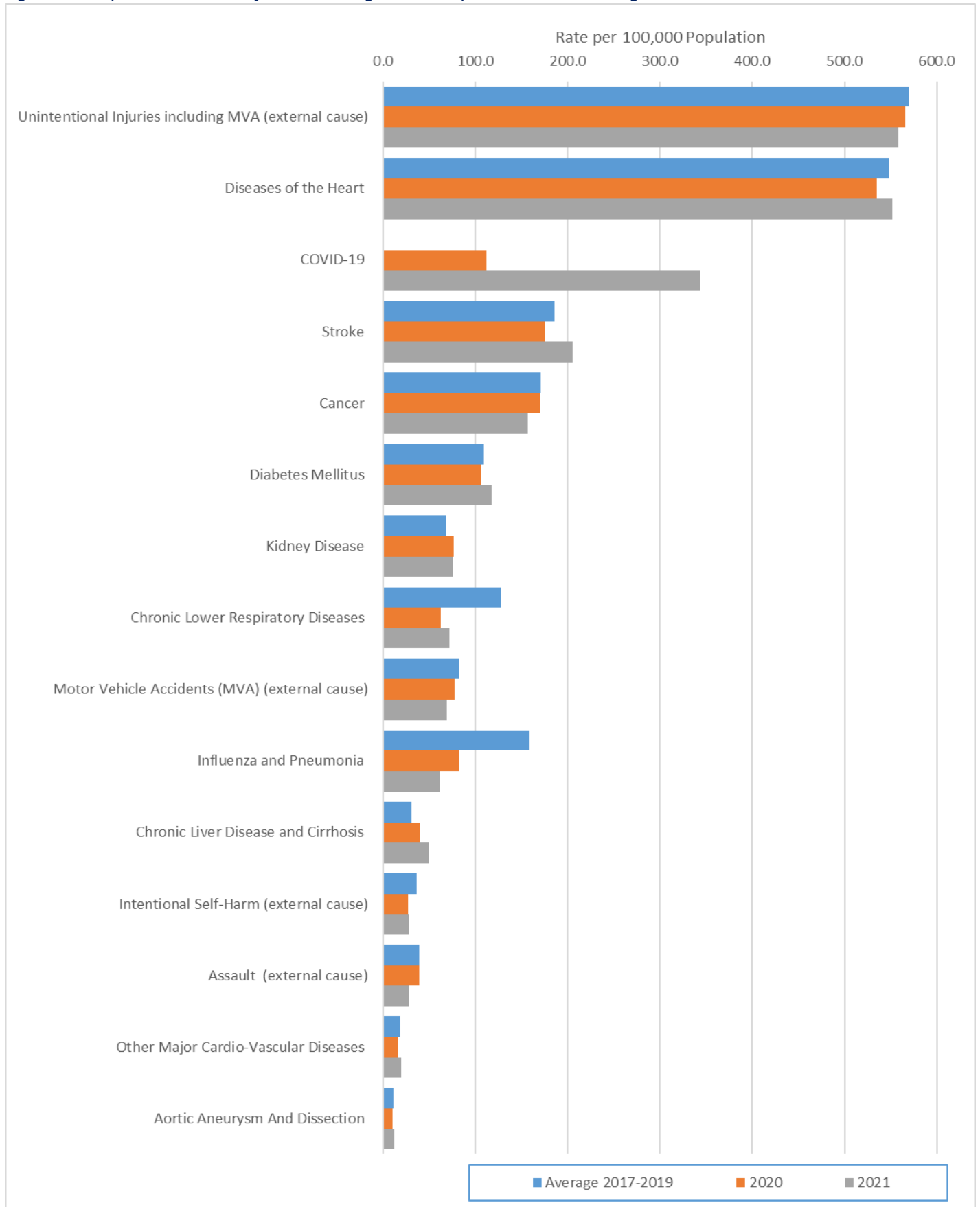
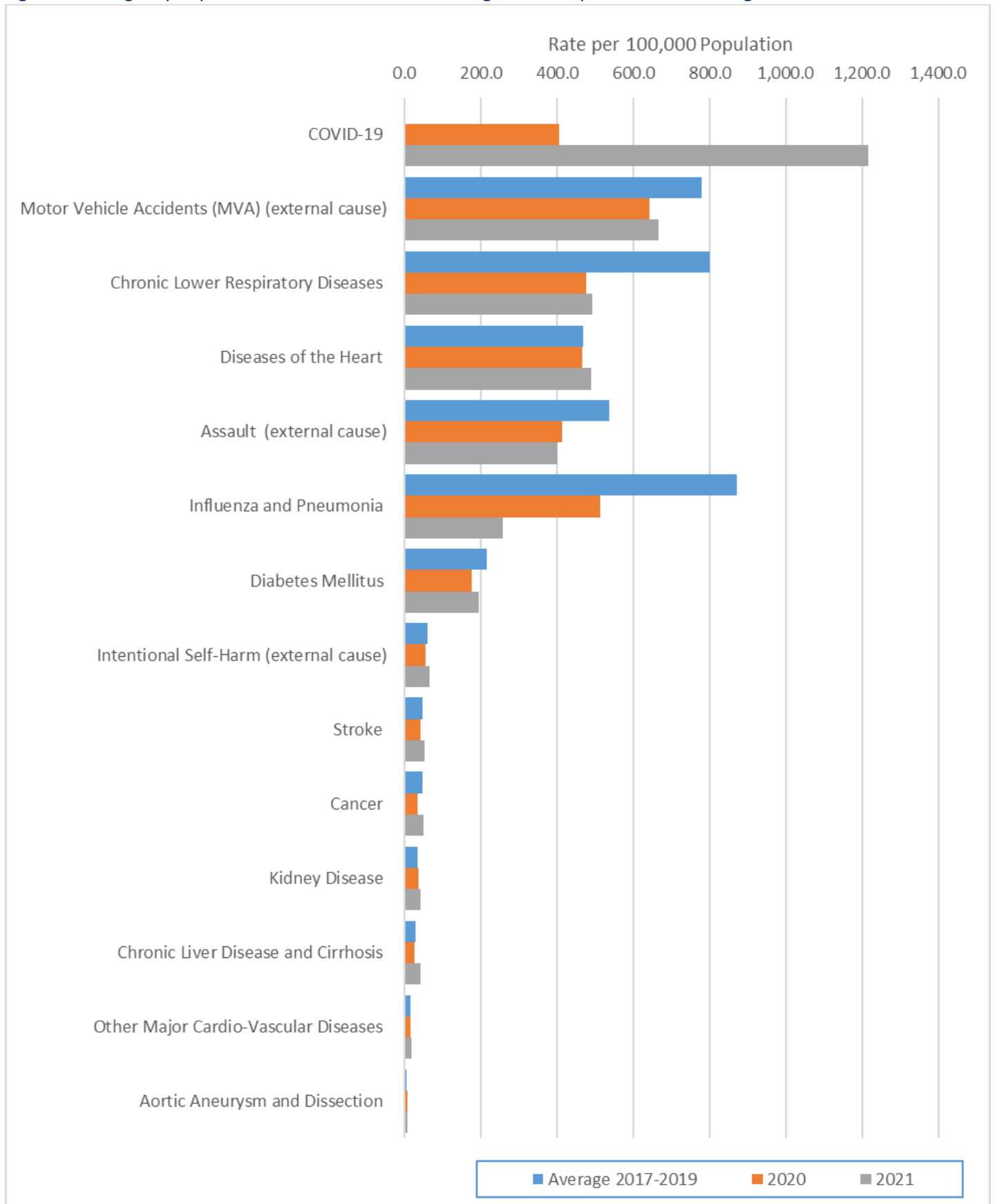


Figure 2. Emergency Department Visit Rates for Select Diagnosis Groups 2017-2019 Average to Post-Pandemic Years



1. Unintentional injuries including MVA excluded for scale.