

COVID-19 Vaccination Demographic Data Analysis December 15, 2020 – April 18, 2021

Snohomish County COVID-19 Vaccination Demographic Data Analysis: December 15, 2020 through April 18, 2021

Snohomish County is currently vaccinating all persons aged 16 years of age and above.

Data source for all tables was the Washington State Immunization Information System (WAIS), and the Washington State Office of Financial Management (OFM) for population estimates. See appendix A for all data cleaning and assumptions.

The demographic profile of Snohomish County is made up of an even split of males and females, each making up 50% of the population in Snohomish County (table 1). The age distribution of Snohomish County residents shows the largest percent of the population is working-aged adults between the ages of 20 and 64 years old (60%) (table 2). Older adults over 65 years-old make up 16% of the population and children and adolescents (<20 years-old) make up almost one-fourth of the Snohomish County population. The race and ethnicity profile of Snohomish County shows that the county is predominantly white, non-Hispanic (69%) (table 3). Asian's are the second most prevalent race seen in the county (11%) followed closely by all-race Hispanics.

The early phases of vaccine distribution primarily emphasize those at highest risk of severe COVID-19 illness, hospitalization and death (e.g., long-term care residents, age ≥ 65), and those at increased risk of acquisition at work (e.g., healthcare workers, high-risk critical infrastructure workers). Currently the only restriction in place for receiving COVID-19 vaccination is age. There are no FDA-authorized vaccines for children and adolescents less than 16 years old at this time. More women than men have been vaccinated in Snohomish County. Age and employment would affect gender rates as women tend to live longer than men, and more women work in healthcare. Sixty-five years and above is the most vaccinated group in Snohomish County (30%). This is followed by 50-64 year-olds, 35-49 year-olds, and 20-34 year-olds respectively.

Non-Hispanic Whites are the most vaccinated group in Snohomish County by absolute number of doses received, but Native Hawaiian/Pacific Islanders are the most vaccinated group in terms of proportional coverage (54%, see figure 1). Vaccine uptake among races was compared to non-Hispanic Whites. Hispanics had lower rates of COVID-19 vaccination compared to non-Hispanic Whites (table 1). Native Hawaiian/Pacific Islanders (NH/PI), and Asians had higher *per capita* rates of vaccination. These differences are statistically significant ($p < 0.05$). African Americans and American Indian/Alaska Natives had similar vaccination rates when compared to non-Hispanic Whites. It is unknown why there are differences among other races, but language barriers, age, mobility and transportation, internet access and fluency, employment, and discretionary time may all play roles in vaccine access.

Over 60% of people initiating vaccination are now considered fully vaccinated (table 6). The trends seen in the different racial and ethnic groups were also seen in the number of persons that are now considered fully vaccinated (table 7). NH/PI have the highest rate of fully vaccinated persons (33%), followed by AI/AN and Asians (27%) and non-Hispanic Whites (24%). The proportion achieving full vaccination increased across age groups, with people 65 and older having the highest rate of full vaccination coverage (60%) (table 8).

Snohomish County is comprised of both urban and rural areas. City of residence can be seen in table 9. Residence is based on address reported at the time of most recent vaccination. (See appendix A for details on how residency was determined.) City name includes both incorporated and unincorporated Snohomish County addresses. Residents from urban areas such as Everett (19%) and Lynnwood (14%) make up higher percentages of total vaccines administered, but overall coverage of this areas cannot be calculated at this time given the dataset limitations.

Table 1: COVID-19 vaccine initiation by sex at birth, Snohomish County

Sex at birth	Count	Population	Percent coverage
Female	168,068	414,378	41%
Male	134,847	416,122	32%
Unknown	1092	---	---
Total persons initiating vaccination	304,007	674,857	45%

Table 2: COVID-19 vaccine initiation by age group, Snohomish County

Age group in years	Count	Population	Percent coverage
15 to 19	6,430	46,608	14%
20 to 34	51,040	152,342	34%
35 to 49	70,579	176,569	40%
50 to 64	85,548	169,752	50%
65+	90,389	129,586	70%
Total initiating vaccination	303,986	674,857	45%

*Note: 21 cases were excluded due to age being <15.

Table 3: COVID-19 vaccine initiation by race and ethnicity, Snohomish County

Race non-Hispanic	Count	Population	Percent coverage	Relative Risk	95% CI Lower	CI Upper
African American	7,168	20,000	36%	1.0	0.95	0.99
American Indian/Alaska Native	2,738	7,372	37%	1.0	0.97	1.04
Asian	39,435	81,511	48%	1.3	1.29	1.32
Native Hawaiian or Pacific Islander	1,986	3,696	54%	1.5	1.39	1.52
White	177,868	480,060	37%	1.0		
Other, non-Hispanic	39,809	---	---	---	---	---
Hispanic	16,393	60,883	27%	0.7	0.72	0.74
Unknown	18,610	---	---	---	---	---
Total persons initiating vaccination	304,007	674,857	45%	---	---	---

Figure 1: COVID-19 vaccine initiation rates by race and ethnicity, Snohomish County

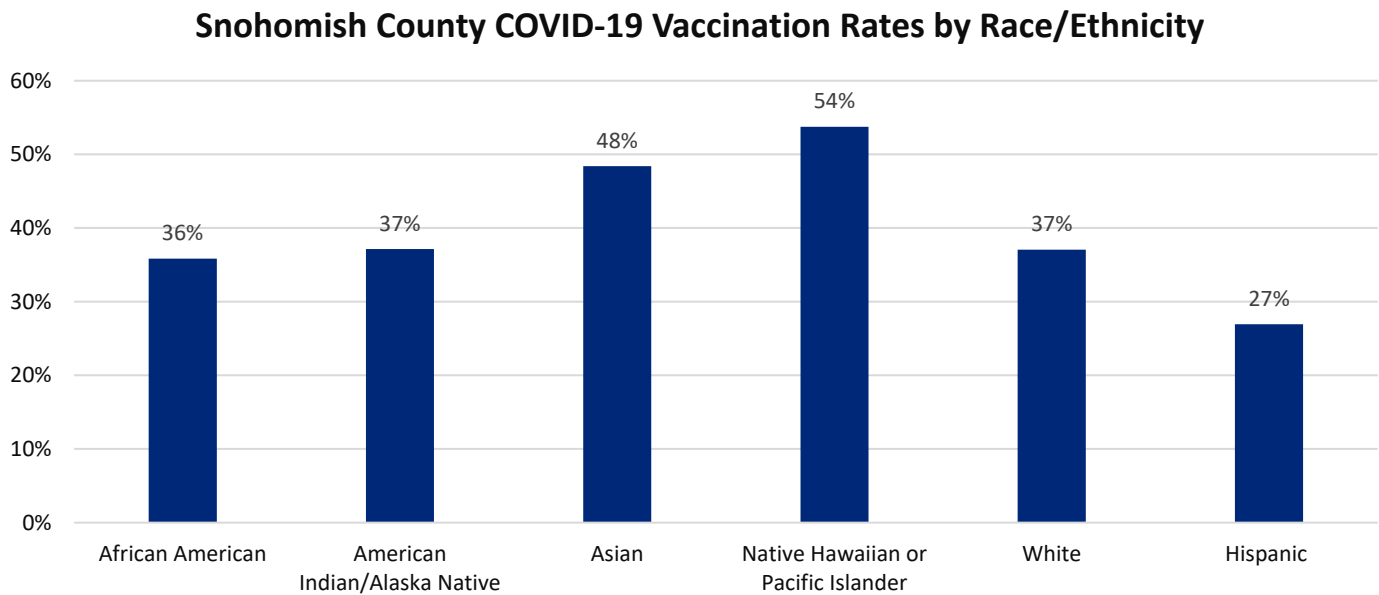


Table 4: COVID-19 vaccine initiation by race/ethnicity and age group, Snohomish County

Race non-Hispanic	15-19	20 to 34	35 to 49	50 to 64	65+	Total
African American	208	1,420	2,388	2,122	1,037	7,165
American Indian or Alaskan Native	93	578	683	792	591	2,737
Asian	1,175	9,234	12,096	9,839	7,088	39,432
Native Hawaiian or Other Pacific Islander	44	343	629	562	317	1,986
White	3,248	25,499	36,283	51,877	60,925	177,859
Other, non-Hispanic	744	5,953	8,216	10,826	14,039	39,808
Ethnicity						
Hispanic	632	4,152	5,308	4,229	2,071	16,392
Unknown	256	3,770	4,976	5,311	4,294	18,607
Total persons initiating vaccination	6,430	51,040	70,579	85,548	90,389	303,986

Table 5: COVID-19 vaccine initiation by race and ethnicity among persons ≥ 65 years-old, Snohomish County

Race non-Hispanic	Count	Population	Percent coverage	Relative Risk	95% CI Lower	95% CI Upper
African American	1,037	1,605	65%	1.1	1.08	1.22
American Indian/Alaska Native	591	1,106	53%	0.9	0.87	1.03
Asian	7,088	12,929	55%	1.0	0.95	0.99
Native Hawaiian or Pacific Islander	317	338	94%	1.7	1.49	1.85
White	60,952	107,913	56%	1.0		
Other, not Hispanic	14,039	---	---	---	---	---
Ethnicity						
Hispanic	2,071	3,867	54%	0.9	0.91	0.99
Unknown	4,294	---	---	---	---	---
Total persons ≥65 initiating vaccination	90,389	129,586	70%			

Table 6: COVID-19 vaccination status among Snohomish County residents having initiated vaccination

Vaccination status	Count	Percent of total
Fully vaccinated	195,362	64%
Partially vaccinated	108,645	36%
Total	304,007	100%

Table 7: COVID-19 vaccination completion status among Snohomish County residents by race/ethnicity

Race non-Hispanic	Fully vaccinated	Partially vaccinated	Total	Population	Percent fully vaccinated
African American	4,397	2,771	7,168	20,000	22%
American Indian/Alaska Native	1,964	774	2,738	7,372	27%
Asian	22,069	17,366	39,435	81,511	27%
Native Hawaiian or Pacific Islander	1,202	784	1,986	3,696	33%
White	115,726	62,142	177,868	480,060	24%
Other, not Hispanic	28,386	11,423	39,809	---	---
Ethnicity					
Hispanic	8,624	7,769	16,393	60,883	14%
Unknown	12,994	5,616	18,610	---	---
Total	195,362	108,645	304,007	674,857	29%

Table 8: COVID-19 vaccination completion status among Snohomish County residents by age group

Age group	Fully vaccinated	Partially vaccinated	Total	Population	Percent fully vaccinated
15 to 19	2,102	4,328	6,430	46,608	5%
20 to 34	25,381	25,659	51,040	152,342	17%
35 to 49	37,430	33,149	70,579	176,569	21%
50 to 64	52,096	33,452	85,548	169,752	31%
65+	78,347	12,042	90,389	129,586	60%
Total	195,356	108,630	303,986	674,857	29%

Table 9: COVID-19 vaccine recipients by city of residency, Snohomish County

City	Count	Percent of total
Arlington	13,883	5%
Bothell	37,205	12%
Brier	2,785	1%
Darrington	611	0%
Edmonds	28,588	9%
Everett	58,376	19%
Gold Bar	1,208	0%
Granite Falls	2,873	1%
Hat Island	9	0%
Index	140	0%
Lake Stevens	16,350	5%
Lynnwood	41,703	14%
Marysville	24,680	8%
Mill Creek	8,343	3%
Monroe	9,239	3%
Mountlake Terrace	8,795	3%
Mukilteo	10,535	3%
North Lakewood	65	0%
Silvana	133	0%
Snohomish	24,654	8%
Stanwood	8,667	3%
Startup	77	0%
Sultan	1,856	1%
Tulalip	2,727	1%
Woodinville	16	0%
Woodway	488	0%
Unknown	1	0%
Total	304,007	100%

Appendix A: Data cleaning and assumptions

1. The dataset is a snapshot of the WAIS backend/repository data. If an existing/historic record is updated in WAIS, updates will not be reflected in subsequent datasets on that exact row.
2. Updated records may be reported as duplicates in the repository (hence cleaning step 3). This cleaning process is an attempt to mimic:
 - a) the WAIS deduplication process (i.e., cleaning step 3 to keep most recent record when vaccines administered within 5 days of each other)
 - b) what may be shown in the final WAIS dataset of "valid" vaccine doses
3. RecipientID is the variable used by DOH for unique identifier per person, but is known to have some issues/inconsistencies. To be consistent with DOH, we use this unique identifier as well.
4. County code is based on zip code. There are known data quality issues with incorrect zip codes entered, resulting in incorrect county code. Additionally, there are several misspelled cities and occasional non-character cities.
 - a) These are cleaned as individual records. They are reviewed for unique records, and misspelled cities are updated in a batch process. In-county city/zip code combinations are coded to Snohomish County.
 - b) Remaining out of county cities are re-coded to the proper county based on city or 99999 if unknown.
 - c) There will be some margin of error as this is not precise. If address is blank, Snohomish residence is not assumed.
5. Final exports with 1 row per person (as opposed to 1 row per vaccine) default demographic info to the LAST reported record by administration date (name, address, race/ethnicity). Most records are the same as the first.
 - a. This is an update from previous weeks, which defaulted to the 1st record reported by administration date. The week this change was implemented was 3/8/2021.
6. Janssen vaccine code was added of 3/8/2021 after DOH cleaning criteria (<6 days apart).
 - a. If any Janssen vaccine in final datasets, person will be considered fully vaccinated. If a person has 2 vaccines in final dataset, person will be considered fully vaccinated. (this variable inserted after final cleaning step 8)
 - b. If a person's 1st vaccine by administration date is Janssen, exclude any subsequent vaccines by administration date (this step inserted after DOH cleaning step 3)
 - c. If a person's 1st vaccine is not Janssen but 2nd vaccine is Janssen, keep both 1st and 2nd vaccine record. Any subsequent records are removed after Janssen vaccine. (this step inserted after DOH cleaning step 3)
7. Step 6 will give preference to anyone with 1st or 2nd vaccine that is Janssen (as a fully vaccinated individual), and may:
 - a) Exclude some people that may otherwise have had a Snohomish County address in a subsequent record that were excluded, but Janssen record does not have Snohomish County address
 - b) Undercount the number of Pfizer/Moderna vaccines given IF the Janssen vaccine is not the "true" vaccine record counted in the final WAIS data system (manually verify individual records is beyond the scope of this analysis and the required resources)

8. While the final dataset after our cleaning process has up to 2 vaccine records per person, we know that persons exist in the WAIS data system with >2 COVID vaccine records reported. Additional vaccine records were excluded from this analysis.
9. Historical records no longer excluding hx records as of 4/18/21 report
 - a) final dataset may have up to 8,511 hx records where administering facility is incorrect (if Hx flag =yes then may not actually be where they got vaccinated). However, there are likely far fewer than this with the following data cleaning steps in place (e.g., removing duplicates by vaccine administration date, removing dates that are within 6 days of each other, removing invalid timeframe doses.)

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Appendix B: Comparisons of residency and where vaccinated by race and ethnicity and age group

	Snohomish Co Resident at least 1 COVID vaccine - ALL	Snohomish Co Resident at least 1 COVID vaccine - Vaccinated in Sno Co	Snohomish Co Resident at least 1 COVID vaccine - Out of jurisdiction	Non-Snohomish County Residents vaccinated in Sno Co	TOTAL DOSES COUNTED	SNO CO ADMINISTERED
Race non-Hispanic						
African American	7,168	4,084	5,252	1,744	11,395	8,958
American Indian/Alaska Native	2,738	2,146	1,048	532	4,727	4,558
Asian	39,435	24,654	24,803	19,601	61,015	65,663
Native Hawaiian or Pacific Islander	1,986	1,354	1,052	449	3,088	2,725
White	177,868	126,568	89,207	62,017	288,043	298,291
Other, not Hispanic	39,809	26,383	24,393	13,478	63,813	61,991
Ethnicity						
Hispanic - All race	16,393	10,811	8,993	4,890	24,422	22,776
Unknown	18,610	12,190	9,885	11,115	26,942	33,237
TOTAL	304,007	208,190	164,633	113,826	483,445	498,199
Age Groups						
15 to 19	6,430	3,942	3,397	2,170	8,238	7,690
20 to 34	51,040	31,888	29,865	27,562	73,380	81,014
35 to 49	70,579	46,934	38,247	34,707	103,440	115,588
50 to 64	85,548	60,203	43,166	26,465	132,634	131,476
65+	90,389	65,212	49,945	22,911	165,729	162,409
AGE TOTAL	303,986	208,179	164,620	113,815	483,421	498,177