WASHINGTON STATE HEALTH SERVICES RESEARCH PROJECT

Washington Hospital Capacity 1986-2018

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Background

Washington state was an early hotspot for COVID 19, the disease caused by the virus SARS-CoV-2. The disease placed unprecedented and complex demands on hospitals.

Hospital beds are a basic resource for response to the pandemic.¹ Media reports have noted nationwide decreases in numbers of beds in recent years because of mergers between health care systems.² On the other hand, U.S. hospital admissions fell during the pandemic.³

Hospital beds can be classified based on their use. These include settings such as intensive care (ICU) and rehabilitation units. The analysis considers beds in all categories, since in a crisis all available beds would likely be used. The total number of beds also offers context for a complete picture of resources.

A recent study investigating the optimal number of beds in hospitals and regions included a review of articles proposing or using specific methods.⁴ The authors conclude there are no accepted standards to be applied.

Availability of hospital beds is also affected by increasing numbers of procedures performed in ambulatory surgery centers (ASCs) that would previously have been performed in hospitals. ASC services can reduce costs for patients and insurers. However, a decrease in the number of hospital beds through a shift of services to ASCs could affect responses to unexpected challenges such as COVID 19.

The Washington state Department of Health collects annual data on hospital capacity and patient encounters from in-state hospitals. This analysis focuses on numbers of hospital beds, numbers of patient days in hospital and hospital admissions as measures of capacity to provide medical care. Data are available for the years 1986-2018.

Most reporting hospitals offer general acute care. A few are specialty facilities for, e.g., cancer or psychiatric patients. The analysis includes beds and admissions for all hospital categories. This approach provides a baseline for potential contexts that impose severe demand on all available resources.

We created seven measures to analyze the data:

- 1. Available hospital beds per 100,000 population
- 2. Adjusted admissions per 100,000 population
- 3. Adjusted patient days per adjusted admission
- 4. Adjusted patient days per available bed
- 5. Adjusted admissions per available bed
- 6. ICU beds as percentage of available hospital beds
- 7. ICU beds per 100,000 population

Access to hospital resources varies with geography, in part because of differing population concentrations. A study of available beds by region offers insights into the distribution of resources statewide. To consider hospital capacity by region, we examined data within Accountable Communities of Health (ACHs). Washington has nine ACHs. Their boundaries correspond to those for Medicaid regional service areas.⁵ Figure 1 displays the nine ACHs and the counties in each. Data in Figure 1 also appear in Table 1 in the Appendix.

Figure 1. Accountable Communities of Health



Results and Discussion

During the overall study period, available beds per 100,000 population decreased by about half statewide and by varying percentages in the ACHs. The decrease in Washington rates resembled national trends for 2007-2018, although Washington always had lower rates than the US. Adjusted admissions increased by values ranging from 2% to almost 60%. Admissions per available bed more than doubled statewide and in seven ACHs.

Patient days per hospital admission showed some variation in early and recent years, but generally stayed within a narrow range. Patient days per available bed climbed from 243 in 1986 to 488 in 2018.

The percentage of ICU beds among all available beds increased slightly at state and regional levels, with more variation in ACHs as two of them saw decreases. The number of ICU beds per 100,000 population trended down in the state and regions, with wide variation among ACHs.

1. Available Beds per 100,000 Population

This metric is a basic measure of hospital resources available to meet health care needs.⁶

Reports distinguish between "available" and "licensed" beds.⁷ Available beds are maintained and staffed for patient care. Licensed beds are the beds a hospital is authorized to provide.⁸ The number of available beds is often lower than the number of licensed beds. The analysis considers numbers of available beds as a more precise assessment of the care a hospital is prepared to provide.

Statewide, available beds per 100,000 population decreased steadily, from 298 in 1986 to 154 in 2018 (see Figure 2 and Table 2 in the Appendix). This represents a 48% decrease.



Figure 2. Available hospital beds per 100,000 population in Washington

We also compared Washington rates with U.S. values during the years 2007-2018 (Figure 3 and Table 3 in the Appendix).⁹

The rates followed similar trends, but Washington's was always lower than the national value. During these years there was a 12% decrease in Washington's rate and a 10% decrease in the national rate.





At the ACH level, trends were similar to the statewide pattern (Figure 4 and Table 2 in the Appendix). Some regions showed more variation than the state but all saw rates decrease, with the pattern holding true for mainly rural ACHs as well as for urban and mixed ACHs. A common result was the loss of 100-200 beds per 100,000 population, ranging from 39 (SWACH) to 189 (Better Health Together). Percentage decreases ranged from 23% (SWACH) to 59% (Cascade Pacific Action Alliance).¹⁰



Figure 4. Available hospital beds per 100,000 population by year and Accountable Community of Health, 1986-2018

















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Among the ACHs, rates for Better Health Together (BHT) were the highest at the beginning and end of the study period. This suggests that BHT has stronger resources than other ACHs, but there is a caveat. BHT includes Spokane County, home to Washington's second largest city, grouped with five rural counties. This context distinguishes BHT from mainly urban ACHs, such as HealthierHere and Elevate Health, which have strong resources that are shared across large populations. Spokane's health care resources can be an advantage for other BHT residents, but many of them live far from Spokane. This effect is visible in other measures.

2. Adjusted Hospital Admissions per 100,000 Population

This metric estimates overall use of hospital resources. It is one approach to the question of how much hospital care the population needs during a year. Rates for this measure increased at state and local levels.

Admissions data include counts for all admissions, and separate counts that have been adjusted for skilled nursing, chemical dependency, and outpatient activity. Because these categories do not fall completely within standard acute care, the analysis uses adjusted admissions values to create measures.

At the state level, the rate of adjusted hospital admissions increased by 13%, from 13,932 to 15,694 (Figure 5 and Table 4 in the Appendix). The highest rate was in 2015, with 17,586 admissions per 100,000.





Admission rates rose for all ACHs, although not all by the same magnitude (Figure 6 and Table 4 in the Appendix).¹¹ BHT's rate increased by 2%, and North Sound's by 5%. By contrast, Elevate Health's rose by 57% and North Central's rate through 2017 rose almost 70%. Taken together, the ACH plots appear comparatively stable, but rates for all ACHs except BHT and North Sound had changes in the thousands of units. The rise in admission rates raises the question whether increased demand for hospital stays creates pressure for shorter stays. Alternatively, changes in treatment may reduce demand for beds by shortening average length of stay. Such changes would include less invasive surgeries being performed at ASCs rather than acute care hospitals.



















Figure 6. Adjusted admissions per 100,000 population by year and Accountable Community of Health, 1986-2018

3. Adjusted Patient Days per Adjusted Admission

Data on numbers of patient days spent in hospitals include counts for patient days, and counts that have been adjusted for skilled nursing, chemical dependency and outpatient activity. Because these categories do not fall completely within standard acute care, the analysis uses adjusted values for patient days to create measures.

The average number of adjusted patient days per adjusted admission is a measure of the length of stay associated with individual admissions. Statewide results (see Figure 7 and Table 5 in the Appendix) show three different periods within slight overall variation. Values ranged between four and just over five adjusted patient days per adjusted admission. The measure declined between 1986 and 1996, remained stable until 2012, then began to rise in 2013. To date, however, values have not matched the maximum value of 1986.

The number of available hospital beds decreased (see Figure 2 and Table 2 in the Appendix) and adjusted admissions per 100,000 population increased (see Figure 5 and Table 4 in the Appendix) even when adjusted patient days per adjusted admission remained steady. This suggests that decreased numbers of hospital beds and increased numbers of admissions are not balanced by shorter hospital stays.



Figure 7. Washington adjusted patient days per adjusted admission

Trends in the ACHs (see Figure 8 and Table 5 in the Appendix) somewhat resemble statewide results but with more variation. Values fall within a range of three to six patient days per admission. For some ACHs the plots resembled the statewide result of a decrease in values, followed by a plateau, followed by a rise. Some ACHs, such as North Central and North Sound, showed more variation, particularly in later years.



Figure 8. Adjusted patient days per adjusted admission by year and Accountable Community of Health, 1986-2018

















4. Adjusted Patient Days per Available Bed

This measure reflects usage of available beds during the year. Statewide trends showed an overall increase in values with plateaus and some decreases in values, mixed with periods when values rose consistently (see Figure 9 and Table 6 in the Appendix). The year 2005 was a landmark of sorts: for the first time, the number of adjusted patient days per available bed, 380, was greater than the number of days in the year. That year therefore marked the first time that the average hospital bed was occupied more than every day of the year. The most recent value, 488, is also the largest one. These values provide further evidence that hospital resources are under increasing stress.





Trends in the ACHs (see Figure 10 and Table 6 in the Appendix) showed consistent increases, though with greater variation in North Central ACH and SWACH. ACHs varied with respect to when the average number of patient days was first greater than 365. Better Health Together never saw values higher than 350. Among other ACHs, years when the 365 day threshold was crossed varied from 1997 (Elevate Health, SWACH) to 2014 (North Central).

North Central ACH reported great variation in days per available bed after 2010. However, this variation tracked similar results in adjusted admissions per available bed (Figure 6 and Table 4 in the Appendix) and adjusted patient days per adjusted admission (Figure 8 and Table 5 in the Appendix).

In 2011 SWACH saw days per available bed drop to 263 from 399 in 2010 before rising again to 397 in 2012. This variation occurred although the number of available hospital beds remained nearly constant between 622 and 625. However, adjusted admissions per 100,000 population for SWACH fell dramatically in 2011 (see Figure 6 and Table 4 in the Appendix) and this likely caused a corresponding decrease in patient days per hospital bed.





















5. Adjusted Hospital Admissions per Available Bed

Beyond the number of hospital beds available in the state or region, how are the beds used over time? Rates for adjusted admissions per hospital bed reflect demand for beds. This metric showed dramatic changes during the study period. Rates for Washington and seven out of nine ACHs more than doubled. The rate for North Central ACH rose by almost 300%.

These values represent more evidence of shrinking resources amid growing demand, and suggest further that fewer hospital beds may reduce flexibility to cope with a sudden increase in demand for treatment.

Washington's percent change was 117% (see Figure 11 and Table 7 in the Appendix).



Figure 11. Washington adjusted hospital admissions per available bed

Rates rose for all ACHs, although some showed more variation (Figure 12 and Table 7 in the Appendix). Among ACHs, the highest increase after North Central was Greater Columbia, with just over 200%. These results again show the impact of Spokane within BHT, which had the smallest increase. This was likely an effect of the larger number of beds available.



Figure 12. Adjusted admissions per available bed by year and Accountable Community of Health, 1986-2018

















6. ICU Beds as a Percentage of Available Beds

What do the data show about how resources are allocated in response to perceived or projected needs for intensive care? Intensive care is defined here as services that "require extraordinary observation and care on a concentrated exhaustive and continuous basis."¹² Response to the COVID 19 pandemic placed severe demands on hospital ICUs. In recent years procedures that would once have been performed in acute care hospitals have transitioned to ASCs. This change may have affected allocation of beds to hospital units and so warrants specific attention to trends in the relation of ICU beds to all available beds and the number of ICU beds available for the population.

It is possible that as the number of procedures performed in ASCs increases, the percentage of ICU beds in hospitals would also increase. Removing less-serious procedures to ASCs likely means patients requiring ICU care represent a larger proportion of remaining hospitalizations. For that reason, it is remarkable that the changes in percentages of ICU beds are slight, compared to the other metrics.

At the state level (Figure 13 and Table 8 in the Appendix), this rate rose by about 5%.



Figure 13. Washington percentage of ICU beds among available beds

Except for Elevate Health and SWACH, the ACH rates appear fairly steady (Figure 14 and Table 8 in the Appendix). Data for other ACHs showed percent changes that do not exceed 4%, with one (North Central) being slightly negative. For both ICU metrics, the scale of ACH plots is affected by an outlier in the HealthierHere data: a hospital that reported almost 45% of its beds as ICU beds during one year.



Figure 14. ICU beds as percentage of available beds by year and Accountable Community of Health, 1986-2018

7. ICU Beds per 100,000 Population

What is the availability of ICU beds for the general population, and how prepared might hospitals be for a sudden increase in demand? Except for two ACHs, values for this metric trended down at the state and regional levels. Over time, fewer ICU beds were available to the state population. As noted above, this change occurs in the context of some procedures moving to ASCs. Considering this metric with the previous one, which found mostly slight increases in percentages of ICU beds, we conclude that access to ICU care has reduced in many settings.

The state's rate for this metric decreased by 22% (Figure 15 and Table 9 in the Appendix).



Figure 15. Washington ICU beds per 100,000 population

Rates for two ACHs, Elevate Health and SWACH, had a positive trend, with SWACH's percent change approaching 200% (Figure 16 and Table 9 in the Appendix). Plots for BHT, Elevate Health, and SWACH show more variation than other ACHs. A new hospital opened in SWACH in 2006, but it is not clear why there is more variation in the other two ACHs. There is no obvious difference between urban and rural ACHs. HealthierHere's rate decreased, while Elevate Health's rate increased. Rates for other ACHs decreased, including BHT (with Spokane) and more rural ACHs.



Figure 16. ICU beds per 100,000 population by year and Accountable Community of Health, 1986-2018

Limitations

The analysis is subject to any limitations in the DOH datasets, including data quality and missing data. Hospitals that are part of the Military Health System and the Veterans Health Administration do not report to DOH, so metrics do not reflect resources in those facilities.

Transition during this period from inpatient to ASC procedures may have suggested to hospital planners and managers that fewer hospital resources were needed than in previous years. The pandemic experience of 2020 demonstrates that unforeseen situations may have a significant impact on demand for hospital resources.

Data on resources for residents who live near state boundaries may be incomplete. Some health systems provide hospital care in both Washington and Oregon, or Washington and Idaho. This cross-boundary presence means patients may obtain health care on either side of the state line. The DOH data analyzed here do not include information on hospitals outside Washington.

Appendix

The Appendix uses tables to present data that appear in graphical form in the main text. Washington is abbreviated as WA and United States is abbreviated as U.S.

Table 1. Accountable Communities of Health, abbreviations and included counties

Accountable Community of Health	Abbreviation	Counties
		Adams
		Ferry
	DUT	Lincoln
Better Health Together	BHT	Pend Oreille
		Spokane
		Stevens
		Cowlitz
		Grays Harbor
		Lewis
Cascade Pacific Action Alliance	СРАА	Mason
		Pacific
		Thurston
		Wahkiakum
Elevate Health	EH	Pierce
		Asotin
		Benton
		Columbia
		Franklin
Greater Columbia	GC	Garfield
		Kittitas
		Walla Walla
		Whitman
		Yakima
HealthierHere	НН	King
		Chelan
North Central	NC	Douglas
		Grant
		Okanogan

Accountable Community of Health	Abbreviation	Counties				
		Island				
		San Juan				
North Sound	NS	Skagit				
		Snohomish				
		Clallam				
Olympic	0	Jefferson				
		Kitsap				
		Clark				
SWACH	SW	Klickitat				
		Skamania				

Table 1. Accountable Communities of Health, abbreviations, and included counties (continued)

Year	WA	BHT	CPAA	EH	GC	HH	NC	NS	О	SW
1986	297.5	453.9	312.0	282.9	302.0	331.5	370.4	195.8	179.4	168.9
1987	284.4	443.2	290.3	242.4	297.2	317.6	369.0	198.8	175.5	164.2
1988	279.2	439.6	267.1	241.8	300.9	315.3	363.3	194.3	169.6	151.3
1989	265.7	439.3	245.7	227.5	300.9	294.8	362.1	175.2	174.0	146.8
1990	254.3	439.6	249.2	196.0	290.8	283.5	369.8	166.2	154.7	133.1
1991	250.4	432.3	250.8	201.7	292.1	277.6	359.8	155.8	154.9	135.2
1992	246.4	423.2	236.8	195.9	284.6	280.3	344.7	150.3	164.3	130.8
1993	233.0	400.4	237.4	184.9	267.3	259.3	343.5	139.8	164.6	127.4
1994	220.3	400.3	237.9	150.9	258.1	241.7	327.1	133.3	159.6	123.1
1995	216.0	380.5	231.4	162.0	251.8	236.7	317.0	130.8	161.2	115.5
1996	214.6	376.8	224.3	171.2	248.6	236.9	315.1	125.6	158.6	113.0
1997	204.8	349.6	222.5	162.0	236.5	226.9	307.4	122.6	156.3	97.0
1998	204.6	349.3	250.0	162.4	227.4	225.3	324.7	115.7	154.7	91.2
1999	199.1	344.1	221.9	159.2	225.3	222.9	323.3	115.0	138.0	91.4
2000	196.3	336.2	216.5	158.5	220.8	224.9	326.5	106.3	135.5	90.0
2001	193.2	333.9	213.5	152.4	217.8	223.4	324.0	106.1	120.2	89.5
2002	187.0	317.9	200.8	147.0	215.9	216.3	297.4	106.1	122.1	93.8
2003	187.8	318.0	198.3	143.4	218.2	220.8	292.4	108.2	123.5	92.2
2004	181.7	315.8	179.4	140.0	212.6	213.7	286.3	105.6	119.0	90.5
2005	179.2	306.2	173.3	147.0	188.3	216.8	281.5	103.8	120.0	91.6
2006	177.2	307.4	169.8	138.6	185.9	213.2	256.3	101.8	117.9	120.1
2007	173.7	293.0	163.5	140.5	183.5	210.4	252.5	100.2	116.3	114.0
2008	173.1	287.6	160.8	140.0	185.5	209.0	246.2	102.7	115.1	118.2
2009	167.8	262.9	160.6	151.2	166.5	203.7	217.7	102.4	106.8	122.2
2010	172.0	286.8	159.9	151.7	175.8	205.3	218.1	101.7	103.6	136.6
2011	172.0	277.5	153.8	157.1	170.1	206.1	211.8	109.9	102.1	136.0
2012	171.8	275.9	148.9	159.7	165.4	213.6	203.3	102.9	101.8	134.3
2013	171.9	273.1	153.1	158.5	153.4	220.9	194.6	101.8	101.8	128.8
2014	172.3	269.3	149.7	156.1	148.7	219.5	208.0	106.2	117.5	130.1
2015	173.9	286.1	145.5	155.8	159.2	214.6	216.1	113.8	109.2	127.8
2016	172.5	274.4	149.8	157.8	160.1	212.9	209.5	109.3	105.4	135.5
2017	169.6	282.2	138.7	171.9	153.4	199.0	207.0	113.2	108.1	132.2
2018	154.1	264.9	127.5	179.9	72.1	201.5	88.2	98.7	107.0	129.5

Table 2. Available hospital beds per 100,000 population

Year	WA	U.S.
2007	173.7	313.8
2008	173.1	312.7
2009	167.8	307.8
2010	172.0	304.5
2011	172.0	296.3
2012	171.8	293.1
2013	171.9	289.1
2014	172.3	283.2
2015	173.9	279.9
2016	172.5	276.8
2017	169.6	286.3
2018	154.1	282.7

Table 3. Comparison of available beds per 100,000 population in Washington and the U.S.

Year	WA	BHT	CPAA	EH	GC	HH	NC	NS	0	SW
1986	13,932	16,624	13,944	11,863	14,656	16,678	13,861	10,627	10,302	9,055
1987	14,022	16,532	13,536	11,833	14,550	17,169	13,651	10,765	10,603	8,657
1988	14,155	16,521	13,738	11,601	14,464	17,689	14,010	10,869	10,201	8,691
1989	13,943	15,694	13,942	11,390	14,903	17,639	14,411	9,945	10,029	8,510
1990	14,033	16,546	14,238	11,187	15,293	17,244	14,475	10,525	10,509	8,445
1991	14,155	17,026	14,535	12,640	15,216	16,916	14,613	10,534	10,462	8,492
1992	14,284	17,159	14,529	12,579	15,574	16,968	15,320	10,838	10,342	8,881
1993	13,975	17,209	14,588	12,336	15,592	16,379	15,032	10,268	10,373	8,897
1994	14,205	17,182	14,533	11,892	15,526	17,373	15,184	10,439	10,020	8,815
1995	14,249	16,923	14,288	13,342	15,951	17,216	15,260	9,955	10,035	9,007
1996	14,820	17,693	15,134	13,332	16,260	17,739	19,571	10,286	10,343	9,592
1997	15,091	17,389	15,168	13,809	16,137	18,382	19,311	10,256	10,496	10,841
1998	15,087	17,051	16,094	13,936	16,983	18,067	17,699	10,239	10,560	11,004
1999	15,257	17,379	16,221	14,057	17,034	18,526	16,608	10,417	10,717	10,841
2000	15,919	18,006	17,117	14,417	18,106	19,545	16,833	10,806	10,678	11,253
2001	16,131	17,771	16,087	14,763	18,048	20,031	17,971	11,155	11,322	11,541
2002	16,251	18,733	17,075	14,716	17,904	19,870	19,029	11,081	11,975	11,074
2003	16,327	19,688	16,872	14,468	17,693	20,127	19,180	11,025	12,185	10,986
2004	16,083	19,093	15,804	14,362	18,110	19,664	18,937	11,163	12,345	10,928
2005	16,471	18,957	15,987	14,320	19,697	20,308	18,903	11,378	12,613	11,081
2006	16,510	18,977	15,759	14,116	19,779	20,369	18,977	11,276	13,543	11,521
2007	16,813	19,246	16,060	14,275	20,539	20,345	20,067	11,811	13,674	12,103
2008	16,831	17,834	16,474	14,598	20,985	20,248	20,409	11,768	13,722	12,646
2009	16,986	19,265	16,416	14,434	19,773	20,435	20,645	12,199	12,993	13,785
2010	17,210	19,699	16,469	16,435	20,547	19,696	19,534	12,591	12,905	14,511
2011	17,459	18,373	16,223	17,421	21,504	20,377	19,948	14,297	12,498	10,009
2012	17,390	18,737	16,688	17,718	21,276	19,533	15,380	13,979	12,206	14,728
2013	16,683	18,255	15,901	17,426	18,709	19,802	18,840	11,108	12,471	14,037
2014	16,299	18,363	16,684	16,430	19,182	17,819	23,185	11,031	13,917	13,483
2015	17,821	18,201	17,186	17,963	21,307	20,326	24,192	12,761	14,547	13,746
2016	17,586	17,793	16,805	18,122	22,069	19,569	23,385	12,957	14,556	13,078
2017	17,204	18,285	16,632	18,436	20,813	18,575	23,344	12,535	15,550	12,991
2018	15,694	16,957	16,482	18,610	10,501	19,070	13,073	11,146	15,377	13,912

Table 4. Adjusted hospital admissions per 100,000 population

Year	WA	BHT	CPAA	EH	GC	HH	NC	NS	О	SW
1986	5.2	5.6	4.4	5.2	4.4	5.9	4.2	4.8	4.1	4.3
1987	5.2	5.6	4.2	5.3	4.5	5.8	4.1	4.8	4.2	4.4
1988	5.1	5.7	4.1	5.4	4.4	5.7	4.1	4.7	4.3	4.4
1989	5.1	5.7	4.2	5.4	4.3	5.5	4.0	4.5	4.4	4.4
1990	5.1	5.6	4.1	5.4	4.4	5.7	3.9	4.6	4.3	4.2
1991	4.9	5.6	4.1	5.2	4.3	5.4	3.8	4.4	4.3	4.1
1992	4.8	5.6	4.0	5.3	4.4	5.1	3.8	4.2	4.3	4.1
1993	4.5	5.3	3.8	4.9	4.2	4.9	3.8	3.9	4.0	3.9
1994	4.2	4.9	3.6	4.4	3.9	4.6	3.6	3.5	3.8	3.9
1995	4.2	4.7	3.5	4.4	3.8	4.5	3.5	3.5	3.6	3.8
1996	4.1	4.5	3.4	4.4	3.7	4.5	3.2	3.6	3.6	3.5
1997	4.0	4.6	3.6	4.3	3.7	4.4	3.2	3.5	3.5	3.4
1998	4.1	4.7	3.6	4.3	3.6	4.6	3.1	3.6	3.4	3.3
1999	4.2	4.7	3.8	4.5	3.6	4.6	3.3	3.7	3.3	3.4
2000	4.1	4.7	3.5	4.5	3.6	4.6	3.3	3.7	3.5	3.5
2001	4.1	4.8	3.7	4.5	3.6	4.5	3.1	3.7	3.5	3.6
2002	4.1	4.7	3.5	4.4	3.6	4.6	3.1	3.8	3.4	3.7
2003	4.1	4.5	3.5	4.4	3.7	4.5	3.1	3.8	3.4	3.7
2004	4.1	4.4	3.6	4.3	3.6	4.6	3.1	3.9	3.5	3.8
2005	4.1	4.5	3.6	4.3	3.6	4.6	3.4	3.8	3.5	3.9
2006	4.1	4.4	3.7	4.2	3.6	4.5	3.2	3.8	3.5	3.8
2007	4.1	4.7	3.6	4.2	3.6	4.5	3.0	3.8	3.5	4.0
2008	4.2	4.8	3.6	4.2	3.6	4.6	3.6	3.8	3.6	4.0
2009	4.1	4.4	3.6	4.3	3.6	4.6	3.7	3.7	3.6	3.9
2010	4.1	4.5	3.6	3.9	3.6	4.6	3.7	3.7	3.6	3.8
2011	4.1	4.7	3.6	3.9	3.6	4.7	3.6	3.3	3.7	3.6
2012	4.0	4.7	3.7	4.0	3.3	4.7	2.9	3.3	3.8	3.6
2013	4.2	4.7	3.7	4.3	3.7	4.7	3.3	4.0	3.8	3.8
2014	4.4	4.8	3.6	4.7	3.7	5.1	3.7	4.4	3.6	4.1
2015	4.5	4.8	3.6	4.9	3.6	5.0	4.9	4.3	3.7	4.1
2016	4.6	5.0	3.8	5.0	3.7	5.2	5.1	4.2	3.8	4.2
2017	4.6	5.0	3.8	4.9	3.6	5.4	4.5	4.4	3.8	4.3
2018	4.8	5.4	3.8	4.9	3.8	5.4	3.6	4.6	3.9	4.0

Table 5. Adjusted patient days per adjusted admission

Year	WA	BHT	CPAA	EH	GC	HH	NC	NS	0	SW
1986	243.1	204.8	195.4	219.7	214.2	296.5	155.4	260.8	236.6	232.8
1987	255.2	209.6	197.4	258.7	220.9	313.2	151.2	259.6	254.6	232.5
1988	259.4	215.8	209.9	258.3	211.9	317.2	157.4	264.1	256.7	251.3
1989	265.6	205.3	239.8	272.0	215.3	331.8	158.9	256.3	252.0	253.5
1990	279.8	211.4	234.0	310.3	230.5	343.9	152.5	290.6	294.0	269.6
1991	276.8	218.7	236.2	328.5	224.6	327.5	155.1	295.5	292.5	257.2
1992	276.7	225.4	243.5	339.8	240.7	310.1	167.9	299.5	268.2	278.5
1993	271.9	227.0	236.5	330.2	242.5	307.3	165.2	288.6	251.2	274.9
1994	273.0	209.7	219.5	343.1	235.8	333.1	164.8	273.4	239.5	281.4
1995	274.0	210.1	217.7	359.5	240.2	329.6	169.0	270.2	224.0	294.1
1996	282.1	212.5	229.5	340.2	241.3	340.2	199.4	291.6	237.0	300.2
1997	297.5	228.8	243.5	370.0	252.9	355.7	200.5	296.6	234.5	377.7
1998	300.2	228.5	229.0	372.2	268.1	365.1	166.4	318.2	229.5	394.0
1999	320.2	235.0	276.4	395.6	275.4	386.5	168.9	334.1	259.7	408.6
2000	334.2	251.2	277.7	405.2	292.3	396.7	170.6	373.4	272.6	433.8
2001	345.0	255.6	276.3	436.9	296.2	405.7	170.4	386.1	326.3	458.7
2002	359.3	278.4	297.3	445.0	298.6	418.9	196.4	396.7	337.5	438.4
2003	358.6	280.0	297.4	447.5	301.1	412.8	204.7	391.2	340.0	442.9
2004	364.0	269.0	317.9	439.1	308.0	418.9	203.7	410.3	362.1	459.7
2005	380.0	281.0	330.1	419.7	377.5	429.2	227.1	417.7	365.0	468.8
2006	380.4	273.1	339.5	425.0	386.9	431.9	239.1	419.3	399.6	361.5
2007	396.0	309.0	349.5	424.0	407.8	435.5	239.3	445.3	411.0	421.6
2008	404.8	297.1	370.4	435.7	412.2	446.0	298.3	435.1	431.5	431.3
2009	415.5	320.3	368.0	406.5	430.9	457.1	351.3	439.1	434.0	444.6
2010	407.5	306.7	370.3	422.4	422.1	442.0	328.4	459.4	447.4	398.6
2011	412.3	312.3	379.8	437.0	450.2	462.7	341.7	433.8	447.7	262.8
2012	407.4	319.1	417.4	444.6	423.0	431.5	221.3	447.9	450.4	396.7
2013	410.2	315.2	382.4	472.6	450.0	421.2	317.1	431.4	461.8	417.1
2014	420.5	328.8	398.6	489.9	472.0	415.7	412.2	453.4	430.7	421.9
2015	460.7	305.1	421.7	568.3	476.4	473.6	548.7	480.8	498.2	445.4
2016	470.9	323.1	422.7	573.9	503.6	480.1	567.8	501.0	526.1	402.6
2017	471.5	324.1	458.1	523.5	490.1	500.8	506.2	488.2	544.3	421.1
2018	488.4	346.0	491.8	509.6	547.6	514.9	532.1	521.0	565.1	432.5

Table 6. Adjusted patient days per available bed

Year	WA	BHT	CPAA	EH	GC	HH	NC	NS	0	SW
1986	46.8	36.6	44.7	41.9	48.5	50.3	37.4	54.3	57.4	53.6
1987	49.3	37.3	46.6	48.8	49.0	54.1	37.0	54.1	60.4	52.7
1988	50.7	37.6	51.4	48.0	48.1	56.1	38.6	55.9	60.1	57.4
1989	52.5	35.7	56.8	50.1	49.5	59.8	39.8	56.8	57.6	58.0
1990	55.2	37.6	57.1	57.1	52.6	60.8	39.1	63.3	67.9	63.4
1991	56.5	39.4	58.0	62.7	52.1	60.9	40.6	67.6	67.5	62.8
1992	58.0	40.5	61.3	64.2	54.7	60.5	44.4	72.1	62.9	67.9
1993	60.0	43.0	61.5	66.7	58.3	63.2	43.8	73.4	63.0	69.8
1994	64.5	42.9	61.1	78.8	60.1	71.9	46.4	78.3	62.8	71.6
1995	66.0	44.5	61.7	82.3	63.3	72.7	48.1	76.1	62.3	78.0
1996	69.1	47.0	67.5	77.9	65.4	74.9	62.1	81.9	65.2	84.8
1997	73.7	49.7	68.2	85.2	68.2	81.0	62.8	83.7	67.2	111.8
1998	73.7	48.8	64.4	85.8	74.7	80.2	54.5	88.5	68.3	120.7
1999	76.6	50.5	73.1	88.3	75.6	83.1	51.4	90.6	77.7	118.6
2000	81.1	53.6	79.0	90.9	82.0	86.9	51.6	101.7	78.8	125.0
2001	83.5	53.2	75.3	96.9	82.9	89.7	55.5	105.2	94.2	128.9
2002	86.9	58.9	85.1	100.1	82.9	91.9	64.0	104.4	98.1	118.0
2003	86.9	61.9	85.1	100.9	81.1	91.2	65.6	101.9	98.6	119.2
2004	88.5	60.5	88.1	102.6	85.2	92.0	66.1	105.7	103.7	120.7
2005	91.9	61.9	92.3	97.4	104.6	93.7	67.2	109.6	105.1	121.0
2006	93.2	61.7	92.8	101.8	106.4	95.5	74.0	110.8	114.9	95.9
2007	96.8	65.7	98.2	101.6	111.9	96.7	79.5	117.9	117.6	106.1
2008	97.2	62.0	102.5	104.3	113.1	96.9	82.9	114.5	119.2	107.0
2009	101.2	73.3	102.2	95.5	118.8	100.3	94.9	119.1	121.7	112.8
2010	100.1	68.7	103.0	108.4	116.9	96.0	89.5	123.8	124.6	106.2
2011	101.5	66.2	105.5	110.9	126.4	98.9	94.2	130.1	122.4	73.6
2012	101.2	67.9	112.1	110.9	128.6	91.4	75.7	135.8	119.9	109.7
2013	97.0	66.8	103.9	109.9	122.0	89.6	96.8	109.1	122.5	109.0
2014	94.6	68.2	111.4	105.3	129.0	81.2	111.5	103.9	118.4	103.6
2015	102.5	63.6	118.1	115.3	133.8	94.7	112.0	112.2	133.2	107.5
2016	101.9	64.8	112.2	114.8	137.9	91.9	111.6	118.6	138.1	96.5
2017	101.4	64.8	119.9	107.3	135.6	93.4	112.8	110.8	143.8	98.2
2018	101.8	64.0	129.3	103.5	145.7	94.6	148.3	113.0	143.7	107.4

Table 7. Adjusted admissions per available bed

Year	WA	BHT	CPAA	EH	GC	HH	NC	NS	0	SW
1986	9.0	8.1	7.8	11.1	6.9	10.1	6.5	9.5	10.0	5.1
1987	9.3	7.7	8.0	12.0	7.5	10.6	6.5	9.5	10.1	5.1
1988	9.6	8.1	7.5	11.8	7.5	11.4	6.5	9.2	10.0	5.4
1989	10.0	8.4	9.3	10.7	7.3	12.6	6.5	8.8	9.6	5.4
1990	10.0	8.6	7.3	10.5	8.1	13.0	6.2	9.0	10.4	5.4
1991	10.2	8.8	7.4	10.9	8.1	13.0	6.2	9.1	10.1	8.9
1992	10.3	9.0	8.3	11.1	8.2	12.9	6.3	9.2	9.3	6.8
1993	10.1	8.6	7.5	11.1	8.2	12.8	5.9	9.9	9.0	6.8
1994	10.4	8.4	7.0	11.9	8.3	13.9	5.6	10.4	9.1	6.8
1995	10.4	8.7	7.4	11.6	8.2	14.0	5.3	9.4	9.2	6.6
1996	10.9	9.5	7.6	16.0	8.4	13.6	5.9	10.0	9.2	6.0
1997	10.7	10.8	9.7	12.8	8.0	42.9	5.9	9.3	9.2	6.7
1998	10.6	10.3	8.5	12.6	8.2	13.3	5.4	9.7	9.2	6.9
1999	10.9	9.3	9.4	18.3	8.1	13.4	5.3	8.1	8.2	7.2
2000	11.0	10.2	7.3	19.9	8.7	12.6	6.9	7.7	10.3	6.5
2001	10.5	11.9	7.2	16.7	7.6	12.1	5.4	7.6	9.2	6.7
2002	11.0	12.5	7.5	17.4	7.7	12.8	6.2	7.3	9.0	11.1
2003	11.1	14.2	7.2	16.9	7.5	12.3	5.2	8.5	8.8	11.3
2004	11.3	13.4	7.6	20.2	7.3	12.2	4.9	8.8	9.0	11.2
2005	11.5	12.8	7.4	17.5	8.1	13.4	4.9	8.1	9.4	10.8
2006	11.6	12.5	7.4	18.2	8.0	13.0	5.3	9.4	9.4	14.0
2007	11.6	13.6	8.1	17.6	7.9	12.4	5.3	9.9	9.4	14.4
2008	11.9	15.7	7.8	17.4	7.4	12.8	5.7	9.5	9.4	13.7
2009	12.2	11.9	8.8	20.7	8.1	12.6	5.6	9.4	10.1	18.0
2010	12.4	10.9	8.8	25.0	7.8	12.7	5.5	9.4	10.4	17.0
2011	12.8	11.3	9.1	23.9	9.0	12.8	7.2	8.6	10.5	17.0
2012	12.6	11.3	9.7	18.6	9.3	13.3	8.0	10.2	10.5	18.3
2013	12.8	11.3	9.4	18.6	9.4	13.4	8.4	11.0	10.5	18.9
2014	12.8	11.3	9.5	17.0	11.5	13.5	7.7	10.4	9.0	21.0
2015	13.5	10.6	9.9	18.6	13.4	15.0	7.4	9.5	9.6	21.0
2016	13.2	11.0	8.0	22.2	12.5	13.7	5.3	10.0	9.8	19.4
2017	13.5	11.7	9.9	20.4	13.4	14.5	4.9	9.7	9.0	19.6
2018	13.7	12.2	10.6	19.2	8.7	14.7	0.9	9.6	9.0	19.5

Table 8. ICU beds as percentage of available beds

Table 9. ICU beds per 100,000 population

Year	WA	BHT	CPAA	EH	GC	НН	NC	NS	0	SW
1986	26.9	36.8	24.4	31.3	21.0	33.6	24.2	18.6	18.0	8.5
1987	26.4	34.1	23.3	29.1	22.1	33.8	24.1	18.9	17.7	8.4
1988	26.7	35.7	20.0	28.5	22.5	36.0	23.7	18.0	17.0	8.2
1989	26.4	37.1	22.9	24.4	22.1	37.1	23.5	15.5	16.7	8.0
1990	25.5	37.7	18.2	20.6	23.5	37.0	22.8	14.9	16.1	7.2
1991	25.5	38.1	18.6	21.9	23.6	36.2	22.2	14.2	15.6	12.1
1992	25.3	38.2	19.6	21.8	23.2	36.2	21.8	13.9	15.2	8.9
1993	23.5	34.5	17.9	20.5	21.8	33.3	20.1	13.8	14.8	8.6
1994	22.9	33.8	16.7	17.9	21.3	33.6	18.4	13.9	14.5	8.3
1995	22.4	33.1	17.2	18.8	20.7	33.1	16.8	12.3	14.9	7.7
1996	23.4	35.9	17.1	27.4	21.0	32.2	18.4	12.6	14.6	6.8
1997	22.0	37.8	21.6	20.8	18.9	97.4	18.0	11.5	14.4	6.5
1998	21.7	35.8	21.2	20.4	18.6	29.9	17.6	11.2	14.3	6.2
1999	21.8	32.2	20.9	29.2	18.3	29.8	17.2	9.3	11.3	6.6
2000	21.5	34.2	15.9	31.5	19.3	28.3	22.5	8.2	14.0	5.9
2001	20.2	39.8	15.3	25.4	16.5	26.9	17.6	8.1	11.1	6.0
2002	20.7	39.7	15.1	25.5	16.6	27.7	18.4	7.7	10.9	10.4
2003	20.8	45.1	14.3	24.2	16.3	27.1	15.1	9.2	10.8	10.4
2004	20.5	42.5	13.6	28.2	15.5	26.0	14.0	9.3	10.7	10.1
2005	20.5	39.2	12.8	25.8	15.2	29.1	13.9	8.4	11.3	9.9
2006	20.6	38.5	12.5	25.2	14.9	27.7	13.6	9.5	11.1	16.8
2007	20.2	40.0	13.2	24.8	14.6	26.1	13.4	9.9	11.0	16.5
2008	20.6	45.2	12.5	24.4	13.7	26.7	14.0	9.8	10.9	16.2
2009	20.4	31.3	14.2	31.4	13.5	25.7	12.1	9.7	10.8	22.0
2010	21.4	31.3	14.1	38.0	13.8	26.0	12.0	9.6	10.8	23.2
2011	22.0	31.3	14.0	37.5	15.4	26.5	15.2	9.5	10.7	23.1
2012	21.7	31.1	14.4	29.7	15.4	28.5	16.4	10.5	10.7	24.6
2013	21.9	30.8	14.3	29.5	14.5	29.6	16.2	11.2	10.7	24.4
2014	22.0	30.6	14.2	26.5	17.0	29.5	16.1	11.0	10.6	27.4
2015	23.4	30.3	14.5	29.0	21.3	32.3	15.9	10.8	10.5	26.8
2016	22.7	30.1	12.0	35.1	20.0	29.1	11.1	10.9	10.4	26.3
2017	23.0	32.9	13.7	35.1	20.6	28.8	10.2	11.0	9.7	26.0
2018	21.1	32.4	13.5	34.6	6.3	29.6	0.8	9.5	9.6	25.3

References

- ¹ See, e.g., <u>https://covid19.healthdata.org/united-states-of-america/washington</u>.
- ² <u>https://www.newsday.com/opinion/coronavirus/hospital-beds-consolidation-coronavirus-covid-19-patients-1.43779062</u>
- ³ <u>https://www.healthaffairs.org/doi/pdf/10.1377/hlthaff.2020.00980</u>
- ⁴ <u>https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-020-5023-z</u>
- ⁵<u>https://www.hca.wa.gov/about-hca/healthier-washington/accountable-communities-health-ach</u>
- ⁶ National population data come from the Census Bureau. State and county populations are estimated by the Forecasting and Research Division of the Washington State Office of Financial Management.
- ⁷ <u>https://www.doh.wa.gov/DataandStatisticalReports/HealthCareinWashington/HospitalandPatientData/Glossary</u> ⁸ <u>https://app.leg.wa.gov/RCW/default.aspx?cite=70.41</u>
- ⁹ <u>https://www.statista.com/statistics/185860/number-of-all-hospital-beds-in-the-us-since-2001;</u> numbers of hospital beds for the US as a whole are estimated with data from the American Hospital Association.
- ¹⁰ Greater Columbia and North Central ACHs both showed percent decreases of 76% if 2018 data are included. Those percentages are an artifact of missing data for 2018 in those ACHs.
- ¹¹ 2018 rates for Greater Columbia and North Central are affected by missing data.

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https://www.doh.wa.gov/DataandStatisticalReports/HealthCareinWashington/HospitalandPatientData/Glossary