

# The Community Connections Initiative of SW Washington



**CORE**

Center for Outcomes  
Research and Education

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# Background

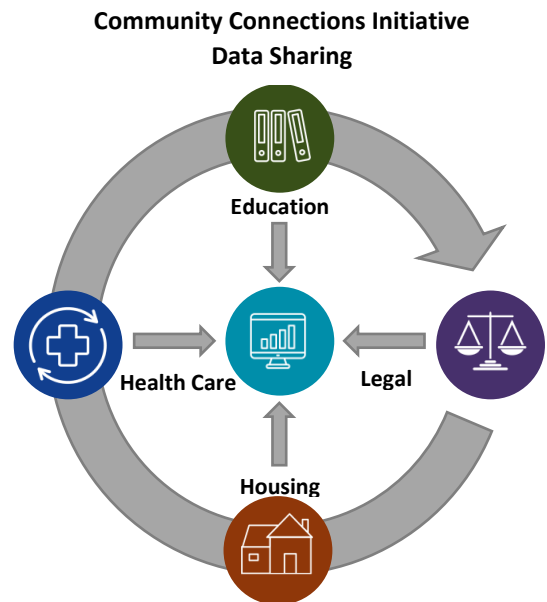
Beginning in 2016, the Clark County Sheriff's Office, Evergreen Public School District (EPS), Vancouver Public School District (VPS), Vancouver Housing Authority (VHA), and Southwest Accountable Community of Health (SWACH) partnered with the Center for Outcomes Research and Education (CORE) to explore how cross-sector data sharing could support shared learning in the region. CORE brought together data from the legal, education, housing, and health care sectors to answer three broad research questions:

- ▶ Who are the shared populations who experience poor outcomes across sectors?
- ▶ To what extent are poor outcomes in one sector associated with poor outcomes in another?
- ▶ What are the high priority needs of the shared populations?

By better understanding the answers to these questions, the cross-sector partners can conduct more effective outreach to the populations they share, provide resources and connections to other sectors based on the priorities of those they serve, and better collaborate to meet these populations' needs.

Working together, the partners prioritized specific topics of interest within the framework of the three broad research questions. The following report details the findings in each of these topic areas:

- ▶ Characteristics of students shared between EPS and VPS
- ▶ Characteristics of students experiencing chronic absenteeism
- ▶ Impact of mental health and substance use on interactions with the legal system
- ▶ Patterns of acute health care need in the region



## How to Use This Report

This report begins with details about the size of the overall population served by the data sharing partners and is then divided into two main sections: the findings from CORE's analyses in each of the prioritized topic areas; and an Appendix that includes detailed methods and supplemental tables.

The findings for each prioritized topic area highlight selected results from the analyses. The Appendix includes: a description of all data sources; inclusion criteria for individuals in the analyses for each prioritized topic area; definitions used in each analysis; details of the descriptive analyses done and analytic models built; and the full results.

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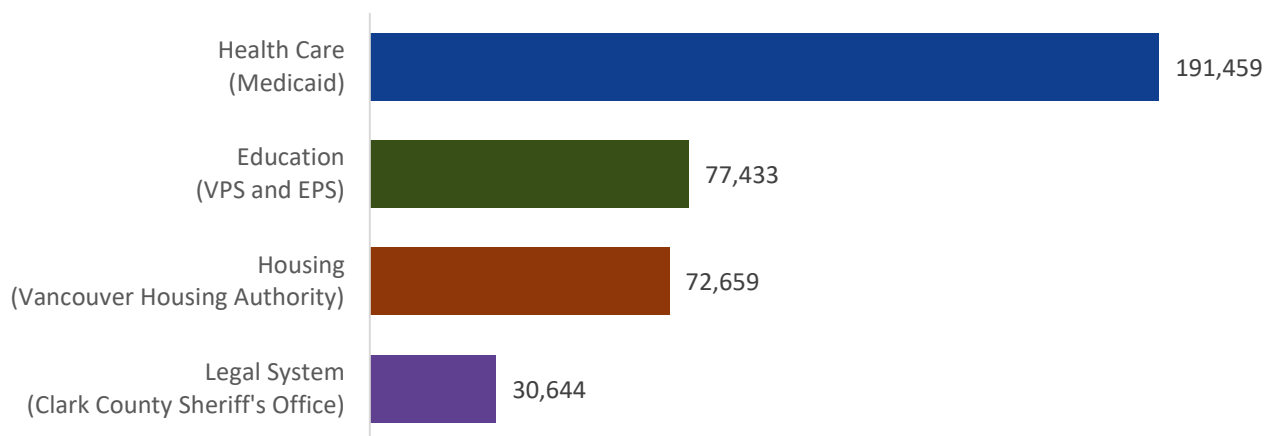
# Study Population

This report describes the characteristics and experiences of the population in Clark County across health care, education, housing, and legal, within the study window 2015 - 2018. Each sector was represented in this work by a data sharing partner: health care by Medicaid; education by Evergreen Public Schools (EPS) and Vancouver Public Schools (VPS); housing by Vancouver Housing Authority (VHA); and legal by Clark County Sheriff's Office.

The number of unique individuals served varied by sector, with the population represented in health care being twice as large as any of the other sectors' populations and the population engaged in the legal sector being less than half the size of the next largest sector.

Of note, there were differences by age in who was considered "served" by each sector. Medicaid enrollees included both adults and children; VPS and EPS included only the students in each school district, and not any information on other family members; VHA's population consisted primarily of the adult applicant, although some information was available on other members of the household, especially if the household received housing through VHA; and the Clark County Sheriff's Office booking data was limited to adults.

Population in each sector, 2015 - 2018



Fuzzy matching – a process that combines probabilistic and deterministic matching techniques – was used to match individuals across sectors. This allows for understanding how a single unique individual may have interacted with multiple sectors, e.g. a student at EPS who was receiving housing through VHA and/or health care services under Medicaid. The above mentioned differences in age eligibility for each sector's population, however, still limit exploration of how a household or family interacts with multiple sectors. For example, if a student at EPS has a parent receiving health care services under Medicaid, these two experiences would not be linked in the data because they pertain to two distinct individuals.

The pie charts represent the proportion of each sector's population that matched to at least one other sector, regardless of timing. An individual would therefore be considered a "match" if, for example, they were enrolled in Medicaid in 2015 only and sought housing assistance through VHA in 2017. Note that, in contrast, some analyses presented further on in this report did require individuals to be present in both sectors at the same time.

Each sector's population matched to other sectors at differing proportions. Only slightly over a third of the Medicaid population and the legal system population matched to at least one other sector. In contrast, over half of the students represented in the EPS and VPS data and slightly less than half of those seeking housing through VHA matched to at least one other sector.

Because the matching process did not require individuals to be in both sectors at the same time, there a few hundred students in the EPS and VPS data who matched to the legal data. Given that the legal data was limited to individuals 18 years of age or older, these few hundred individuals likely represent those who interacted with the legal system during their senior year of high school or after graduation.

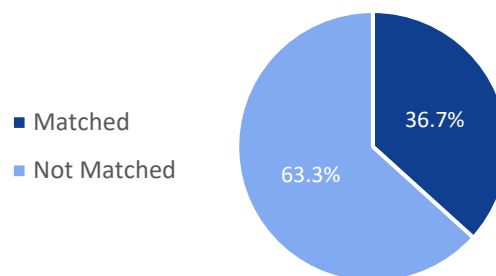
Once the matching was complete, there were **288,905 unique individuals** identified in the data:

- ▶ 75% observed in only one sector
- ▶ 22% observed in two sectors
- ▶ 3% observed in three sectors

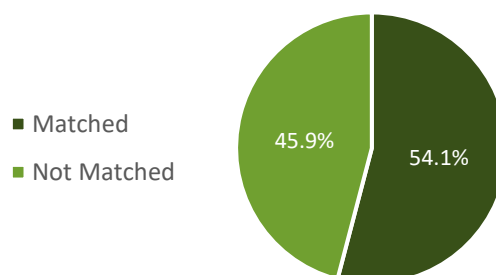
Less than half a percent of the population – approximately 100 individuals – matched to all four sectors

Fuzzy matching is, by definition, an approximation. It is therefore possible that there was some misclassification in the data: the same individual may have been in multiple sectors without having been identified as such, which would result in this person being counted multiple times; or multiple people may have been mistakenly identified as the same person and matched across sectors. Without a unique identifier across sectors, however, fuzzy matching is the best option for analyzing cross-sector data to support cross-sector partnerships.

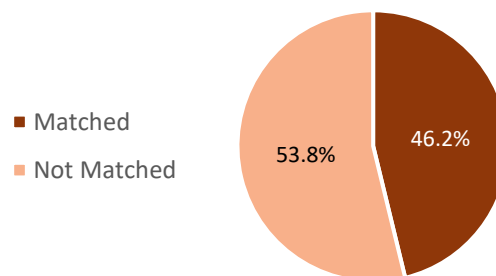
Percent of Medicaid population matched to another sector



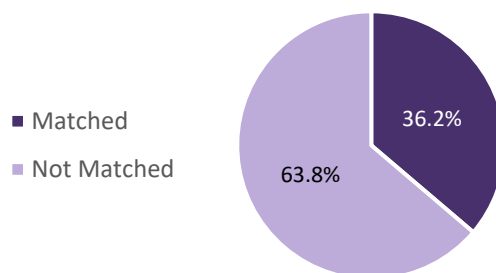
Percent of VPS and EPS students matched to another sector



Percent seeking housing through VHA matched to another sector



Percent of adults in the legal system matched to another sector





# Students Shared by Districts in Southwest Washington

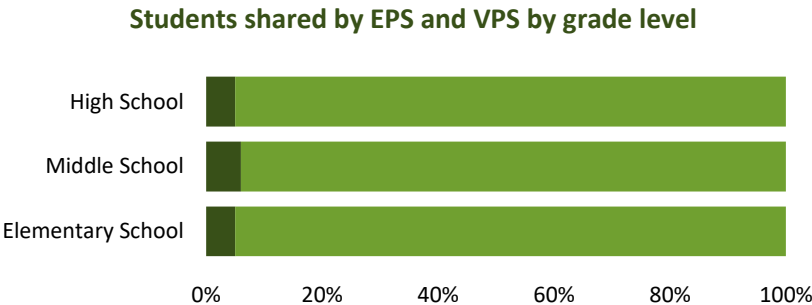


Evergreen Public Schools (EPS), Vancouver Public Schools (VPS), Vancouver Housing Authority (VHA), and the Southwest Accountable Community of Health partnered with the Center for Outcomes Research and Education to understand more about the characteristics and experiences of students in southwest Washington who moved between the EPS and VPS districts. The cross-sector partners were interested in understanding the extent to which moving disrupted students' learning, or was indicative of larger instability or greater needs.

Being **shared between districts** was defined as moving between the EPS district and VPS district at least once between the 2014-2015 and 2017-2018 school years.

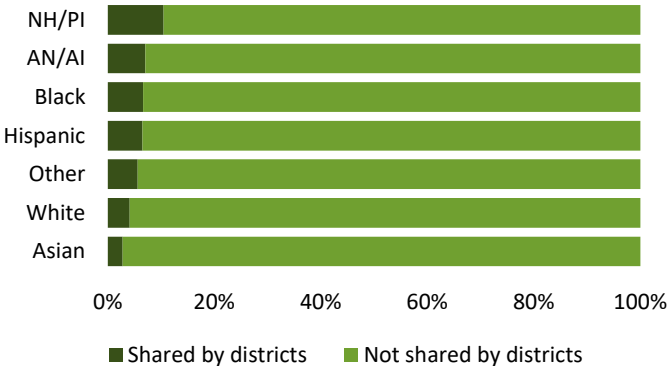
73,654	Students included in this analysis
3,620	Students shared between EPS and VPS
414	Students moved districts more than once

There was little difference in grade level between students only in one district and students shared by the two districts; in elementary, middle, and high school, approximately 5% of students were shared by EPS and VPS.

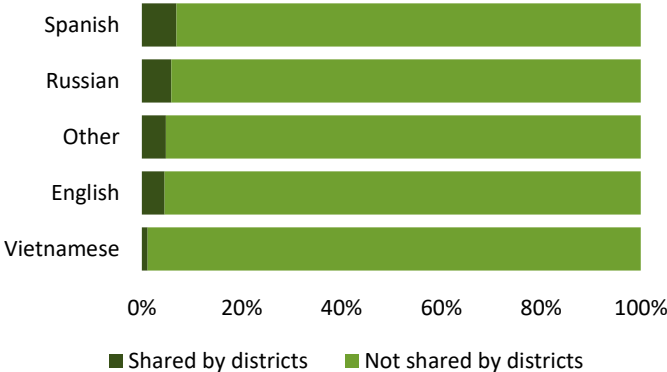


There were differences, however, by race, ethnicity, and language. **Native Hawaiian/Pacific Islander, Alaskan Native/American Indian, and Black students, as well as those who spoke Spanish or Russian, were the most likely to be shared between EPS and VPS.** There were no differences by gender.

**Students shared by EPS and VPS by race/ethnicity**



**Students shared by EPS and VPS by language**



NH/PI: Native Hawaiian/Pacific Islander  
AN/AI: Alaskan Native/American Indian

# Students Shared by Districts and Housing Need



The need to move between districts can result from external pressures on a student and their household, including housing instability. We explored the association between switching between EPS and VPS school districts and needing housing assistance, defined as applying for assistance through one of VHA’s programs.

**We found that students shared between the two school districts were 3 times more likely to seek housing assistance than students remaining in a single district.**

	Sought housing assistance	Did not seek housing assistance	Relative Risk*
Shared by districts	18.4%	81.6%	2.91
Not shared by districts	6.3%	93.7%	

\*Adjusted for age, sex, race/ethnicity, and language; p<0.001

A total of 1,680 students were housed through VHA in the study period. Of these, 262 (7%) moved between EPS and VPS, with **an average of 2.25 moves between the two districts per student**. Housing instability is a known risk factor for district mobility, but obtaining housing did not necessarily result in students remaining in the same district. Nearly half of these moves between the two school districts occurred well after the student had been housed through VHA.

## Demand vs Supply

Of the over 5,000 students seeking housing assistance, only one third were able to obtain housing through VHA.

# Students Shared by Districts and Health Care

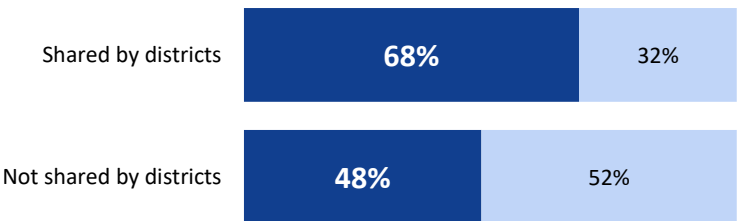


Moving between school districts can impede regular attendance and forming connections with teachers, staff, and other students; and it can increase risk for poor academic outcomes, which can in turn lead to poor economic, social, and health outcomes later in life.

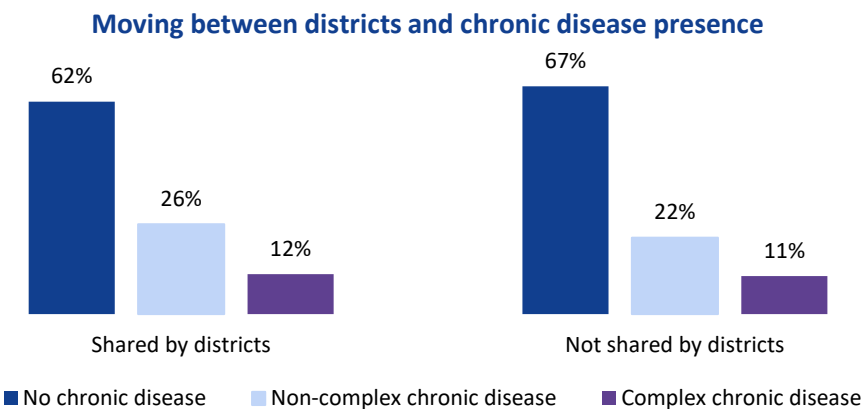
This risk for poor outcomes can be exacerbated among students already dealing with the burden of chronic health conditions. Because of this, we explored the overlap between students shared between the two districts and students with chronic health conditions.

**Students shared between districts were substantially more likely to be enrolled in Medicaid**, compared to students not shared between districts. Medicaid enrollment can serve as an indicator of student and household poverty, and is often associated with higher chronic disease burden. It is therefore of critical importance to consider the needs of students enrolled in Medicaid, especially as poverty and poor health can exacerbate each other.

**Medicaid enrollment** was nearly 20 percentage points higher for students who moved between districts



Among students enrolled in Medicaid, there was little difference in the presence of chronic conditions. The majority of students did not have chronic conditions; approximately 10% of students – both shared by districts and not shared by the districts – had complex chronic disease.





# Chronic Absenteeism in Southwest Washington



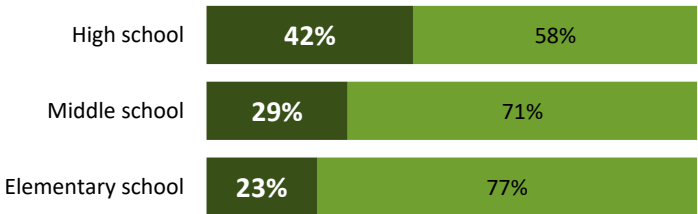
Evergreen Public Schools, Vancouver Public Schools, Vancouver Housing Authority (VHA), and the Southwest Accountable Community of Health partnered with the Center for Outcomes Research and Education to understand more about the characteristics and experiences of children in southwest Washington experiencing chronic absenteeism. The cross-sector partners sought to understand the prevalence of chronic absenteeism given its impact on future academic outcomes and its relationship to social and health needs.

Students were considered **chronically absent** if they were present less than 90% of the time in any given school year.

72,367	Students included in this analysis
22,734	Students experiencing chronic absenteeism
15,522	Students chronically absent in more than one school year

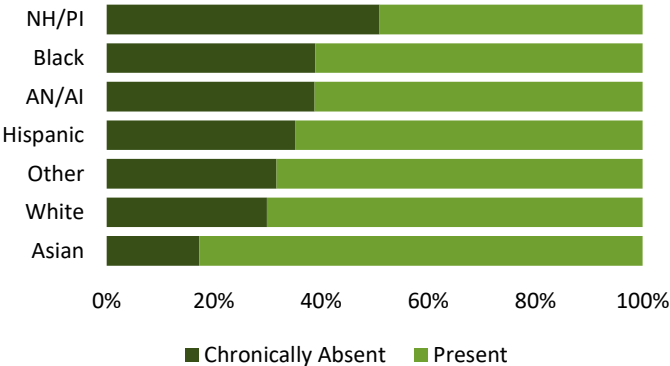
High school students were the most likely to experience chronic absenteeism, with 42% of high school students attending school less than 90% of the time in at least one school year. This is higher than the national average, though the Department of Education uses a slightly different measure of chronic absenteeism; missing at least 15 days per school year.

Chronic absenteeism by grade level

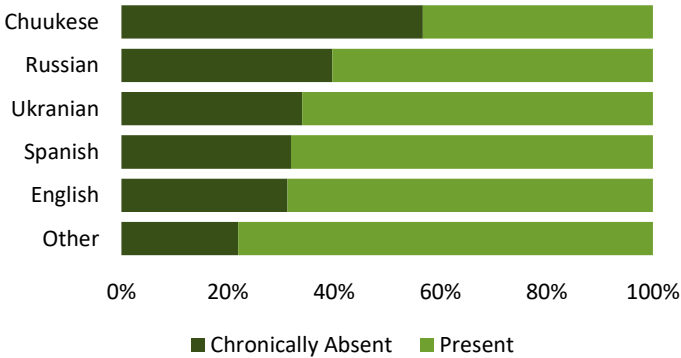


There were substantial differences in attendance by race/ethnicity and language. **Native Hawaiian/Pacific Islander Black, Alaskan Native/American Indian, and Hispanic students, as well as students who spoke speak Russian or Chuukese, were the most likely to be chronically absent.** There were no differences in attendance rates by gender.

Attendance by race/ethnicity



Attendance by language



NH/PI: Native Hawaiian/Pacific Islander  
AN/AI: Alaskan Native/American Indian

## Chronic Absenteeism and Housing Need



Decreased school attendance is often caused by external pressures on a child, such as housing instability or household economic strain. This perpetuates a cycle of inequity – these external burdens prevent children from regularly attending school, which in turn increases their risk for poor academic outcomes and poverty later in life. To better understand this cycle, we explored the associations between housing instability and students' attendance rates.

**Students experiencing chronic absenteeism were two-thirds more likely to seek housing assistance than students present 90% of the time or more.** Despite this high need, and the known links between housing instability and lower attendance, there is not enough affordable housing available. **Of the 5,168 students seeking housing at VHA, only 1,727 (33%) were able to obtain housing.**

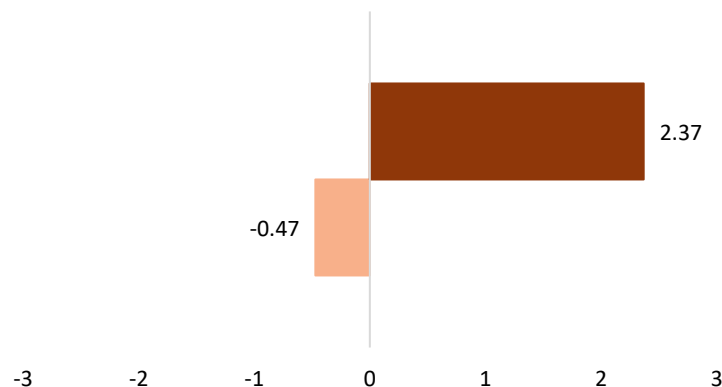
	Sought housing assistance	Did not seek housing assistance	Relative Risk*
Chronically absent	11.4%	88.6%	1.67
Present	5.2%	94.8%	

\*Adjusted for age, sex, race/ethnicity, and language;  $p < 0.001$


Providing safe, stable, affordable housing to children experiencing housing instability can have a profound impact on their lives.

However, our data suggest that the benefit of housing on attendance may differ across ages. In particular, **elementary school students who received housing through VHA saw a significant increase in their attendance rates** when compared to students who were on a waitlist but did not receive housing through VHA. This was not true for middle school or high school students in our data.

Difference in school days present for **elementary** students after receiving housing vs waitlist controls

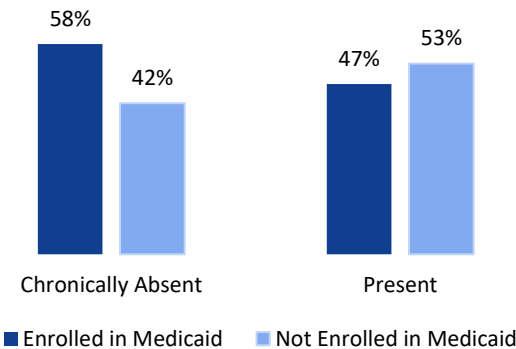


# Chronic Absenteeism and Health Care

 Decreased school attendance can also be caused by chronic health conditions that impact a student’s ability to attend school regularly. To better understand this association, we explored the presence of chronic physical and behavioral (mental, psychiatric, and substance use) conditions and the use of health care services among students enrolled in Medicaid.

Students experiencing chronic absenteeism were more likely to be enrolled in Medicaid than students present 90% of the time. **Over half of students experiencing chronic absenteeism were Medicaid enrollees.**

Attendance by Medicaid enrollment vs non-Medicaid enrollment



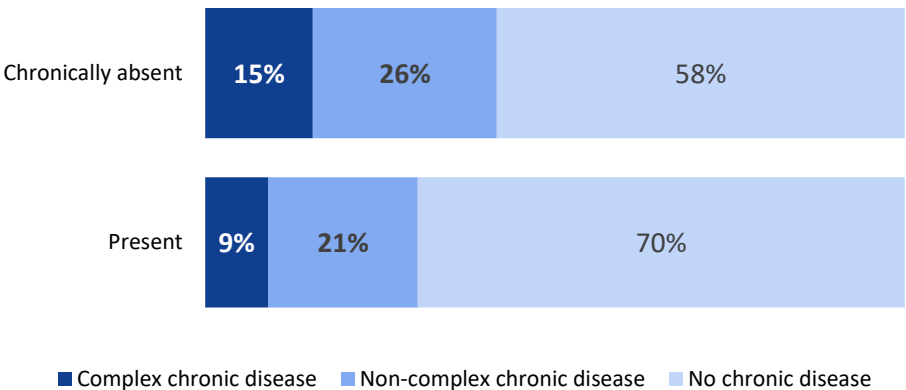
## Top Chronic Health Conditions

- Anxiety disorders
- Depression
- Attention Deficit Hyperactivity Disorder
- Fibromyalgia, Chronic Pain, And Fatigue
- Asthma
- Post-Traumatic Stress Disorder
- Bipolar Disorder

Among students enrolled in Medicaid and experiencing chronic absenteeism, **most of the top chronic health conditions were behavioral health diagnoses.** These behavioral health conditions were significantly more common among students experiencing chronic absenteeism than among students present 90% of the time. Programs and policies meant to increase attendance by addressing health burden should therefore consider the specific needs of treating and managing behavioral health conditions.

In addition to differences in the prevalence of specific chronic health conditions, there were differences in overall health burden due to chronic disease. **Students experiencing chronic absenteeism were more likely to have complex and non-complex chronic conditions than those present 90% of the time.**

Attendance rates by chronic disease prevalence



The increased health burden among chronically absent students can lead to increased use of both acute and ambulatory health care services, as managing chronic conditions can often require extensive use of health care. **A significantly higher proportion of students experiencing chronic absenteeism used acute care – they were 50% more likely to have an emergency department visit and nearly two-thirds more likely to have an inpatient stay** than students present 90% of the time. They were also more likely to have an outpatient mental health visit. Thus, supporting students with chronic health conditions to meet their health care needs has the potential to result both in improved attendance and in decreased use of acute health care.

### Attendance rates and health care utilization

Types of Utilization	Chronically absent	Present	Relative Risk*	p-Value
Emergency department visit	43.6%	29.0%	1.47	<0.001
Inpatient stay	4.0%	1.4%	1.65	<0.001
Primary care visit	82.3%	82.2%	1.03	0.107
Outpatient mental health visit	22.1%	14.9%	1.29	<0.001

\*Adjusted for age, sex, race/ethnicity, and language

## Chronic Absenteeism and Dental Care



In addition to physical and behavioral health, we looked at dental care. Dental health has been linked to a number of other health conditions, and setting up strong oral health habits in childhood can have both an immediate impact on attendance and a lifelong impact on general health.

Receipt of dental care could be associated with attendance in two ways:

1. Dental health could directly impact attendance, whereby students experiencing oral pain may be more likely to miss school, and
2. Receipt of dental services could be associated with attendance due to some underlying construct that impacts both of them, such as poverty

Dental services can be divided into three main categories: preventive care, diagnostic care, and treatment care.

**Preventive:** Services including cleanings, fluoride varnishes, and dental sealants

**Diagnostic:** Services including examinations, imaging, and evaluation of disease

**Treatment:** Services including fillings and other restorations and procedures

**Students experiencing chronic absenteeism were less likely to have any preventive or diagnostic dental visits** but had no difference in the likelihood of a treatment dental visit, compared to students present at least 90% of the time. Students should receive preventive dental care visits twice per year, and these data show that only two-thirds of chronically absent students received it even once per year, although students present at least 90% of the time also fell short of this goal.

In contrast to preventive dental care, which has specific guidelines about how often a student should receive such care, treatment dental care is only accessed when needed, which could suggest that an equal proportion of chronically absent and present students experienced issues like dental caries or oral pain. However, it is also important to note when interpreting these results that we do not have information on how many students might have needed treatment dental care but did not receive it.

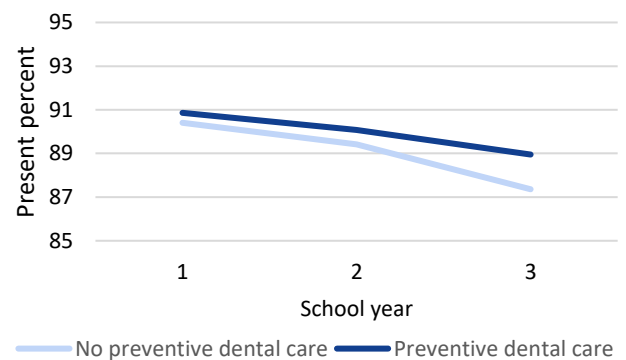
### Attendance rates and dental care

Types of Utilization	Chronically absent	Present	Relative Risk*	p-Value
Preventive dental care	67.6%	75.0%	0.92	<0.001
Diagnostic dental care	70.4%	76.2%	0.95	<0.001
Treatment dental care	53.4%	56.5%	1.00	0.890

\*Adjusted for age, sex, race/ethnicity, and language

We finally looked at how receipt of preventive dental care might impact attendance rates over time. We did this by identifying a cohort of students and assessing their attendance rates across three years. We found that overall attendance rates decreased over time; this is expected, given that chronic absenteeism rates are higher in later grade levels. However, **for students who received preventative dental care, the decline in attendance rates was less steep** compared to students who do not receive dental care. This held true regardless of whether students had received preventive dental care at baseline.

Attendance over time between **students with preventive dental care** vs **students without preventive dental care** in Year 2



# Impact of Mental Health and Substance Use on Interactions with the Legal System



The United States has the highest incarceration rate in the world, spending \$40-80 billion annually housing inmates.<sup>i</sup> This creates an enormous societal and financial burden; the Washington State Department of Corrections reported that in 2019 it costs \$41,232 annually to house an incarcerated individual.<sup>ii</sup> In order to better address this, the Clark County Sheriff's Office and the Southwest Accountable Community of Health partnered with the Center for Outcomes Research and Education to understand more about the needs of individuals incarcerated in Southwest Washington.

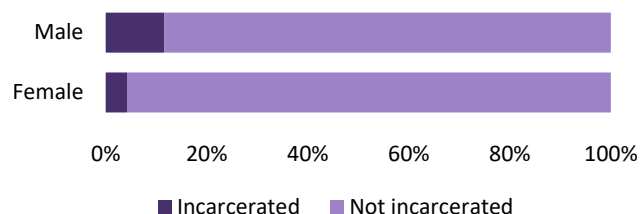
We limited this analysis to adults enrolled in Medicaid, 2015 – 2018. We considered individuals to have been incarcerated if they appeared in the Clark County booking data during our study window. **7.3% of adult Medicaid enrollees had been incarcerated during the study window;** of those who had been incarcerated, 73% had been incarcerated multiple times.

98,724	Adults enrolled in Medicaid for at least 6 months
7,230	Adult Medicaid enrollees in the legal data
5,244	Adult Medicaid enrollees in the legal data multiple times

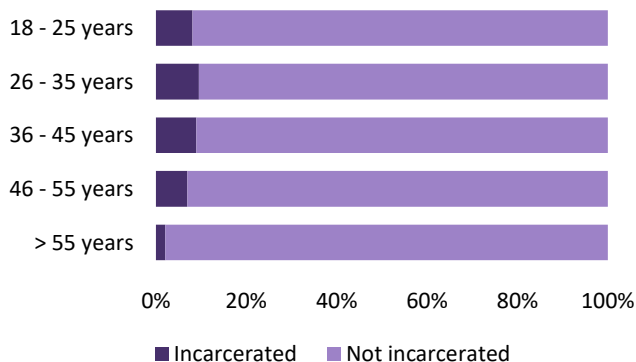
Adults who had been incarcerated were **more likely to be younger and male, and to be Black, American Indian/Alaskan Native, or Multiracial** compared to adult Medicaid enrollees who had never been incarcerated.

Adults who had been incarcerated were also **more likely to be English speakers.**

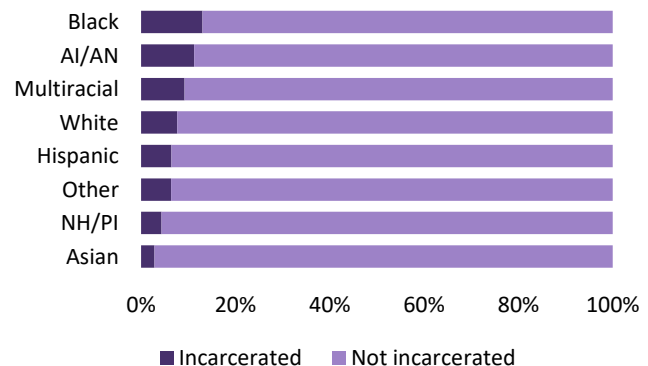
**Incarceration by gender**



**Incarceration by age**



**Incarceration by race/ethnicity**



AI/AN: American Indian/Alaskan Native  
NH/PI: Native Hawaiian/Pacific Islander



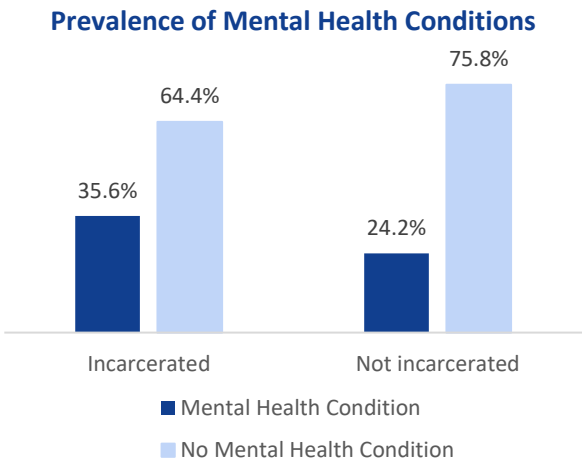
# Incarceration and Mental Health and Substance Use Needs



Deinstitutionalization and inadequate mental health and substance use condition resources have funneled people with severe mental health and substance use needs into the legal system.<sup>iii</sup> Now, jails and prisons incarcerate a disproportionate number of individuals with these needs; one study found that as many as one in four individuals with severe mental illness such as schizophrenia or bipolar disorder are involved with the legal system during a two year period.<sup>iv</sup>

This comes at a very high individual and societal cost. Incarceration interrupts receipt of services like health care and adds stress to economic needs like finding stable housing, which can in turn exacerbate health needs. At the same time, adults who have been incarcerated incur double the financial costs to state agencies and Medicaid.<sup>v</sup> We were therefore interested in understanding the association between interactions with the legal system and mental health and substance use needs.

Medicaid enrolled adults who had been incarcerated were more likely to have a mental health condition, when compared to Medicaid enrollees who had not been incarcerated. Even after adjusting for differences in age, gender, race/ethnicity, and language, **adults who had been incarcerated were 70% more likely to have been diagnosed with a mental health condition.**



Among adults who had been incarcerated during the study window, the top mental health conditions were anxiety and depression, which are also the most common mental health conditions in the general Medicaid adult population in the region. However, while the most common mental health conditions are consistent among both individuals who had been incarcerated and those who had not, the likelihood of many of these **mental health conditions was substantially higher among adults who had been incarcerated.**

**Top Mental Health Diagnoses**

- Anxiety
- Depression
- Schizophrenia and other psychoses
- Post-traumatic stress disorder
- Bipolar disorder

For example, compared to adults who had not been incarcerated, adults who had been incarcerated were:

Schizophrenia	PTSD	Bipolar Disorder
2.5x	2.1x	2.1x

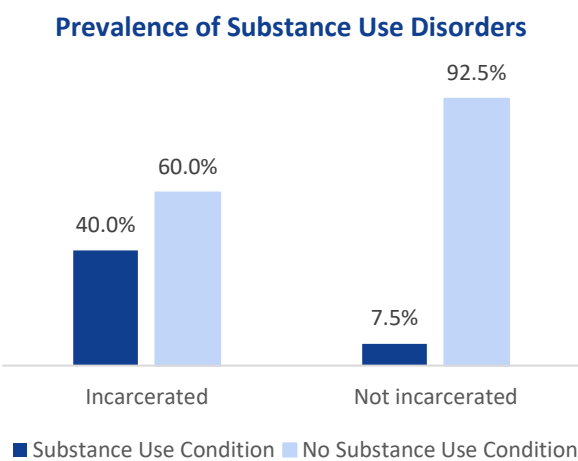
In addition to an increased likelihood of having a mental health condition, adults who had been incarcerated were also substantially more likely to have a substance use disorder.

Forty percent of adults who had been incarcerated had a diagnosed substance use disorder. Even after accounting for age, gender, race/ethnicity, and language, **adults who had been incarcerated were 5 times more likely to have a diagnosed substance use disorder**, compared to individuals who had not been incarcerated.

Adults who had been incarcerated were more likely to have a mental health diagnosis across every demographic group, and the magnitude of the association did not vary much between groups. For example, female individuals with a history of incarceration were twice as likely to have a mental health diagnosis as women without a history of incarceration, while men were 1.59 times as likely.

In contrast, there were substantial differences in the magnitude of the association between having a substance use condition and having been incarcerated by demographic group. For example, women who had a jail stay were over 7 times as likely to have a substance use disorder as women without a jail stay, while men were 4 times as likely. The magnitude of the association was greater for younger age groups, and for White and Hispanic individuals compared to Black individuals.

This difference in magnitude suggests that **health needs related to substance use may be a stronger driver of arrests for certain subgroups: women, younger adults, and White and Hispanic individuals.**



Association between mental health and substance use conditions and jail stays, by demographics

Demographic	Mental Health Conditions		Substance Use Conditions	
	Relative Risk*	p-Value	Relative Risk*	p-Value
Female	1.93	<0.001	7.27	<0.001
Male	1.59	<0.001	4.13	<0.001
18-25 years of age	1.88	<0.001	6.10	<0.001
26-40 years of age	1.74	<0.001	5.09	<0.001
41 years and older	1.65	<0.001	4.48	<0.001
White	1.65	<0.001	5.05	<0.001
Black	1.70	<0.001	3.94	<0.001
Hispanic	2.02	<0.001	5.75	<0.001

## Incarceration, Recidivism, and Use of Outpatient Health Care



As the previous section showed, adults who had been incarcerated had a much higher risk of having a mental health or substance use disorder. Additionally, in the United States, the recent exponential growth in the prevalence of opioid use disorder has correlated with exponential growth in criminalization of substance use.<sup>vi</sup> Addressing this through prevention would be the most cost-effective option: the average cost of one year of methadone maintenance treatment is \$4,700 versus \$41,232 annually to house an incarcerated individual.<sup>vii</sup> Despite this, access to preventive substance use and mental health services are still not prioritized in state budgets. We were therefore interested in understanding if access to these services could be an economic way to reduce both initial incarceration and recidivism.

We explored this among two distinct groups: **adults with severe mental health conditions**, defined as having bipolar disorder, impulse disorder, personality disorders, PTSD, and schizophrenia or other psychotic disorders; and **adults with substance use disorder**.

2,107

Adults with severe mental health conditions were arrested during the study window

6,202

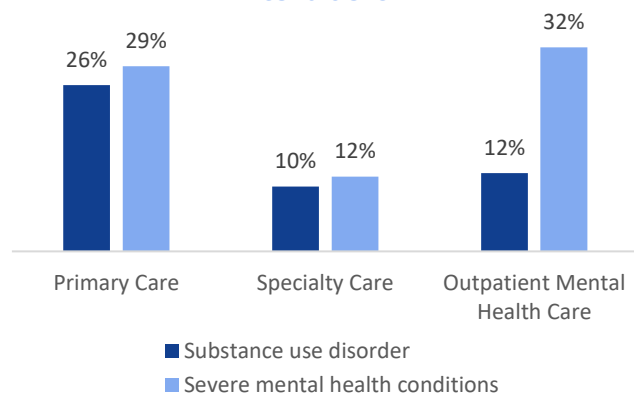
Adults with substance use disorder were arrested during the study window

Jail stays can disrupt needed care and ongoing treatment, and a key to managing mental health or substance use concerns is quick connection back to outpatient care after leaving jail. However, among Medicaid-enrolled adults, **less than a third had any outpatient care in the three months after leaving jail**. In fact, the most common type of care was emergency department visits, with over a third having at least one emergency department visit in this time frame.

This lack of connection to care can have a negative impact on managing mental health or substance use conditions, which can in turn negatively influence future interactions with the legal system. To better understand this, we explored how using outpatient mental health services was associated with recidivism rates. We defined **recidivism as experiencing a rearrest for any reason within 15 months of having left jail**.

In both groups, well over half of adults had a rearrest, regardless of outpatient mental health services use. However, among both groups, **receiving outpatient mental health services within three months of leaving jail resulted in a decreased likelihood of recidivism**; this association was slightly stronger for adults with mental health conditions than for those with substance use disorders. This suggests that investing in programs that immediately link adults with mental health services has the potential to reduce rearrests in individuals with mental health and substance use disorders. Given the high rates of these conditions among individuals who had been incarcerated, this could have a substantial impact on total arrests.

**Use of outpatient health care among adults with substance use disorder or severe mental health conditions**

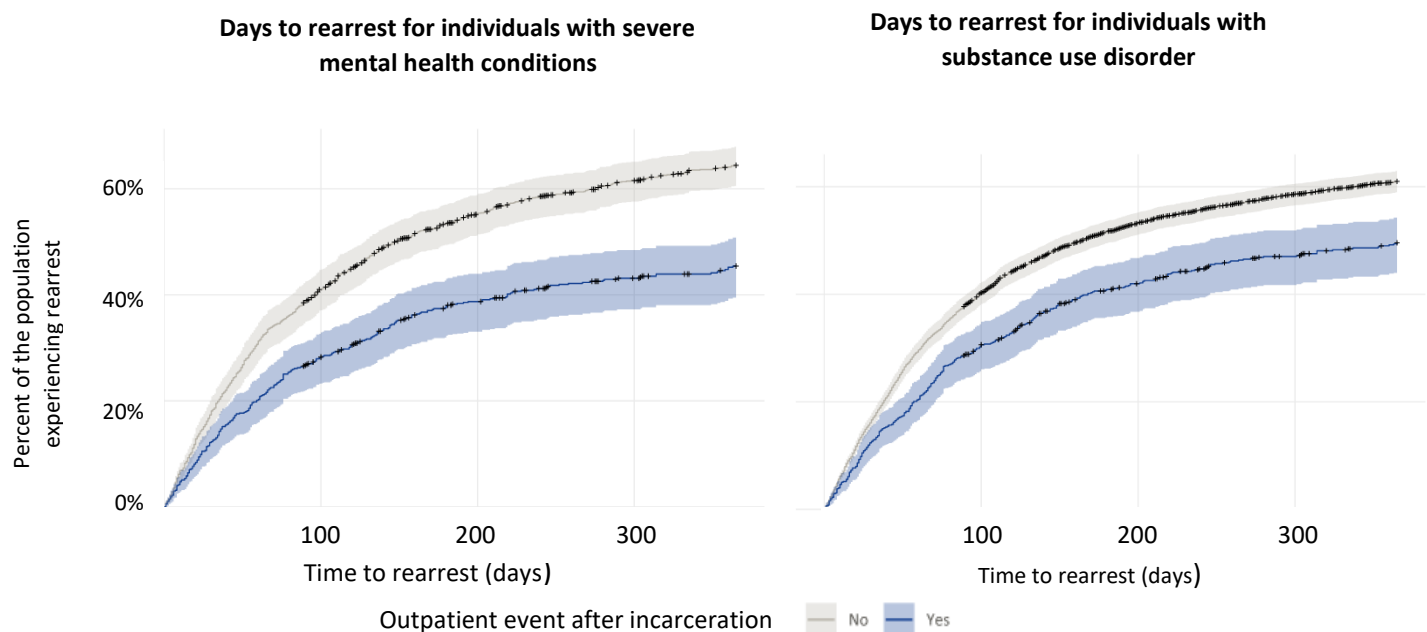


## Recidivism rates and outpatient mental health care (OPMH) utilization

	Rearrest	No rearrest	Relative Risk*	p-value
Severe mental health conditions				
Accessed OPMH	61.4%	38.7%	0.60	<0.001
Did not access OPMH	78.2%	21.8%		
Substance use disorder				
Accessed OPMH	66.3%	33.7%	0.70	<0.001
Did not access OPMH	75.7%	24.3%		

\*Adjusted for age, sex, race/ethnicity, and language

In addition to impacting the proportion of individuals who experienced recidivism, receiving outpatient mental health care impacted the time to rearrest. In both groups, among those who experienced recidivism, **adults who received outpatient mental health treatment had a longer time to their next arrest** than those who did not receive outpatient mental health services. Among both groups, the average time to arrest was less than six months for adults who had not received outpatient mental health services, and over seven months for adults who had received such services.



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<sup>i</sup> Horn, B. P., Li, X., Mamun, S., McCrady, B., & French, M. T. (2018). The economic costs of jail-based methadone maintenance treatment. *The American Journal of Drug and Alcohol Abuse*, 44(6), 611–618. <https://doi.org/10.1080/00952990.2018.1491048>

<sup>ii</sup> DOC Budget Office. (2019). *DOC institutional costs, average daily population (ADP), and cost per incarcerated individual per day: FY2019 cost per incarcerated individual per day--all facility costs*. Washington State Department of Corrections. <https://www.doc.wa.gov/docs/publications/reports/200-AR001.pdf>

<sup>iii</sup> Dvoskin, J. A., Knoll, J. L., & Silva, M. (2020). A brief history of the criminalization of mental illness. *CNS Spectrums*, 25(5), 1–13. <https://doi.org/10.1017/s1092852920000103>

<sup>iv</sup> Swanson, J. W., Frisman, L. K., Robertson, A. G., Lin, H.-J., Trestman, R. L., Shelton, D. A., Parr, K., Rodis, E., Buchanan, A., & Swartz, M. S. (2013). Costs of criminal justice involvement among persons with serious mental illness in Connecticut. *Psychiatric Services*, 64(7), 630–637. <https://doi.org/10.1176/appi.ps.002212012>

<sup>v</sup> Swanson, J. W., Frisman, L. K., Robertson, A. G., Lin, H.-J., Trestman, R. L., Shelton, D. A., Parr, K., Rodis, E., Buchanan, A., & Swartz, M. S. (2013). Costs of criminal justice involvement among persons with serious mental illness in Connecticut. *Psychiatric Services*, 64(7), 630–637. <https://doi.org/10.1176/appi.ps.002212012>

<sup>vi</sup> Horn, B. P., Li, X., Mamun, S., McCrady, B., & French, M. T. (2018). The economic costs of jail-based methadone maintenance treatment. *The American Journal of Drug and Alcohol Abuse*, 44(6), 611–618. <https://doi.org/10.1080/00952990.2018.1491048>

<sup>vii</sup> National Institute on Drug Abuse. (2018). *Is drug addiction treatment worth its cost?* National Institute on Drug Abuse. <https://nida.nih.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/frequently-asked-questions/drug-addiction-treatment-worth-its-cost>

DOC Budget Office. (2019). *DOC institutional costs, average daily population (ADP), and cost per incarcerated individual per day: FY2019 cost per incarcerated individual per day--all facility costs*. Washington State Department of Corrections. <https://www.doc.wa.gov/docs/publications/reports/200-AR001.pdf>

## Patterns of Acute Care Use in Southwest Washington

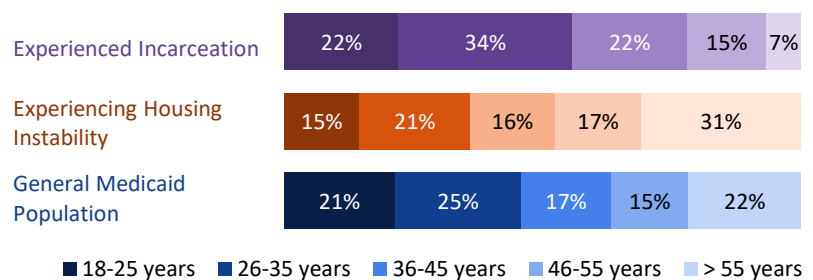


The Clark County Sheriff's Office, Vancouver Housing Authority (VHA), and the Southwest Washington Accountable Community of Health (SWACH) partnered with the Center for Outcomes Research and Education to better understand patterns of acute care use – i.e. **emergency department visits and inpatient stays** – for individuals who had experienced incarceration or housing instability. Acute health care is often both a result of poor health for the individual and costly to the health care sector, and it is therefore crucial to understand the drivers of acute health care use in order to improve community health.

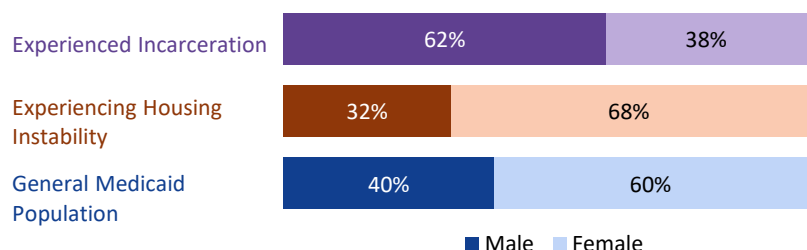
55,196	General Medicaid population: Medicaid enrollees (not in VHA or Clark Co. Sheriff's Office booking data)
3,713	Experienced incarceration: Medicaid enrollees present in the Clark Co. Sheriff's Office booking data
7,031	Experiencing housing instability: Medicaid enrollees who applied for housing through VHA

**Adults who had been incarcerated were more likely to be younger and male than the general Medicaid population.** They were also slightly more likely to identify as Black, Alaska Native/American Indian, and Multiracial compared to general Medicaid population; however, this group was still three-quarters White.

### Experiencing incarceration or housing instability by age

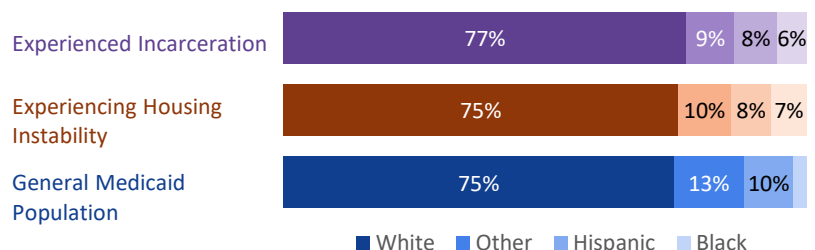


### Experiencing incarceration or housing instability by gender



**Adults who had experienced housing instability were more likely to be older and female than the region's Medicaid-enrolled adult population.** They were also slightly more likely to identify as Black and Multiracial compared to the general Medicaid population; however, this group was still three-quarters White.

### Experiencing incarceration or housing instability by race



Other race includes: American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander/Multiracial, and Other



## Prevalence of Physical Health, Mental Health, and Substance Use Conditions

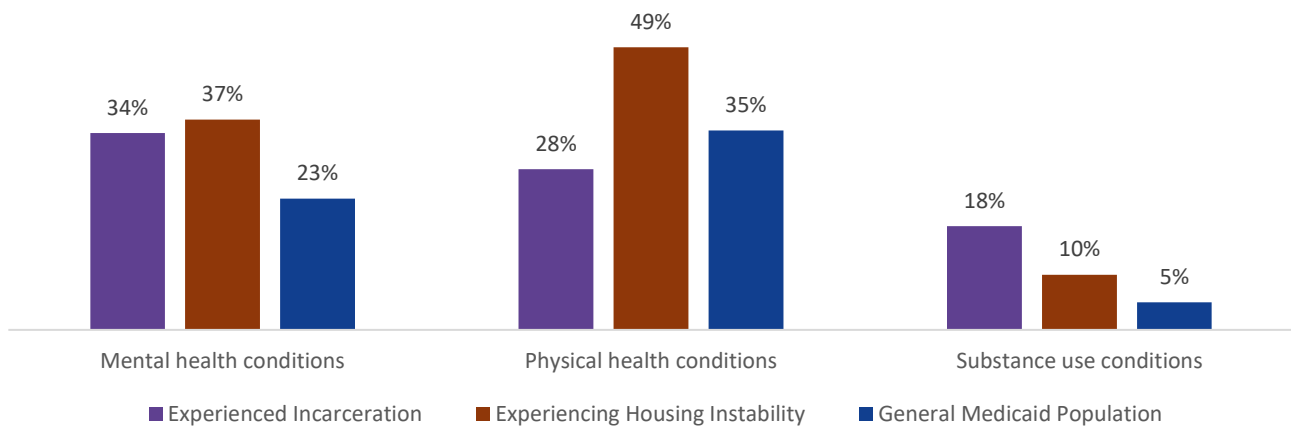


Patterns of acute health care use are often driven in part by the presence of chronic conditions requiring medical treatment; we therefore sought to understand if there were differences in chronic condition prevalence among adults who had been incarcerated or were experiencing housing instability, compared to the general adult Medicaid-enrolled population in the region.

Rates of chronic conditions, especially substance use and mental health conditions, in health care data are likely an underestimate; for example, previous studies have shown that self-reported rates of substance use disorders were up to three times higher than rates recorded in health records. Despite this likely undercount, we found substantial disparities in chronic conditions between the three groups.

Compared to Medicaid-enrolled adults in the general population, **adults who had been incarcerated were more likely to have chronic substance use and mental health conditions**, while **adults experiencing housing instability were more likely to have chronic physical and mental health conditions**.

**Prevalence of chronic substance use, mental health, and physical health conditions**



Differences in the prevalence of physical health conditions between adults who had been incarcerated and adults experiencing housing instability may be due in part to differences in age. As shown in the previous section, the population experiencing housing instability is older than the other two groups, and the more common physical health conditions (e.g. hypertension, diabetes) are most common among older adults. Likewise, that substance use conditions occur at twice the rate among individuals who had been incarcerated compared to those experience housing instability may also be driven in part by age; substance use conditions tend to be diagnosed more frequently among younger populations.

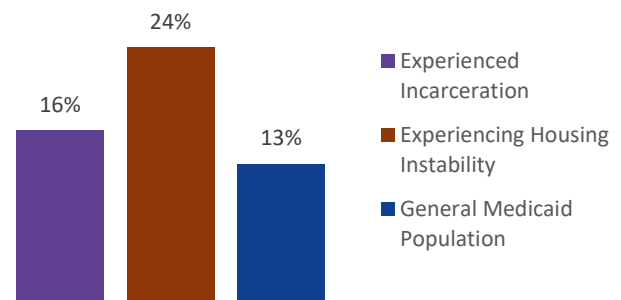
The presence of individual health conditions follows a similar pattern as the overall conditions described above, with adults who had been incarcerated having a greater prevalence of the three most common mental health conditions, and adults experiencing housing instability having a greater prevalence of the three most common mental health conditions and the three most common physical health conditions, compared to adult Medicaid enrollees in the general population.

Prevalence of the most common mental and physical health conditions			
	Experienced incarceration	Experiencing housing instability	General Medicaid population
<b>Mental health conditions</b>			
Depression	22%	25%	14%
Anxiety Disorders	19%	20%	11%
PTSD	7%	8%	3%
<b>Physical health conditions</b>			
Hypertension	7%	16%	10%
Diabetes	4%	13%	8%
Chronic Pain & Fatigue	8%	13%	8%

In addition to the presence of any chronic health condition, another driver of acute health care use is having cooccurring physical, mental, or substance use conditions, as managing multiple differing conditions presents unique challenges.

Individuals who had been incarcerated were slightly more likely to have co-occurring physical, mental, or substance use conditions, compared to the general population. However, this difference was substantially greater for adults experience housing instability. **Nearly a quarter of all Medicaid-enrolled adults experiencing housing instability had co-occurring conditions;** this was almost twice the prevalence in the general Medicaid population.

**Prevalence of co-occurring physical health, mental health, and substance use conditions**



## Acute Health Care Utilization and Incarceration



As the previous section described, individuals who had been incarcerated had different and often more intense health burdens than the region’s general adult Medicaid population. Given these health disparities, we wanted to better understand how this population used acute care after engaging with the legal system, as well as the quality of care they received.

Almost half of Medicaid-enrolled adults who had been incarcerated had an emergency department visit in the year after incarceration. Adults who had experienced incarceration were **more than twice as likely to have an emergency department visit and nearly 80% more likely to have an inpatient stay** in the year after incarceration, compared to adults who did not engage with the legal system.

Acute care utilization in the 12 months after incarceration				
	Experienced Incarceration	General Medicaid Population	Relative Risk*	p-value
Emergency department visit	48.0%	26.4%	2.35	<0.001
Inpatient stay	10.7%	7.6%	1.77	<0.001

\*Adjusted for age, sex, race/ethnicity, and language

In addition to being more likely to have any emergency department visit or inpatient stay, adults who had been incarcerated also had more of these types of visits. **Adults who had been incarcerated averaged nearly one more emergency department visit** in the year following their involvement with the legal system than the general Medicaid population.

For every 100 people involved in the legal system, the following year they experience:

88 more

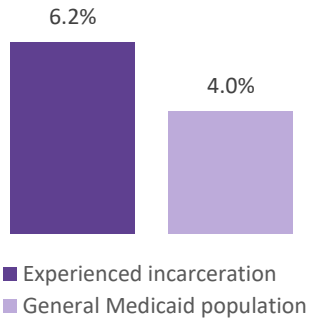
8 more

Emergency Department events

Inpatient events

We were further interested in hospitalizations for ambulatory care sensitive conditions, or conditions for which outpatient care should have prevented hospitalization, as these indicators of poor-quality care often arise from a lack of access to appropriate outpatient care. Although inpatient stays for ambulatory care sensitive conditions are quite low overall, after adjusting for age, sex, race/ethnicity, and language, **individuals who had been incarcerated were nearly twice as likely to have had an inpatient stay for an ambulatory care sensitive condition** than the general population of Medicaid-enrolled adults.

Hospitalization for ambulatory care sensitive conditions



While acute health care utilization indicates concerns around an individual’s health and is costly to the health care system, it does provide an opportunity for connecting individuals to outpatient care. We were therefore interested in understanding the experiences of individuals after they had been hospitalized.

986

Adults who had experienced incarceration and been hospitalized

7,099

Adults in the general Medicaid population who had been hospitalized

It is considered best practice for an individual to connect with a primary care doctor after hospitalization. Despite this, **among adults who had been incarcerated, only a little over a third had had a follow-up visit with a primary care provider within a month of being discharged from the hospital, compared to over half of the general Medicaid population.**

Further, while readmission rates were generally low across all populations, **individuals who had been incarcerated were nearly 50% more likely to be readmitted to the hospital within 30 days of their initial admission** compared to those who had not been incarcerated.

Quality of care following an inpatient visit in the 12 months after incarceration				
	Experienced Incarceration	General Medicaid Population	Relative Risk*	p-value
Follow-up with a primary care provider within 30 days	39.3%	51.9%	0.70	<0.001
Readmission within 30 days	12.7%	7.4%	1.45	<0.001

\*Adjusted for age, sex, race/ethnicity, and language

These observed higher rates of acute care, including hospitalizations for ambulatory care sensitive conditions and readmissions, as well as the lower rates of follow-up with primary care, suggest that individuals who had been incarcerated were likely also experiencing greater barriers to accessing outpatient care. To assess this, we looked at two types of outpatient care: primary care and specialty care. **Adults who had been incarcerated were less likely to have both outpatient primary and specialty care visits** compared to the general population of Medicaid-enrolled adults.

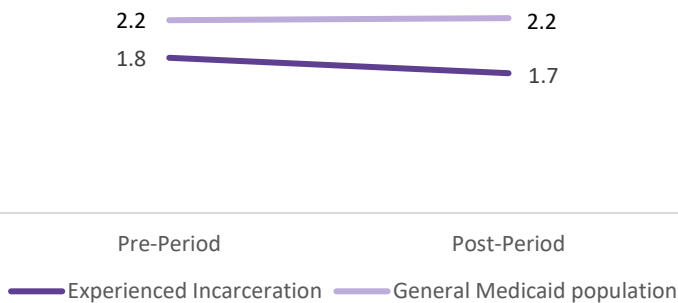
Outpatient care in the 12 months after incarceration				
	Experienced Incarceration	General Medicaid Population	Relative Risk*	p-value
Primary care visit	51.1%	58.1%	0.92	0.013
Specialty care visit	26.9%	35.4%	0.85	<0.001

\*Adjusted for age, sex, race/ethnicity, and language

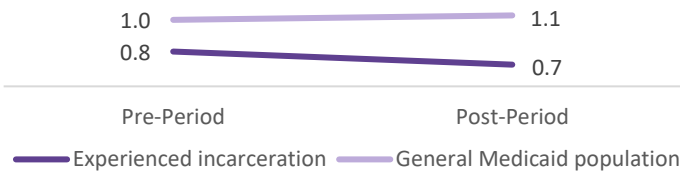
Further, when comparing trends over time, **incarceration exacerbated the differences in use of outpatient care between individuals who had experienced incarceration and the general Medicaid population.**

Being incarcerated led to an immediate (within 3 months) decrease in the average number of primary care and specialty care visits per person after being released; this change was sustained over the full year. In contrast, among the control group of Medicaid-enrolled adults who had not been incarcerated during the study window, the average number per person of both primary care and specialty care visits stayed the same or trended slightly towards increasing over time.

Change in the average number of **primary care visits** per person per year between adults who had **experienced incarceration** and the **general Medicaid population**



Change in the average number of **specialty care visits** per person per year between adults who had **experienced incarceration** and the **general Medicaid population**



## Acute Health Care Utilization and Housing Instability



As shown previously, adults experiencing housing instability had higher health burden than the general Medicaid-enrolled population; and nearly a quarter were dealing with co-occurring physical health, mental health, and substance use conditions. Given this, and combined with the substantial economic needs experienced by those with housing instability, we were interested in understanding the use of acute health care for this population, as well as the quality of the care they received.

Over one-third of adults experiencing housing instability had at least one emergency department visit in the study year. **Adults experiencing housing instability were over 50% more likely to have an emergency department visit and 30% more likely to have an inpatient stay** than individuals not seeking housing support through VHA.

Acute care utilization among adults experiencing housing instability				
	Experiencing Housing Instability	General Medicaid Population	Relative Risk*	p-value
Emergency department visit	37.5%	25.6%	1.54	<0.001
Inpatient stay	11.5%	7.7%	1.32	<0.001

\*Adjusted for age, sex, race/ethnicity, and language

In addition to being more likely to have any emergency department visit or inpatient stay, adults experiencing housing instability also had more of these types of visits. **Adults experiencing housing instability averaged one more emergency department visit every two years** than those who did not experience housing instability.

For every 100 people involved in the housing system, the following year they experience:

49 more

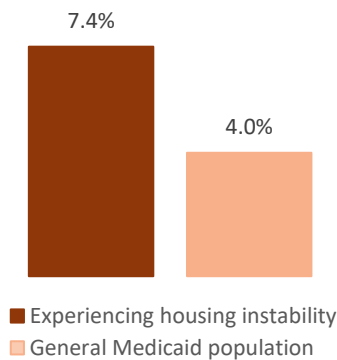
5 more

Emergency Department events

Inpatient events

We were further interested in hospitalizations for ambulatory care sensitive conditions, or conditions for which outpatient care should have prevented hospitalization, as these indicators of poor-quality care often arise from a lack of access to outpatient care. Although these types of inpatient stays are quite low overall, after adjusting for age, sex, race/ethnicity, and language, **individuals experiencing housing instability were 50% more likely to have had an inpatient stay for an ambulatory care sensitive condition** than the general population of Medicaid-enrolled adults.

Hospitalization for ambulatory care sensitive conditions





In addition to increased use of acute care, adults experiencing housing instability were more likely to have used other types of health care as well; **they were a little over a third more likely to have had an outpatient primary care or specialty care visit**. Taken together with their higher prevalence of physical and mental health conditions, this suggests that although they may not have substantially less access to care than the general Medicaid population, they may still face challenges managing their health burden.

#### Outpatient care among adults experiencing housing instability

	Experiencing Housing Instability	General Medicaid Population	Relative Risk*	p-value
Primary care visit	67.4%	57.7%	1.37	<0.001
Specialty care visit	46.7%	35.7%	1.37	<0.001

\*Adjusted for age, sex, race/ethnicity, and language

While acute health care utilization indicates concerns around an individual's health and is costly to the health care system, it does provide an opportunity for connecting an individual to outpatient care. We were therefore interested in the experiences of adults experiencing housing instability after they had been hospitalized.

**2,042** Adults experiencing housing instability who had been hospitalized  
**7,158** Adults in the general Medicaid population who had been hospitalized

Interestingly, compared to the general Medicaid-enrolled adult population in the region, adults experiencing housing instability were **slightly more likely to both have a follow-up visit with a primary care provider and have a readmission to the hospital within 30 days of hospital discharge**. This again suggests that the adults experiencing housing instability have a higher health burden that requires more health care to manage.

#### Quality of care following an inpatient visit among adults experiencing housing instability

	Experiencing Housing Instability	General Medicaid Population	Relative Risk*	p-value
Follow-up with a primary care provider within 30 days	54.5%	51.0%	1.10	0.014
Readmission within 30 days	8.6%	7.4%	1.15	0.038

\*Adjusted for age, sex, race/ethnicity, and language

Given the high health burden and use of health care among adults experiencing housing instability, we were interested in understanding the impact of receiving housing on health care utilization. **A total of 2,631 Medicaid-enrolled adults received housing through VHA during our study window.**

Receiving housing led to an immediate (within 3 months) **decrease in the average number of primary care visits** per person; this change was sustained over a full year. In contrast, the number of primary care visits per person stayed approximately the same in the short- and long-term for the general Medicaid-enrolled adult population. Despite this difference between the two groups, even after being housed for a full year, adults housed through VHA had higher rates of primary care use than the control group.

Specialty care visits showed a different pattern. Receiving housing led to an immediate **increase in the average number of specialty care visits** per person, and this change was sustained over a full year. Over the same time period there was no change in the number of specialty care visits for the general Medicaid-enrolled adult population. Those housed through VHA therefore started out with more specialty care visits than the control group and this difference increased over time.

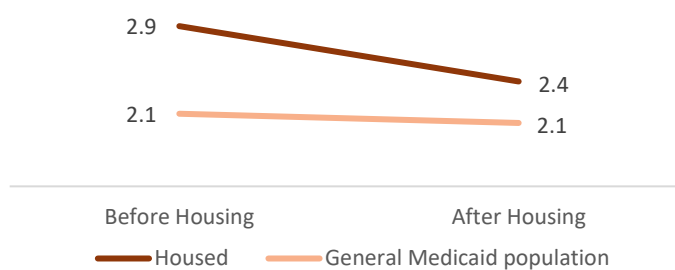
Interpreting changes in the use of primary and specialty care presents challenges as we do not have information on why the average number of visits increased or decreased, and potential hypotheses can be contradictory. For example, primary care visits may have decreased among the housed group because their health and social needs are now being met, resulting in less need for primary care; however, primary care visits may also have decreased because some aspect of obtaining housing, such as location, has decreased access to primary care.

There was no change in either the proportion of individuals using acute health care or in the amount of acute health care they used after obtaining housing among the group housed through VHA. This matches the trend seen in the general population; emergency department visits and inpatient stays stayed constant over the study window. This suggests that individuals experiencing housing instability may have generally higher rates of acute care use than the general Medicaid population, and actually obtaining housing does not change this trend.

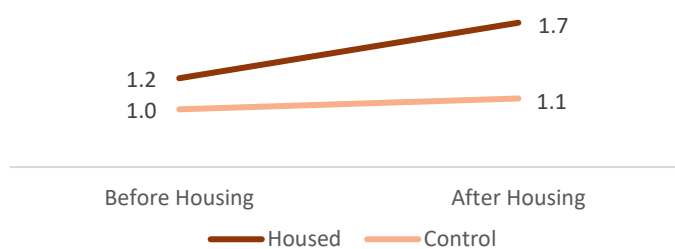
### Demand vs Supply

Of the over 7,000 Medicaid-enrolled adults seeking housing assistance, only one third were able to obtain housing through VHA.

Change in the average number of **primary care visits** per person per year between adults **housed through VHA** and the **general Medicaid population**



Change in the average number of **specialty care visits** per person per year between adults **housed through VHA** and the **general Medicaid population**



# Appendix

## How to Use This Appendix

In partnership with the Clark County Sheriff's Office, Evergreen Public School District (EPS), Vancouver Public School District (VPS), Vancouver Housing Authority (VHA), and Southwest Accountable Community of Health (SWACH), we identified prioritized research topic areas (below) that could be answered with the data from the different sectors, and we have highlighted key findings from each topic area in the sections above. In this appendix, we present the methodology and full results for all prioritized research topic areas. The appendix is divided into the five broad topic areas; within each section, we list the prioritized research questions answered in that section, then describe the study inclusion criteria, definitions for key terms, the analyses and results, and any limitations.

## Prioritized Topic Areas

- ▶ Characteristics of students shared between EPS and VPS
- ▶ Characteristics of students experiencing chronic absenteeism
- ▶ Impact of mental health and substance use on interactions with the legal system
- ▶ Patterns of acute health care need in the region

# Students Shared by Districts in Southwest Washington

## Research Topic Area

**What are the demographic characteristics, housing needs, and health care burden of students shared between the Evergreen Public School (EPS) district and the Vancouver Public School (VPS) district?**

## Study Inclusion Criteria

EPS and VPS data were obtained directly from the school districts. Students were included in the analysis of demographics and housing need if they were present in the EPS or VPS data for at least 10 days during the study period, which corresponds with the 2014 – 2015 school year through the 2017 – 2018 school year. A total of **73,654 students** met this criteria.

The analysis of health care was further limited to students who were present in the EPS and VPS data and enrolled in Medicaid on the same day. A total of **36,239 students** met this criteria.

## Definitions

We used the following terms and definitions for this research topic area:

**Shared between districts:** students present in both the VPS and EPS data at any point during the study window.

**Chronically absent:** students were considered chronically absent if they were present at school less than 90% of the time in any given school year.<sup>1</sup>

**Seeking housing assistance:** students seeking housing assistance through the VHA, defined as being present in the VHA data.

**Received housing assistance:** students who received housing through the VHA during the study window.

**Chronic disease:** the presence of chronic conditions measured and categorized through the Pediatric Medical Complexity Algorithm.<sup>2</sup>

- **Complex chronic disease:** chronic conditions impacting multiple body systems or resulting in deteriorating health.
- **Non-complex chronic disease:** chronic conditions impacting a single body system and not considered progressive.
- **No chronic disease:** no chronic conditions present.

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<sup>1</sup> This definition aligns with that of the Washington Office of Superintendent of Public Instruction. *OSPI Releases Data on Student Attendance and Absenteeism*. Office of Superintendent of Public Instruction. (2017, April 13). Retrieved April 30, 2022, from <https://www.k12.wa.us/about-ospi/press-releases/ospi-releases-data-student-attendance-and-absenteeism>.

<sup>2</sup> Simon, Tamara D et al. "Pediatric medical complexity algorithm: a new method to stratify children by medical complexity." *Pediatrics* vol. 133,6 (2014): e1647-54. doi:10.1542/peds.2013-3875

## Analysis & Results

We began by constructing descriptive statistics for demographic characteristics of all students in VPS or EPS, stratified by whether they were shared between the two districts, as well as for the subset of students who moved between school districts multiple times.

Demographics are presented with both column percents (Table 1) and row percents (Table 2). These comparisons answer two slightly different questions, for example:

- **Column percents** answer the question “*of students shared between the two districts, what percent were female?*” Table 1 gives the answer: 50.6%
- **Row percents** answer the question “*of female students, what percent were shared between the two districts?*” Table 2 gives the answer: 5.1%

**Table 1.** Column Percents: Demographic characteristics of students in EPS and VPS, stratified by being shared between districts, 2014-2015 to 2017-2018

	Not Shared by Districts N=70,034		Shared by Districts N=3,620		More Than 1 Switch N=414	
	%	95% C.I.	%	95% C.I.	%	95% C.I.
<b>Age at entry</b>						
8 and under	39.1%	38.7%, 39.4%	40.4%	38.8%, 42.0%	42.5%	37.8%, 47.3%
9 to 12	24.9%	24.6%, 25.3%	28.1%	26.6%, 29.6%	33.6%	29.2%, 38.3%
13 to 16	26.5%	26.1%, 26.8%	27.2%	25.8%, 28.7%	22.0%	18.3%, 26.2%
17 and over	9.6%	9.3%, 9.8%	4.4%	3.8%, 5.1%	1.9%	1.0%, 3.8%
<b>Gender</b>						
Female	48.3%	48.0%, 48.7%	50.6%	49.0%, 52.2%	53.1%	48.3%, 57.9%
Male	51.7%	51.3%, 52.0%	49.4%	47.9%, 51.1%	46.9%	42.1%, 51.7%
<b>Language</b>						
English	77.94%	77.6%, 78.3%	72.5%	71.0%, 73.9%	75.1%	70.7%, 79.1%
Spanish	12.22%	12.0%, 12.5%	17.7%	16.5%, 19.0%	16.9%	13.6%, 20.8%
Russian	3.74%	3.6%, 3.9%	4.6%	3.9%, 5.3%	3.4%	2.0%, 5.6%
Vietnamese	0.87%	0.8%, 0.9%	0.2%	0.1%, 0.4%	0.0%	-
Other	5.23%	5.1%, 5.4%	5.1%	4.4%, 5.9%	4.6%	3.0%, 7.1%
<b>Race/Ethnicity</b>						
White	59.41%	59.1%, 59.8%	48.9%	47.3%, 50.5%	47.3%	42.6%, 52.2%
Hispanic	21.93%	21.6%, 22.2%	29.5%	28.0%, 31.0%	27.1%	23.0%, 31.5%
Black	2.95%	2.8%, 3.1%	4.0%	3.4%, 4.7%	4.4%	2.8%, 6.8%
Asian	4.47%	4.3%, 4.6%	2.5%	2.0%, 3.0%	1.0%	0.4%, 2.6%
NH/PI	1.90%	1.8%, 2.0%	4.3%	3.7%, 5.0%	6.5%	4.5%, 9.3%
AN/AI	0.26%	0.2%, 0.3%	0.4%	0.2%, 0.7%	0.0%	-
Other	9.08%	8.9%, 9.3%	10.4%	9.5%, 11.5%	13.8%	10.8%, 17.44%

**Table 2.** Row Percents: Demographic characteristics of students in EPS and VPS, stratified by being shared between districts, 2014-2015 to 2017-2018

	Not Shared by Districts			Shared by Districts		More Than 1 Switch	
	N	%	95% C.I.	%	95% C.I.	%	95% C.I.
<b>Age at entry</b>							
8 and under	28,804	94.9%	94.7%, 95.2%	5.1%	4.8%, 5.3%	0.6%	10.1%, 13.3%
9 to 12	18,474	94.5%	94.2%, 94.8%	5.5%	5.2%, 5.8%	0.8%	11.4%, 15.5%
13 to 16	19,507	95.0%	94.6%, 95.3%	5.0%	4.8%, 5.4%	0.5%	8.0%, 11.9%
17 and over	6,848	97.7%	97.3%, 98.0%	2.3%	2.0%, 2.7%	0.1%	2.9%, 10.9%
<b>Gender</b>							
Female	35,668	94.9%	94.6%, 95.1%	5.1%	4.9%, 5.4%	0.6%	10.5%, 13.5%
Male	37,965	95.3%	95.1%, 95.5%	4.7%	4.5%, 4.9%	0.5%	9.5%, 12.3%
<b>Language</b>							
English	57,211	95.4%	95.2%, 95.6%	4.6%	4.4%, 4.8%	0.5%	10.6%, 13.1%
Spanish	9,199	93.0%	92.5%, 93.6%	7.0%	6.5%, 7.5%	0.8%	8.7%, 13.6%
Russian	2,784	94.1%	93.1%, 94.9%	5.9%	5.1%, 6.9%	0.5%	5.1%, 13.8%
Vietnamese	615	98.9%	97.6%, 99.5%	1.1%	0.5%, 2.4%	0.0%	-
Other	3,845	95.2%	94.5%, 95.8%	4.8%	4.2%, 5.5%	0.2%	4.3%, 15.9%
<b>Race/Ethnicity</b>							
White	43,257	95.9%	95.7%, 96.1%	4.1%	3.9%, 4.3%	0.5%	9.6%, 12.5%
Hispanic	16,383	93.5%	93.1%, 93.9%	6.5%	6.2%, 6.9%	0.7%	8.7%, 12.4%
Black	2,203	93.4%	92.3%, 94.3%	6.6%	5.7%, 7.7%	0.8%	7.9%, 18.7%
Asian	3,207	97.2%	96.6%, 97.7%	2.8%	2.3%, 3.4%	0.1%	1.7%, 11.3%
NH/PI	1,482	89.5%	87.9%, 91.0%	10.5%	9.0%, 12.1%	1.8%	12.1%, 24.1%
AN/AI	198	92.9%	88.4%, 95.8%	7.1%	4.2%, 11.6%	0.0%	-
Other	6,721	94.4%	93.8%, 94.9%	5.6%	5.1%, 6.2%	0.8%	11.8%, 19.1%

In general, students shared between districts are more likely to be Hispanic, Black, Native Hawaiian/Pacific Islander, and Alaskan Native/American Indian, and to speak Spanish and Russian.

We next constructed descriptive statistics and estimated adjusted risk ratios (RRs) for several key characteristics, including: experiencing chronic absenteeism, seeking housing assistance, receiving housing assistance, enrollment in Medicaid, and presence of chronic conditions (Table 3).

RRs are adjusted for age, sex, language, and race, and are presented with 95% confidence intervals and p-values. All findings are statistically significant at  $p < 0.05$ ; however, as statistical significance is partially driven by sample size (that is, studies with large sample sizes are more likely to show statistical significance, even when there is no scientifically meaningful difference between groups), the statistical significance of all findings should be interpreted with caution. Instead, the magnitude of the RR should be used to determine whether differences are meaningful.



**Table 3.** Associations between being shared between districts and attendance, housing need, Medicaid enrollment, and medical complexity, 2014-2015 to 2017-2018

	Not Shared by Districts N = 70,034	Shared by Districts N = 3,620			
	%	%	RR <sup>^</sup>	95% C.I.	p-value
<b>Chronically absent</b>					
No	69.3%	58.6%	<i>ref</i>		
Yes	30.8%	41.4%	1.45	1.35, 1.55	<0.001
<b>Sought housing assistance</b>					
No	93.7%	81.6%	<i>ref</i>		
Yes	6.3%	18.4%	2.91	2.68, 3.17	<0.001
<b>Received housing assistance</b>					
No	98.0%	92.8%	<i>ref</i>		
Yes	2.0%	7.2%	3.13	2.77, 3.53	<0.001
<b>Enrolled in Medicaid</b>					
No	51.8%	32.0%	<i>ref</i>		
Yes	48.2%	68.0%	2.05	1.91, 2.20	<0.001
<b>Chronic disease*</b>					<0.001
No chronic disease	66.6%	62.1%	<i>ref</i>		
Non-complex chronic disease	22.3%	26.3%	1.25	1.14, 1.36	
Complex chronic disease	11.1%	11.7%	1.13	1.00, 1.28	

\*among students enrolled in Medicaid

<sup>^</sup>adjusted for age, gender, language, race

Students shared between districts had greater rates of chronic absenteeism, were more likely to seek housing assistance, and were more likely to be enrolled in Medicaid. There was little meaningful difference in chronic disease burden.

Finally, to further understand the association between being shared between the districts and receiving housing assistance, we explored the timing of receiving housing assistance in relation to moving between districts. Among the 3,620 students who were shared by the districts, we assessed if obtaining housing happened before or after switching school districts (Table 4), and by how many days (Table 5).

**Table 4.** Timing of receiving housing in relation to moving between school districts among 3,620 students seeking housing assistance through VHA, 2014 – 2018.

	N	%	95% C.I.
<b>Not housed</b>	3,358	92.8%	91.9%, 93.6%
<b>Housed after switch</b>	48	1.3%	1.0%, 1.8%
<b>Housed before switch</b>	16	0.4%	0.3%, 0.7%
<b>Switched before and after being housed</b>	198	5.5%	4.8%, 6.3%

**Table 5.** Length of time in days between switching districts and receiving housing among 3,620 students seeking housing assistance through VHA, 2014-2015 to 2017-2018\*

	N^	Mean	Range	Median	IQR
<b>Housed after switching districts</b>	332	384.8	3, 1,476	189	120, 637
<b>Housed before switching districts</b>	259	-414.3	-1,176, -4	-320	-608, -142.5

\*Day 0 corresponds to the day that students changed districts

^Students may belong to both groups, and may be present multiples times

Most students who received housing switched school districts both before and after obtaining housing through VHA. We hypothesized that obtaining housing might result in an immediate switch if students moved into housing located in a new school district; however, on average these switches could happen over six months before or after getting housed.

## Limitations

The findings presented in this report and appendix should be interpreted within the context of the limitations of the data. Because all findings come from secondary analysis of administrative data that was collected for reasons other than research, each data source has limitations on interpretation. For example:

- EPS and VPS data indicate if a student was present in either school district during the school year; however, we are unable to identify if students moved to a different neighboring school district.
- VHA data identifies students experiencing housing instability only if they are listed as part of a household on a VHA application. This excludes both students whose household never applies to VHA, and students whose household applies to VHA but does not list the student on the initial application. In this instance, a student may not be listed until they are housed; and since the majority of applications do not result in housing, this undercounts students experiencing housing instability.
- Medicaid enrollment and claims data can tell us if an individual has been diagnosed with a condition, but lack of diagnosis does not necessarily mean absence of the condition. Many conditions, such as anxiety or depression, are often substantially underdiagnosed in claims data.

This report is meant primarily to describe the experiences of students in southwest Washington and not necessarily to make broader statements about students in the entire United States. However, there are critical lessons here about the connectedness of these sectors, and it is therefore important, when thinking about broader lessons learned, to consider some limitations to the generalizability of the findings. In particular, the demographic makeup of southwest Washington – and the entire Pacific Northwest – tends to be substantially different from much of the country. Major driving social forces such as structural racism will have a differential impact on findings, depending on the demographics of the population being studied.

# Chronic Absenteeism in Southwest Washington

## Research Topic Area

**What are the demographic characteristics, housing needs, health burden, and health care utilization patterns of students experiencing chronic absenteeism in the VPS and EPS districts?**

## Study Inclusion Criteria

EPS and VPS data were received directly from the school districts. Students were included in the analysis of demographics and housing need if they were present in the EPS or VPS data for at least 10 days during the study period, which corresponds with the 2014-2015 school year through the 2017-2018 school year. A total of **72,367 students** met this criteria.

The analysis of health burden and health care utilization was further limited to students who had at least six months of Medicaid enrollment during the study window. A total of **36,623 students** met this criteria.

## Definitions

We used the following terms and definitions for this research topic area:

**Chronically absent:** students were considered chronically absent if they present at school less than 90% of the time in any given school year.<sup>3</sup>

**Seeking housing assistance:** students seeking housing assistance through the VHA, defined as being present in the VHA data.

**Received housing assistance:** students who received housing through the VHA during the study window.

**Chronic disease:** the presence of chronic conditions measured and categorized through the Pediatric Medical Complexity Algorithm.<sup>4</sup>

- **Complex chronic disease:** chronic conditions impacting multiple body systems or resulting in deteriorating health.
- **Non-complex chronic disease:** chronic conditions impacting a single body system and not considered progressive.
- **No chronic disease:** no chronic conditions present.

<sup>3</sup> This definition aligns with that of the Washington Office of Superintendent of Public Instruction. *OSPI Releases Data on Student Attendance and Absenteeism*. Office of Superintendent of Public Instruction. (2017, April 13). Retrieved April 30, 2022, from <https://www.k12.wa.us/about-ospi/press-releases/ospi-releases-data-student-attendance-and-absenteeism>.

<sup>4</sup> Simon, Tamara D et al. "Pediatric medical complexity algorithm: a new method to stratify children by medical complexity." *Pediatrics* vol. 133,6 (2014): e1647-54. doi:10.1542/peds.2013-3875

## Analysis & Results

We began by constructing descriptive statistics for demographic characteristics of all students in VPS or EPS, stratified by whether they experienced chronic absenteeism during the study window.

Demographics are presented with both column percents (Table 7) and row percents (Table 8). These comparisons answer two slightly different questions, for example:

- Column percents answer the question “*of students experiencing chronic absenteeism, what percent were female?*” Table 6 gives the answer: 49.6%
- Row percents answer the question “*of female students, what percent experienced chronic absenteeism?*” Table 7 gives the answer: 32.1%

**Table 6.** Column Percents: Demographic characteristics of students in EPS and VPS, stratified by absenteeism, 2014-2015 to 2017-2018

		Present N=49,633		Chronically Absent N=22,734	
		%	95% C.I.	%	95% C.I.
<b>Age group</b>					
	8 and under	21.6%	21.9%, 22.0%	16.2%	15.8%, 16.73
	9 to 12	30.6%	30.2%, 31.0%	17.2%	16.7%, 17.66
	13 to 16	25.5%	25.2%, 25.9%	27.4%	26.8%, 27.98
	17 and over	22.3%	21.9%, 22.6%	39.2%	38.6%, 39.83
<b>Gender</b>					
	Female	48.1%	47.7%, 48.5%	49.6%	48.9%, 50.2%
	Male	51.9%	51.5%, 52.3%	50.4%	49.8%, 51.1%
<b>Language</b>					
	English	77.8%	77.4%, 78.2%	77.2%	76.6%, 77.7%
	Spanish	12.5%	12.2%, 12.8%	12.7%	12.3%, 13.2%
	Russian	3.3%	3.2%, 3.5%	4.8%	4.5%, 5.0%
	Chuukese	0.4%	0.4%, 0.5%	1.2%	1.0%, 1.3%
	Ukrainian	0.9%	0.8%, 1.0%	1.0%	0.9%, 1.2%
	Other	5.1%	5.0%, 5.3%	3.2%	2.9%, 3.4%
<b>Race/Ethnicity</b>					
	White	60.2%	59.8%, 60.6%	56.1%	55.5%, 56.8%
	Hispanic	21.1%	20.7%, 21.4%	25.0%	24.4%, 25.5%
	Asian	5.3%	5.1%, 5.5%	2.4%	2.2%, 2.6%
	Black	2.7%	2.5%, 2.8%	3.7%	3.5%, 4.0%
	NH/PI	1.4%	1.3%, 1.5%	3.2%	3.0%, 3.5%
	AN/AI	0.2%	0.2%, 0.3%	0.3%	0.3%, 0.4%
	Other	9.1%	8.8%, 9.3%	9.2%	8.8%, 9.6%

**Table 7.** Row Percents: Demographic characteristics of students in EPS and VPS, stratified by absenteeism, 2014 – 2018, 2014-2015 to 2017-2018

		Present		Chronically Absent	
	N	%	95% C.I.	%	95% C.I.
Age group					
8 and under	14,429	74.4%	73.7%, 75.1%	25.6%	24.9%, 26.3%
9 to 12	19,064	79.5%	79.0%, 80.1%	20.5%	19.9%, 21.0%
13 to 16	18,896	67.1%	66.4%, 67.7%	33.0%	32.3%, 33.6%
17 and over	19,958	55.4%	54.7%, 56.1%	44.6%	44.0%, 45.3%
Gender					
Female	35,132	67.9%	67.5%, 68.4%	32.1%	31.6%, 32.6%
Male	37,214	69.2%	68.7%, 69.7%	30.8%	30.3%, 31.3%
Language					
English	56,163	68.8%	68.4%, 69.1%	31.3%	30.9%, 31.6%
Spanish	9,077	68.1%	67.1%, 69.1%	31.9%	31.0%, 32.9%
Russian	2,727	60.3%	58.5%, 62.1%	39.7%	37.9%, 41.5%
Chuukese	460	43.3%	38.8%, 47.8%	56.7%	52.2%, 61.2%
Ukrainian	673	66.0%	62.3%, 69.5%	34.0%	30.5%, 37.7%
Other	3,267	78.1%	76.6%, 79.4%	22.0%	20.6%, 23.4%
Race/Ethnicity					
White	42,516	70.1%	69.7%, 70.5%	29.9%	29.5%, 30.3%
Hispanic	16,097	64.9%	64.1%, 65.6%	35.1%	34.4%, 35.9%
Asian	3,183	82.7%	81.4%, 83.6%	17.3%	16.0%, 18.6%
Black	2,155	61.1%	59.0%, 63.1%	38.9%	36.9%, 41.0%
NH/PI	1,444	49.1%	46.5%, 51.7%	50.9%	48.3%, 53.5%
AN/AI	196	61.2%	54.2%, 67.8%	38.8%	32.2%, 45.8%
Other	6,584	68.3%	67.2%, 69.4%	31.7%	30.6%, 32.8%

Students experiencing chronic absenteeism were older, and they were more likely to be Russian and Chuukese speakers. They were less likely to be White.

We next constructed descriptive statistics and estimated adjusted risk ratios (RRs) for three characteristics: seeking housing assistance, receiving housing assistance, and enrollment in Medicaid (Table 8).

RRs are adjusted for age, sex, language, and race, and are presented with 95% confidence intervals and p-values. All findings are statistically significant at  $p < 0.05$ ; however, as statistical significance is partially driven by sample size (that is, studies with large sample sizes are more likely to show statistical significance, even when there is no scientifically meaningful difference between groups), the statistical significance of all findings should be interpreted with caution. Instead, the magnitude of the RR should be used to determine whether differences are meaningful.

**Table 8.** Associations between chronic absenteeism, housing need, and Medicaid enrollment, 2014-2015 to 2017-2018

		Present N = 49,633	Chronically Absent N=22,734			
		%	%	RR*	95% C.I.	p-value
<b>Enrolled in Medicaid</b>						
	No	52.9%	41.8%	1.00	<i>ref</i>	
	Yes	47.1%	58.2%	1.36	1.33, 1.39	<0.001
<b>Sought housing assistance</b>						
	No	94.8%	88.6%	1.00	<i>ref</i>	
	Yes	5.2%	11.4%	1.67	1.62, 1.72	<0.001
<b>Received housing assistance</b>						
	No	98.4%	96.0%	1.00	<i>ref</i>	
	Yes	1.6%	4.0%	1.71	1.63, 1.79	<0.001

\*adjusted for age, gender, language, race

Students experiencing chronic absenteeism were much more likely to be enrolled in Medicaid and to seek and receive housing assistance.

To further understand how obtaining housing impacted students' attendance rates, we first narrowed our sample to students seeking housing through the VHA, then stratified students by those who had received housing through the VHA and those who had not. For each group, we calculated the mean percent of days present both before and after obtaining housing (or a randomly assigned index date for those who did not receive housing). We used a difference-in-differences analysis to determine if the change in attendance from pre- to post-housing was different for controls than for housing recipients.

We found no statistically significant differences in attendance for students overall (Table 9); however, we did observe a difference among elementary school students, with housed students having an increase in attendance while students not housed through the VHA did not (Table 10).

**Table 9.** Difference-in-differences analysis of the impact of obtaining housing through VHA on attendance rates, 2014-2015 to 2017-2018

Control N = 1,614				Housed N=382				Difference-in-Differences	
Pre-Index Date		Post-Index Date		Pre-Housing		Post-Housing		Est	p-value
Mean	SE	Mean	SE	Mean	SE	Mean	SE		
86.46	16.41	84.36	17.03	81.97	20.72	81.21	17.63	1.58	0.277

\*adjusted for age, gender, language, race

**Table 10.** Difference-in-differences analysis of the impact of obtaining housing through VHA on days of school attended for students in elementary school, 2014-2015 to 2017-2018

Control N = 854				Housed N=181				Difference-in-Differences	
Pre-Index Date		Post-Index Date		Pre-Housing		Post-Housing		Est	p-value
Mean	SE	Mean	SE	Mean	SE	Mean	SE		
89.31	12.80	88.83	11.13	85.30	18.04	87.67	9.76	2.84	0.0468

\*adjusted for age, gender, language, race

To further understand the association between chronic absenteeism and health care burden, we next constructed descriptive statistics and adjusted risk ratios of several chronic physical and behavioral health conditions. We found significant differences for all specific conditions, as well as for overall presence of chronic conditions, by chronic absenteeism.

**Table 11.** Associations between chronic conditions and attendance rates, 2014-2015 to 2017-2018

		Present N=22,573	Chronically Absent N=12,589			
		%	%	RR*	95% C.I.	p-value
<b>Chronic disease</b>						<0.001
	No chronic disease	69.6%	58.3%	1.00	ref	
	Non-complex chronic disease	21.4%	26.3%	1.24	1.20, 1.28	
	Complex chronic disease	9.0%	15.4%	1.46	1.40, 1.51	
<b>Top physical conditions</b>						
	Fibromyalgia, Chronic Pain, And Fatigue	2.3%	4.6%	1.41	1.33, 1.49	<0.001
	Asthma	1.5%	3.1%	1.56	1.45, 1.67	<0.001
	Autism Spectrum Disorders	1.2%	1.7%	1.25	1.13, 1.38	<0.001
	Anemia	0.6%	1.1%	1.38	1.23, 1.54	<0.001
	Migraine And Chronic Headache	0.5%	1.2%	1.44	1.30, 1.59	<0.001
	Sensory – Deafness And Hearing Impairment	0.4%	0.6%	1.24	1.04, 1.47	0.017
	Epilepsy	0.5%	1.0%	1.42	1.24, 1.61	<0.001
	Chronic Kidney Disease	0.3%	0.7%	1.50	1.31, 1.72	<0.001
	Diabetes	0.3%	0.6%	1.41	1.21, 1.65	<0.001
<b>Mental health conditions</b>						
	Anxiety Disorders	6.8%	12.1%	1.37	1.31, 1.42	<0.001
	ADHD, Conduct Disorders, And Hyperkinetic Syndrome	6.3%	7.8%	1.13	1.08, 1.19	<0.001
	Depression	4.5%	10.1%	1.43	1.37, 1.50	<0.001
	Post-Traumatic Stress Disorder	1.3%	2.9%	1.49	1.40, 1.60	<0.001
	Learning Disabilities	1.2%	1.4%	1.24	1.10, 1.39	<0.001
	Bipolar Disorder	0.9%	2.2%	1.42	1.29, 1.57	<0.001
	Personality Disorders	0.6%	1.3%	1.40	1.27, 1.56	<0.001
	Other Developmental Delays	0.6%	1.0%	1.44	1.26, 1.64	<0.001
	Intellectual Disabilities And Related Conditions	0.5%	0.7%	1.27	1.09, 1.48	0.003
	Schizophrenia And Other Psychotic Disorders	0.1%	0.6%	1.74	1.53, 1.97	<0.001

\*adjusted for age, gender, language, race



We next estimated associations between attendance rates and two measures of health care utilization: proportion of students who used health care (Table 12); and the average amount of health care used per member per year (Table 13). We estimated these associations for two forms of acute care (inpatient stays and emergency department visits), as well as primary, specialty, outpatient mental health, and dental care.

**Table 12.** Associations between proportion of students who use health care utilization and attendance rates, 2014-2015 to 2017-2018

	Present N=22,573	Chronically Absent N=12,589	RR*	95% C.I.	p-value
<b>Inpatient</b>	1.4%	4.0%	1.65	1.56, 1.74	<0.001
<b>Emergency department</b>	29.0%	43.6%	1.47	1.43, 1.51	<0.001
<b>Outpatient mental health</b>	14.9%	22.1%	1.29	1.25, 1.33	<0.001
<b>Primary care</b>	82.2%	82.3%	1.03	0.99, 1.07	0.107
<b>Specialty care</b>	46.8%	49.1%	1.02	0.99, 1.05	0.203
<b>Any dental</b>	76.4%	70.6%	0.91	0.88, 0.94	<0.001

\*adjusted for age, gender, language, race

**Table 13.** Associations between health care utilization per member per year and attendance rates, 2014-2015 to 2017-2018

	Present N=22,573	Chronically Absent N=12,589	Estimate*	95% C.I.	p-value
<b>Inpatient</b>	0.01	0.02	0.02	0.02, 0.02	<0.001
<b>Emergency department</b>	0.19	0.41	0.24	0.23, 0.26	<0.001
<b>Outpatient mental health</b>	0.87	1.39	0.57	0.46, 0.67	<0.001
<b>Primary care</b>	1.12	1.50	0.36	0.33, 0.40	<0.001
<b>Specialty care</b>	0.38	0.52	0.14	0.12, 0.16	<0.001
<b>Any dental</b>	1.33	1.21	-0.11	-0.21, -0.15	<0.001

\*adjusted for age, gender, language, race

Students experiencing chronic absenteeism were more likely to have had at least one inpatient, emergency department, outpatient mental health, and specialty care visit, but were less likely to have any dental care visits. There was no difference in primary care.

Across every type of care, students experiencing chronic absenteeism also had more visits per member per year – except for dental care, where they had less average annual visits.

Finally, we were interested in understanding more about the association between chronic absenteeism and the use of dental care. We first assessed this by using regression models that estimated the associations between attendance rates and two measures of dental care utilization: the proportion of students who used dental care (Table 14); and students' use of dental care per member per year (Table 15).

**Table 14.** Associations between proportion of students who use dental care and attendance rates, 2014-2015 to 2017-2018

	Present N=23,069	Chronically Absent N=12,937	RR*	95% C.I.	p-value
<b>Service type</b>					
Preventative dental	75.0%	67.6%	0.92	0.89, 0.94	<0.001
Treatment dental	56.5%	53.4%	1.00	0.97, 1.03	0.890
Diagnostic dental	76.2%	70.4%	0.95	0.92, 0.97	<0.001
<b>Specific service</b>					
Oral health assessments	13.3%	7.3%	0.81	0.76, 0.85	<0.001
Fluoride varnishes	74.1%	65.9%	0.90	0.88, 0.93	<0.001
Dental sealants	43.1%	30.3%	0.80	0.78, 0.83	<0.001

\*adjusted for age, gender, language, race

**Table 15.** Associations between dental care utilization per member per year and attendance rates, 2014-2015 to 2017-2018

	Present N=23,069	Chronically Absent N=12,937	Estimate*	95% C.I.	p-value
<b>Service type</b>					
Preventative dental	1.11	0.86	-0.12	-0.12, 0.01	<0.001
Treatment dental	0.62	0.64	0.05	-0.16, -0.08	0.001
Diagnostic dental	1.20	1.01	-0.06	0.02, 0.08	0.002
<b>Specific service</b>					
Oral health assessments	0.08	0.04	-0.02	-0.02, -0.01	<0.001
Fluoride varnishes	0.99	0.75	-0.12	-0.15, -0.08	<0.001
Dental sealants	0.21	0.15	-0.03	-0.04, -0.02	<0.001

\*adjusted for age, gender, language, race

Students experiencing chronic absenteeism were less likely to receive preventive and diagnostic dental care (including oral health assessments, fluoride varnishes, and dental sealants), but there was no difference in the proportion of students receiving treatment dental care. Students experiencing chronic absenteeism also received a smaller amount of preventive and diagnostic dental services (including fluoride varnishes) each year; however, while statistically significant, there was no clinically meaningful difference in the amount of treatment dental services or oral health assessments and dental sealants.

Finally, we used a difference-in-differences analysis to assess the impact of receiving preventive dental care on attendance. We did this by estimating change in attendance over three (baseline, index, post) years. Students were assigned to the treatment group if they received preventive dental care in the index year; and were assigned to the control group if they did not receive dental care in the index year. We then compared the change in attendance from the baseline year to the post year from both groups.

Students' attendance decreased over time, which is aligned with our previous findings that students' attendance tends to decrease as they get older. However, we also observed that attendance decreased more slowly for students who received preventive dental care in the index year, compared to those who did not. This was true both for students who had received preventive care in the baseline year (Table 16) and for students who had not received preventive care in the baseline year (Table 17).

**Table 16.** Difference-in-differences analysis of the impact of obtaining preventive dental care on attendance rates, 2014-2015 to 2017-2018

No Preventive Dental N = 1,866				Preventive Dental N=7,847				Difference-in-Differences	
Pre-Index Date		Post-Index Date		Pre-Index Date		Post-Index Date		Est*	p-value
Mean	SE	Mean	SE	Mean	SE	Mean	SE		
90.90	8.43	88.31	12.00	92.83	6.45	91.43	8.92	1.19	<0.001

\*adjusted for age, gender, language, race

**Table 17.** Difference-in-differences analysis of the impact of obtaining preventive dental care on attendance rates, 2014-2015 to 2017-2018

No Preventive Dental N = 3,323				Preventive Dental N=1,915				Difference-in-Differences	
Pre-Index Date		Post-Index Date		Pre-Index Date		Post-Index Date		Est*	p-value
Mean	SE	Mean	SE	Mean	SE	Mean	SE		
90.41	9.32	87.36	13.16	90.86	8.50	88.95	11.06	1.13	<0.001

\*adjusted for age, gender, language, race

## Limitations

The findings presented in this report and appendix should be interpreted within the context of the limitations of the data. Because all findings come from secondary analysis of administrative data that was collected for reasons other than research, each data source has limitations on interpretation. For example:

- EPS and VPS data indicate if a student was absent on any given day, but not necessarily the reason for the absence. Without knowing the specific reason, we can only make assumptions about the impact intervening on various factors – e.g. housing instability or chronic health burden – would have on attendance.
- VHA data identifies students experiencing housing instability only if they are listed as part of a household on a VHA application. This excludes both students whose household never applies to VHA, and students whose household applies to VHA but does not list the student on the initial application. In this instance, a student may not be listed until they are housed; and since the majority of applications do not result in housing, this undercounts students experiencing housing instability.
- Medicaid enrollment and claims data can tell us if an individual has been diagnosed with a condition, but lack of diagnosis does not necessarily mean absence of the condition. Many conditions, such as anxiety or depression, are often substantially underdiagnosed in claims data.

This report is meant primarily to describe the experiences of students in southwest Washington and not necessarily to make broader statements about students in the entire United States. However, there are critical lessons here about the connectedness of these sectors, and it is therefore important, when thinking about broader lessons learned, to consider some limitations to the generalizability of the findings. In particular, the demographic makeup of southwest Washington – and the entire Pacific Northwest – tends to be substantially different from much of the country. Major driving social forces such as structural racism will have a differential impact on findings, depending on the demographics of the population being studied.

# Impact of Mental Health & Substance Use on Interactions with the Legal System

## Research Topic Area

**What are the demographic characteristics, behavioral health and substance use disorder needs, and outpatient mental health treatment patterns of adults who have been incarcerated?**

## Study Inclusion Criteria

Booking data was received directly from the Clark County Sheriff's Office; Medicaid enrollment and Claims data were received from the Washington State Health Care Authority. Individuals were included in this data if they were adults enrolled in Medicaid for at least 6 months during the study window, 2015 - 2018. A total of **98,724 individuals** met this criteria.

The analysis of incarceration, recidivism, and use of outpatient health care was further limited to individuals with a diagnosis of severe mental health conditions or substance use disorder (SUD) in the Medicaid claims data during our study window. A total of **2,107 individuals** met the severe mental health condition criteria and **6,202 individuals** met the SUD criteria.

## Definitions

We used the following terms and definitions for this research topic area:

**History of incarceration:** Adults were considered to have a history of incarceration/to have been incarcerated if they appeared in the Clark County Sheriff's Office booking data at any point during the study window.

**Severe mental health condition:** Adults were considered to have a severe behavioral health condition if they had a diagnosis of bipolar disorder, impulse disorder, personality disorder, post-traumatic stress disorder, or schizophrenia and other psychotic disorders.

**Substance use disorder:** Adults were considered to have a substance use disorder if they had a diagnosis of alcohol- or drug-related disorders.

**Recidivism:** Adults were considered to have experienced recidivism if they had a rearrest for any reason within 15 months of leaving jail.

## Small Number Suppression

In order to protect the anonymity of individuals included in this report, we suppressed all small numbers (i.e. cell sizes < 10) in the following tables.

## Analysis & Results

We began by conducting descriptive statistics for demographic characteristics for all individuals in our study population, stratified by whether they had a had been incarcerated during the study window. Demographics are presented with both column percents (Table X) and row percents (Table 8). These comparisons answer two slightly different questions, for example:

- Column percents answer the question “*of adults with a history of incarceration, what percent were female?*” Table 18 gives the answer: 33.5%
- Row percents answer the question “*of female adults, what percent had a history of incarceration?*” Table 19 gives the answer: 4.2%

**Table 18.** Column percents: Demographic characteristics of adult Medicaid enrollees, stratified by history of incarceration, 2015 – 2018

		No History of Incarceration N=91,494		History of Incarceration N=7,230	
		%	95% C.I.	%	95% C.I.
<b>Age group</b>					
	25 and under	21.3%	21.1%, 21.6%	23.7%	22.7%, 24.6%
	26 to 35	26.4%	26.1%, 26.7%	35.3%	34.7%, 36.4%
	36 to 45	17.3%	17.0%, 17.5%	21.4%	20.4%, 22.3%
	46 to 55	15.2%	15.0%, 15.5%	14.5%	13.7%, 15.3%
	56 and over	19.8%	19.5%, 20.0%	5.3%	4.8%, 5.8%
<b>Gender</b>					
	Female	60.0%	59.7%, 60.3%	33.5%	32.4%, 34.6%
	Male	40.0%	39.7%, 40.3%	66.5%	65.4%, 67.7%
<b>Language</b>					
	English	91.6%	91.4%, 91.7%	97.5%	97.1%, 97.8%
	Spanish	2.1%	2.0%, 2.2%	<0.05%	--
	Russian	2.0%	1.9%, 2.1%	0.4%	0.2%, 0.5%
	Missing	3.4%	3.3%, 3.5%	1.8%	1.6%, 2.2%
	Other	0.9%	0.8%, 0.9%	<0.5%	--
<b>Race/Ethnicity</b>					
	White	72.9%	72.6%, 73.2%	76.3%	75.3%, 77.3%
	Hispanic	9.5%	9.3%, 9.7%	8.3%	7.7%, 8.9%
	Black	3.1%	3.0%, 3.2%	5.9%	5.4%, 6.4%
	Asian	3.2%	3.1%, 3.3%	1.2%	1.0%, 1.5%
	NH/PI	2.3%	2.2%, 2.4%	1.3%	1.1%, 1.6%
	AN/AI	1.5%	1.4%, 1.5%	2.4%	2.0%, 2.7%
	Multiracial	0.7%	0.6%, 0.7%	0.9%	0.7%, 1.1%
	Other	2.0%	1.9%, 2.1%	1.7%	1.5%, 2.1%
	Missing	4.9%	4.7%, 5.0%	2.1%	1.8%, 2.4%

**Table 19. Row Percents: Demographic characteristics of adult Medicaid enrollees, stratified by history of incarceration, 2015 – 2018**

	No History of Incarceration		History of Incarceration	
	N	%	N	%
<b>Age group</b>				
25 and under	19507	91.9%	1710	8.1%
26 to 35	24182	90.5%	2549	9.5%
36 to 45	15792	91.1%	1545	8.9%
46 to 55	13925	93.0%	1045	7.0%
56 and over	18088	97.9%	381	2.1%
<b>Gender</b>				
Female	54915	95.8%	2422	4.2%
Male	36579	88.4%	4808	11.6%
<b>Language</b>				
English	83772	92.2%	7046	7.8%
Spanish	1949	99.1%	<0.5%	--
Russian	1848	98.6%	25	1.4%
Missing	3120	95.9%	133	4.1%
Other	796	99.0%	<0.5%	--
<b>Race/Ethnicity</b>				
White	66672	92.4%	5519	7.6%
Hispanic	8701	93.6%	598	6.4%
Black	2836	87.0%	424	13.0%
Asian	2919	97.1%	86	2.9%
NH/PI	2123	95.7%	96	4.3%
AN/AI	1336	88.7%	170	11.3%
Multiracial	613	90.8%	62	9.2%
Other	1848	93.7%	125	6.3%
Missing	4447	96.7%	150	3.3%

Individuals with a history of incarceration were younger, and they were more likely to be male; White, Black, American Indian/Alaskan Native, and Multiracial; and English-speakers.

To understand the association between mental health and substance use conditions and a history of incarceration, we next constructed descriptive statistics and estimated adjusted risk ratios (RRs) for these conditions. RRs are adjusted for age, gender, language, and race, and are presented with 95% confidence intervals and p-values. All findings are statistically significant at  $p < 0.05$ ; however, as statistical significance is partially driven by sample size (that is, studies with large sample sizes are more likely to show statistical significance, even when there is no scientifically meaningful difference between groups), the statistical significance of all findings should be interpreted with caution. Instead, the magnitude of the RR should be used to determine whether differences are meaningful.

Adults with a history of incarceration had a much greater likelihood of having any substance use disorder or mental health condition diagnoses: for some specific mental health conditions (e.g. schizophrenia), this was a greater than two-fold difference; while for substance use disorders it was greater than a four-fold difference (Table 20).

**Table 20.** Associations between mental health and substance use conditions and history of incarceration, 2014-2018.

		No History of Incarceration N=91,494	History of Incarceration N=7,230	Logistic Regression		
		%	%	RR*	95% C.I.	p-value
<b>Any mental health condition</b>						
	No	75.8%	64.4%	1.00	<i>ref</i>	
	Yes	24.2%	35.6%	1.71	1.63, 1.79	<0.001
<b>Specific mental health conditions</b>						
	Depression	13.7%	18.1%	1.45	1.37, 1.54	<0.001
	Anxiety Disorders	13.7%	21.4%	1.70	1.61, 1.79	<0.001
	Post-Traumatic Stress Disorder	3.4%	7.2%	2.14	1.97, 2.32	<0.001
	Bipolar Disorder	3.0%	6.7%	2.05	1.88, 2.23	<0.001
	Schizophrenia And Other Psychotic Disorders	2.3%	7.3%	2.48	2.29, 2.69	<0.001
	ADHD, Conduct Disorders, and Hyperkinetic Disorders	1.7%	3.7%	1.61	1.44, 1.80	<0.001
	Personality Disorders	0.9%	1.5%	1.77	1.49, 2.11	<0.001
<b>Any substance use disorder</b>						
	No	92.5%	60.0%	1.00	<i>ref</i>	
	Yes	7.5%	40.0%	4.98	4.77, 5.20	<0.001
<b>Specific substance use disorders</b>						
	Alcohol use disorders	3.8%	21.1%	4.04	3.84, 4.24	<0.001
	Drug use disorders	5.1%	32.2%	4.93	4.72, 5.15	<0.001

\*adjusted for age, gender, language, race



We were further interested in exploring if the observed associations between mental health and substance use conditions differed across different demographic groups: by gender (Table 21), age (Table 22), and race (Table 23).

There was little difference in the observed association between having any mental health conditions and history of incarceration by gender. The magnitude of the association was greater among women for a few specific conditions: for example, women with a diagnosis of bipolar disorder were 2.5 times as likely to have a history of incarceration than women without bipolar disorder; while men with a diagnosis of bipolar disorder were only 1.75 times as likely to have a history of incarceration.

In contrast, there were substantial differences in the magnitude of the association between having a substance use disorder and having a history of incarceration by gender. Women who had a history of incarceration were over 7 times as likely to have a substance use disorder as women without a history of incarceration, while men were 4 times as likely.

**Table 21.** Associations between mental health and substance use conditions and history of incarceration, stratified by gender, 2015-2018.

		Female			Male		
		Not Incarcerated N=54,910	Incarcerated N=2,422	aRR	Not Incarcerated N=36,582	Incarcerated N=4,808	aRR
<b>Any mental health condition</b>							
	No	72.6%	55.0%	<i>ref</i>	80.6%	69.2%	<i>ref</i>
	Yes	27.5%	45.1%	1.93**	19.4%	30.8%	1.59**
<b>Specific mental health conditions</b>							
	Depression	15.9%	25.6%	1.68**	10.5%	14.3%	1.31**
	Anxiety Disorders	16.5%	30.8%	1.88**	9.5%	16.6%	1.57**
	Post-Traumatic Stress Disorder	4.3%	11.9%	2.34**	2.9%	7.6%	1.92**
	Bipolar Disorder	3.3%	9.5%	2.51**	2.5%	5.3%	1.75**
	Schizophrenia And Other Psychoses	2.0%	6.8%	3.71**	2.0%	3.8%	2.16**
	ADHD, Conduct and Hyperkinetic Disorders	1.5%	3.6%	1.82**	1.9%	4.9%	1.52**
	Personality Disorders	1.1%	2.7%	2.14**	0.6%	1.0%	1.41**
<b>Any substance use disorder</b>							
	No	93.4%	57.7%	<i>ref</i>	91.2%	61.2%	<i>ref</i>
	Yes	6.7%	42.3%	7.27**	8.8%	38.8%	4.13**
<b>Specific substance use disorders</b>							
	Alcohol use disorders	3.0%	19.9%	5.76**	5.0%	21.8%	3.49**
	Drug use disorders	4.7%	34.8%	7.12**	5.8%	30.8%	4.13**

\*adjusted for age, language, race

\*\*statistically significant at  $p < 0.05$

There was little difference in the observed association between having any mental health conditions and history of incarceration by age. The magnitude of the association differed by age for a few specific conditions: for example, adults over 40 who had a history of incarceration were 2.5 times as likely to have ADHD or other conduct and hyperkinetic disorders than those without a history of incarceration; this was only 1.5 times greater in the younger age groups. For most specific conditions, if there were differences in the associations between a history of incarceration and the mental health condition by age, these differences did not follow a clear pattern.

In contrast, there was a clear pattern to differences in the magnitude of the association between having a substance use disorder and having a history of incarceration by age. Adults in the youngest age group had the strongest association between both overall and specific substance use disorders and a history of incarceration, and this association decreased with each increasing age group.

**Table 22.** Associations between behavioral health and substance use conditions and history of incarceration, stratified by age, 2015-2018.

		18 – 25 years old			26-40 years of age			41 years and older		
		Not Incarcerated N=19,509	Incarcerated N=1,710	aRR	Not Incarcerated N=32,713	Incarcerated N=3,393	aRR	Not Incarcerated N=39,272	Incarcerated N=2,127	aRR
<b>Any mental health condition</b>										
	No	79.5%	66.8%	1.00	75.6%	63.3%	1.00	74.0%	64.3%	1.00
	Yes	20.5%	33.2%	1.88**	24.4%	36.7%	1.74**	26.0%	35.7%	1.65**
<b>Specific mental health conditions</b>										
	Depression	10.7%	15.5%	1.57**	13.3%	18.5%	1.49**	15.6%	19.4%	1.37**
	Anxiety Disorders	12.2%	19.9%	1.85**	14.9%	23.0%	1.74**	13.4%	19.9%	1.74**
	Post-Traumatic Stress Disorder	2.7%	5.6%	2.25**	3.8%	8.1%	2.22**	3.4%	7.2%	2.36**
	Bipolar Disorder	2.2%	4.3%	2.29**	3.3%	6.6%	1.85**	3.2%	8.0%	2.54**
	Schizophrenia And Other Psychoses	2.2%	5.4%	2.69**	2.2%	3.8%	2.38**	3.1%	9.1%	2.61**
	ADHD, Conduct and Hyperkinetic Disorders	1.4%	5.9%	1.53**	1.9%	7.0%	1.47**	1.1%	3.2%	2.51**
	Personality Disorders	0.9%	1.7%	2.03**	0.9%	1.4%	1.68**	0.9%	1.6%	1.89**
<b>Any substance use disorder</b>										
	No	94.3%	61.2%	1.00	92.2%	57.2%	1.00	91.9%	63.6%	1.00
	Yes	5.7%	38.8%	6.10**	7.8%	42.8%	5.09**	8.1%	36.4%	4.48**
<b>Specific substance use disorders</b>										
	Alcohol use disorders	2.5%	18.7%	4.83**	3.7%	21.2%	3.90**	4.5%	23.0%	4.14**
	Drug use disorders	4.3%	32.9%	6.94**	5.8%	35.9%	5.03**	5.0%	25.7%	4.47**

\*adjusted for gender, language, race

\*\*statistically significant at p<0.05

There was little difference in the observed association between having any mental health conditions and history of incarceration by race. The magnitude of the association between a history of incarceration and specific mental health condition was slightly higher for White and Hispanic individuals, compared to Black individuals, for all conditions except personality disorders.

There were much larger differences in the associations between substance use disorder – both overall and for each specific substance – and history of incarceration. Among both White and Hispanic individuals, having a substance use disorder was associated with a greater than 5-fold increase in likelihood of having a history of incarceration; among Black individuals, this increase was approximately 2.6-fold.

**Table 23.** Associations between behavioral health and substance use conditions and history of incarceration, stratified by race, 2015-2018.

		Black			Hispanic			White		
		Not Incarcerated N=2,836	Incarcerated N=424	aRR	Not Incarcerated N=8,701	Incarcerated N=598	aRR	Not Incarcerated N=66,668	Incarcerated N=5,519	aRR
<b>Any mental health condition</b>										
	No	79.0%	72.2%	1.00	80.2%	64.2%	1.00	73.5%	63.4%	1.00
	Yes	21.0%	27.8%	1.54**	19.8%	35.8%	2.02	26.6%	36.6%	1.65**
<b>Specific mental health conditions</b>										
	Depression	11.7%	13.0%	1.32**	11.3%	17.9%	1.67**	15.1%	18.8%	1.42**
	Anxiety Disorders	11.7%	15.3%	1.49**	11.5%	19.9%	1.76**	15.0%	22.3%	1.67**
	Post-Traumatic Stress Disorder	3.9%	5.0%	1.51**	2.7%	6.7%	2.04**	3.7%	7.5%	2.13**
	Bipolar Disorder	2.7%	4.7%	1.68**	2.1%	5.9%	2.26**	3.4%	7.1%	2.04**
	Schizophrenia And Other Psychoses	4.2%	8.3%	1.57**	1.4%	6.9%	2.85**	2.5%	7.2%	2.44**
	ADHD, Conduct and Hyperkinetic Disorders	1.2%	2.4%	1.64**	1.2%	3.7%	1.87**	1.9%	3.8%	1.52**
	Personality Disorders	0.5%	<2.0%	3.08**	0.6%	0.5%	0.86	1.0%	1.7%	1.73**
<b>Any substance use disorder</b>										
	No	91.3%	71.2%	1.00	94.3%	59.5%	1.00	91.8%	58.7%	1.00
	Yes	8.7%	28.8%	2.67**	5.7%	40.5%	5.75**	8.2%	41.3%	5.05**
<b>Specific substance use disorders</b>										
	Alcohol use disorders	4.1%	15.3%	2.66**	3.1%	24.1%	4.80**	4.1%	21.7%	4.10**
	Drug use disorders	6.3%	21.9%	2.62**	3.8%	30.1%	5.17**	5.7%	33.7%	5.03**

\*adjusted for age, gender, language

\*\*statistically significant at p<0.05

We finally wished to understand the impact of receiving ambulatory health care on incarceration and recidivism among individuals with severe mental health conditions or substance use disorder. We began by calculating the proportion of individuals in each group who had at least one visit among each type of health care in the three months after leaving jail (Table 24).

**Table 24.** Proportion of individuals who used each type of health care at least once within three months of leaving jail, 2015 - 2018.

	Severe mental health condition N=6,202		Substance use disorder N=2,107	
	N	95% CI	N	95% CI
<b>Inpatient</b>	5.2%	4.3%, 6.2%	4.8%	4.3%, 5.4%
<b>Emergency department</b>	33.4%	31.4%, 35.4%	32.2%	31.0%, 33.3%
<b>Outpatient mental health</b>	31.5%	29.6%, 33.5%	12.1%	11.3%, 13.0%
<b>Primary care</b>	28.6%	26.7%, 30.5%	25.7%	24.6%, 26.8%
<b>Specialty care</b>	11.5%	10.2%, 13.0%	10.0%	9.3%, 10.8%
<b>Any dental</b>	9.1%	7.9%, 10.4%	9.3%	8.6%, 10.0%

The most commonly used type of health care in both groups was emergency department visits, with around a third of individuals having had at least one emergency department visit in the three months after leaving jail. For those with severe mental health conditions, the next most commonly used type of care was outpatient mental health visit, followed closely by primary care; for those with substance use conditions, the next most commonly used type of care was primary care.

We next assessed the proportion of individuals who experienced recidivism – i.e. had a rearrest within 15 months of leaving jail – in both groups (Table 25). In both groups, nearly three-quarters of all individuals experienced recidivism.

**Table 25.** Proportion of individuals leaving jail who experienced recidivism, 2015 - 2018.

	Severe mental health condition N=6,202		Substance use disorder N=2,107	
	N	95% CI	N	95% CI
<b>Experienced recidivism</b>	72.9%	71.0%, 74.8%	74.6%	73.5%, 75.6%

In order to understand the impact of obtaining outpatient mental health care on recidivism, we next identified: those individuals who had at least one outpatient mental health care visit within 3 months of leaving jail, and those who did not. We then calculated adjusted relative risks of the association between receiving outpatient mental health care within 3 months of leaving jail and recidivism (Table 26).

While recidivism rates were still high, for both individuals with severe mental health disorders and individuals substance use disorders, accessing outpatient care within 3 months of leaving jail was associated with a 30% to 40% decreased risk of recidivism.

**Table 26.** Association between receiving outpatient mental health care (OPMH) within 3 months of leaving jail and proportion experiencing recidivism, 2015 – 2018.

	OPMH	No OPMH	Relative Risk*	95% CI	p-value
<b>Proportion experiencing recidivism</b>					
Severe mental health conditions	61.4%	78.2%	0.60	0.51, 0.71	<0.001
Substance use disorder	66.3%	75.7%	0.70	0.59, 0.84	<0.001

\*adjusted for age, gender, language, and race

We next calculated hazard ratios for the same comparison (Table 27). Similar to relative risks, hazard ratios compare the likelihood of an event (recidivism happening); unlike relative risks, they explicitly include time to rearrest in the model. Censoring occurred under two circumstances: when an individual had not experienced recidivism by 15 months after the original release date; or when an individual had not experienced recidivism before the last date they appeared in the Medicaid data.

In addition to experiencing less recidivism, individuals who used outpatient mental health care within 3 months of leaving jail also had on average a longer time until the next rearrest.

**Table 27.** Association between receiving outpatient mental health care (OPMH) within 3 months of leaving jail and days to experiencing recidivism, 2015 – 2018.

	OPMH	No OPMH	Hazard Ratios*	95% CI	p-value
<b>Days to rearrest</b>					
Severe mental health conditions	217.5	172.0	0.61	0.51, 0.74	<0.001
Substance use disorder	210.8	176.2	0.74	0.63, 0.86	<0.001

\*adjusted for age, gender, language, and race

## Limitations

The findings presented in this report and appendix should be interpreted within the context of the limitations of the data. Because all findings come from secondary analysis of administrative data that was collected for purposes other than research, each data source has limitations on interpretation. For example:

- Medicaid enrollment and claims data can tell us if an individual has been diagnosed with a condition, but lack of diagnosis does not necessarily mean absence of the condition. In particular, mental health and substance use conditions often substantially underdiagnosed in clinical data. In fact, a 2022 study in JAMA found that self-reported prevalence rates of

substance use disorder, including both alcohol use disorder and drug use disorder, were up to three times higher than the prevalence rates recorded in electronic health record data.<sup>5</sup>

- The legal data is only from the Clark County Sheriff's Office, and does not include incarceration that resulted in prison stays or jails stays outside of the Clark County system. Not having this information meant that some individuals who may have experienced incarceration or recidivism were not categorized as such in our analysis because the rearrest occurred outside of the data we had.

An additional limitation of the data is that we only have information for our study window, 2015 – 2018. In particular, with the Clark County Sheriff's Office booking data, this means we have no record of if an individual had been arrested prior to 2015. A history of interactions with the legal system is likely to impact risk of recidivism, and we were unable to account for this in our analysis.

This report is meant primarily to describe the experiences of adults experiencing incarceration and recidivism in southwest Washington, and not necessarily to make broader statements about individuals in the entire United States. However, there are critical lessons here about the connectedness of mental health, substance use, and incarceration, and it is therefore important, when thinking about broader lessons learned, to consider some limitations to the generalizability of the findings. In particular, the demographic makeup of southwest Washington – and the entire Pacific Northwest – tends to be substantially different from much of the country. Major driving social forces such as structural racism will have a differential impact on findings, depending on the demographics of the population being studied.

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<sup>5</sup> Williams EC, Fletcher OV, Frost MC, Harris AHS, Washington DL, Hoggatt KJ. Comparison of Substance Use Disorder Diagnosis Rates From Electronic Health Record Data With Substance Use Disorder Prevalence Rates Reported in Surveys Across Sociodemographic Groups in the Veterans Health Administration. *JAMA Netw Open*. 2022;5(6):e2219651.

# Patterns of Acute Care Use in Southwest Washington

## Research Topic Area

**What are the patterns of acute health care use – e.g. emergency department visits and inpatient stays – among adults in Southwest Washington, and how do these patterns differ for individuals who had been incarcerated or were experiencing housing instability?**

## Study Inclusion Criteria

Medicaid enrollment and claims data were received from the Washington State Health Care Authority; booking data was received directly from the Clark County Sheriff's Office; and housing data came from Vancouver Housing Authority (VHA). For the main analysis, individuals were included in this data if they were adults enrolled in Medicaid for at least 12 months during the study window, 2015 - 2018. There were **55,196 individuals** in the general Medicaid population, **3,713 individuals** who had experienced incarceration, and **7,031 individuals** experiencing housing instability.

The analysis of hospitalization for ambulatory care sensitive conditions, readmissions, and follow-up after hospitalization included all individuals enrolled in Medicaid for at least 6 months during the study window.

## Definitions

We used the following terms and definitions for this research topic area:

**General Medicaid population:** adults appearing in the Medicaid data but not in the Clark County Sheriff's Office booking data or the VHA data during the study window.

**Experienced incarceration:** adults appearing in the Clark County Sheriff's Office booking data at any point during the study window.

**Experiencing housing instability:** adults seeking housing assistance through the VHA, defined as being present in the VHA data during the study window.

**Received housing assistance:** adults who received housing through the VHA during the study window.

**Hospitalization for ambulatory care sensitive conditions:** hospitalization for conditions that potentially could have been managed through ambulatory care as defined by the National Quality Forum, including diabetes complications, low-extremity amputation, chronic obstructive pulmonary disease and asthma, hypertension, heart failure, and infections such as bacterial pneumonia, urinary tract infections, and cellulitis.

## Analysis & Results

We began by conducting descriptive statistics for demographic characteristics for all individuals in our study population, stratified into three groups: general Medicaid population, experienced incarceration, and experiencing housing instability (Table 28). The experienced incarceration and experiencing housing instability groups were not mutually exclusive, so an individual who had experienced both during the study window would be represented in both groups.

In order to protect the anonymity of individuals included in this report, we suppressed all small numbers (i.e. cell sizes < 10) in the following table.

**Table 28.** Demographic characteristics of adult Medicaid enrollees, stratified by experiences of incarceration and housing instability, 2015 – 2018

	Experienced Incarceration N=3,713			Experiencing Housing Instability N=7,031		General Medicaid Population N=55,196	
	%	95% C.I.		%	95% C.I.	%	95% C.I.
<b>Age group</b>							
25 and under	22.1%	20.8%, 23.5%		14.5%	13.7%, 15.4%	21.4%	21.0%, 21.7%
26 to 35	33.6%	32.1%, 35.2%		21.4%	20.5%, 22.4%	24.5%	24.2%, 24.9%
36 to 45	22.2%	20.9%, 23.5%		16.4%	15.6%, 17.3%	17.3%	17.0%, 17.6%
46 to 55	15.4%	14.3%, 16.6%		16.8%	15.9%, 17.7%	15.1%	14.8%, 15.4%
56 and over	6.7%	5.9%, 7.5%		30.9%	29.8%, 32.0%	21.7%	21.4%, 22.1%
<b>Gender</b>							
Female	38.3%	36.8%, 39.9%		67.9%	66.8%, 69.0%	59.6%	59.2%, 60.1%
Male	61.7%	60.1%, 63.2%		32.1%	31.0%, 33.2%	40.4%	40.0%, 40.8%
<b>Language</b>							
English	98.9%	98.5%, 99.2%		94.9%	94.4%, 95.4%	95.0%	94.8%, 95.2%
Russian	0.6%	0.4%, 0.9%		3.4%	3.0%, 3.8%	2.1%	2.0%, 2.2%
Spanish	<1.0%	--		0.7%	0.5%, 0.9%	2.1%	2.0%, 2.2%
Other	<1.0%	--		1.1%	0.8%, 1.3%	0.8%	0.8%, 0.9%
<b>Race/Ethnicity</b>							
White	77.1%	75.7%, 78.4%		74.8%	73.8%, 75.8%	74.7%	74.3%, 75.1%
Hispanic	8.2%	7.4%, 9.2%		7.7%	7.1%, 8.3%	9.6%	9.3%, 9.8%
Black	5.6%	4.9%, 6.3%		6.7%	6.1%, 7.3%	2.5%	2.3%, 2.6%
Asian	1.2%	0.9%, 1.6%		2.6%	2.2%, 3.0%	3.4%	3.3%, 3.6%
NH/PI	1.3%	1.0%, 1.7%		2.2%	1.9%, 2.6%	2.0%	1.9%, 2.2%
AN/AI	2.5%	2.0%, 3.0%		1.5%	1.2%, 1.8%	1.5%	1.4%, 1.6%
Multiracial	1.0%	0.8%, 1.4%		1.0%	0.8%, 1.2%	0.6%	0.5%, 0.6%
Other	1.6%	1.2%, 2.1%		2.1%	1.8%, 2.5%	2.0%	1.9%, 2.1%
Missing	1.6%	1.2%, 2.0%		1.6%	1.3%, 1.9%	3.8%	3.7%, 4.0%



We next conducted descriptive statistics for chronic conditions in our population, stratified by experiences of incarceration and housing instability. Table 29 provides percentages and confidence intervals for four mutually exclusive chronic condition categories. We see differences in the distribution of physical and behavioral health conditions across the three groups; this is driven primarily by the higher prevalence of physical health conditions among those experiencing housing instability and behavioral health conditions among those who had experienced incarceration.

**Table 29.** Prevalence of dual physical and behavioral health\* chronic conditions among adult Medicaid enrollees, stratified by experiences of incarceration and housing instability, 2015 – 2018

	Experienced Incarceration N=3,713		Experiencing Housing Instability N=7,031		General Medicaid Population N=55,196	
	%	95% C.I.	%	95% C.I.	%	95% C.I.
No chronic conditions	47.8%	46.2%, 49.4%	36.1%	34.9%, 37.2%	54.4%	54.0%, 54.9%
At least one physical health condition, no behavioral health conditions	14.4%	13.3%, 15.6%	26.3%	25.3%, 27.4%	22.2%	21.8%, 22.5%
At least one behavioral health condition, no physical health conditions	21.3%	20.1%, 22.7%	13.4%	12.6%, 14.2%	10.1%	9.8%, 10.3%
Both behavioral and physical health conditions	16.5%	15.3%, 17.7%	24.3%	23.3%, 25.3%	13.3%	13.0%, 13.6%

\*Behavioral health is defined as the combined category of mental health and substance use conditions

Table 30 provides percentages and confidence intervals for four three non-mutually exclusive categories – physical health, mental health, and substance use disorders – as well as specific chronic conditions within those broader categories. In general, the specific chronic conditions followed the same patterns as the overall categories, with those who had experienced incarceration having a greater prevalence of mental health and substance use conditions, and those experiencing housing instability having a greater prevalence of physical and mental health conditions, than the general Medicaid population.

**Table 30.** Prevalence of chronic conditions among adult Medicaid enrollees, stratified by experiences of incarceration and housing instability, 2015 – 2018

		Experienced Incarceration N=3,713		Experiencing Housing Instability N=7,031		General Medicaid Population N=55,196	
		%	95% C.I.	%	95% C.I.	%	95% C.I.
<b>Any physical health condition</b>							
	No	72.0%	70.6%, 73.4%	50.8%	49.6%, 52.0%	65.3%	64.9%, 65.7%
	Yes	28.0%	26.6%, 29.5%	49.2%	48.0%, 50.4%	34.7%	34.4%, 35.1%
<b>Top physical health conditions</b>							
	Hypertension	7.1%	6.3%, 7.9%	15.7%	14.9%, 16.6%	10.0%	9.7%, 10.2%
	Diabetes	4.3%	3.7%, 5.0%	12.9%	12.1%, 13.7%	7.9%	7.7%, 8.1%
	Fibromyalgia, Chronic Pain, And Fatigue	7.8%	6.9%, 8.7%	12.6%	11.9%, 13.4%	7.8%	7.6%, 8.1%
	Rheumatoid Arthritis/Osteoarthritis	3.0%	2.5%, 3.6%	7.2%	6.6%, 7.8%	4.6%	4.4%, 4.7%
	Anemia	3.6%	3.0%, 4.2%	6.7%	6.2%, 7.3%	4.4%	4.3%, 4.6%
	Chronic Kidney Disease	3.0%	2.5%, 3.5%	5.7%	5.2%, 6.3%	4.4%	4.2%, 4.6%
	Hyperlipidemia	2.1%	1.7%, 2.6%	6.5%	5.6%, 7.1%	4.3%	4.1%, 4.5%
	Chronic Obstructive Pulmonary Disease	2.5%	2.1%, 3.1%	4.8%	4.4%, 5.4%	2.8%	2.6%, 2.9%
<b>Any mental health condition</b>							
	No	65.7%	64.2%, 67.3%	63.4%	62.3%, 64.5%	77.2%	76.8%, 77.5%
	Yes	34.3%	32.8%, 35.8%	36.6%	35.5%, 37.7%	22.8%	22.5%, 23.2%
<b>Specific mental health conditions</b>							
	Depression	22.1%	20.8%, 23.5%	25.1%	24.1%, 26.1%	14.1%	13.8%, 14.4%
	Anxiety Disorders	19.3%	18.1%, 20.6%	19.7%	18.7%, 20.6%	11.5%	11.2%, 11.7%
	Post-Traumatic Stress Disorder	7.4%	6.6%, 8.3%	8.4%	7.7%, 9.0%	3.1%	2.9%, 3.2%
	Bipolar Disorder	6.9%	6.2%, 7.8%	5.6%	5.1%, 6.1%	2.8%	2.6%, 2.9%
	Schizophrenia And Other Psychoses	6.0%	5.3%, 6.8%	6.7%	6.2%, 7.3%	2.0%	1.9%, 2.1%
	ADHD, Conduct and Hyperkinetic Disorders	3.6%	3.1%, 4.3%	2.2%	1.9%, 2.6%	1.9%	1.7%, 2.0%
	Personality Disorders	1.3%	1.0%, 1.7%	1.7%	1.5%, 2.1%	0.6%	0.5%, 0.7%
<b>Any substance use disorder</b>							
	No	82.0%	80.7%, 83.2%	90.4%	89.7%, 91.1%	95.2%	95.0%, 95.4%
	Yes	18.0%	16.8%, 19.3%	9.6%	9.0%, 10.3%	4.8%	4.6%, 5.0%
<b>Specific substance use disorders</b>							
	Alcohol use disorders	8.0%	7.2%, 8.9%	4.0%	3.5%, 4.5%	2.3%	2.2%, 2.4%
	Drug use disorders	13.1%	12.0%, 14.2%	7.4%	6.8%, 8.1%	3.2%	3.0%, 3.3%

We next estimated associations between having experienced incarceration and two measures of health care utilization: the proportion of individuals who used each domain of health care (Table 31); and the average amount of health care used per member per year (Table 32). We estimated these associations for two forms of acute care (inpatient stays and emergency department visits), as well as primary, specialty, outpatient mental health, and dental care.

All regressions are adjusted for age, gender, language, and race, and are presented with 95% confidence intervals and p-values. All findings are statistically significant at  $p < 0.05$ ; however, as statistical significance is partially driven by sample size (that is, studies with large sample sizes are more likely to show statistical significance even when there is no scientifically meaningful difference between groups), the statistical significance of all findings should be interpreted with caution. Instead, the magnitude of the difference between groups should be used to determine whether differences are meaningful.

**Table 31.** Proportion of individual who used each type of health care at least once in the 12 months after leaving jail, compared to the general Medicaid population, 2015 – 2018.

	Experienced Incarceration N=3,713	General Medicaid Population N=38,837	RR*	95% C.I.	p-value
<b>Inpatient</b>	10.7%	7.6%	1.77	1.61, 1.95	<0.001
<b>Emergency department</b>	48.0%	26.4%	2.35	2.22, 2.50	<0.001
<b>Outpatient mental health</b>	19.2%	8.9%	2.07	1.92, 2.24	<0.001
<b>Primary care</b>	51.1%	58.0%	0.92	0.87, 0.98	0.013
<b>Specialty care</b>	26.9%	35.4%	0.85	0.79, 0.91	<0.001
<b>Any dental</b>	20.3%	22.3%	0.94	0.87, 1.01	0.092

\*adjusted for age, gender, language, race

**Table 32.** Amount of each type of health care (per member per month) used in the 12 months after leaving jail, compared to the general Medicaid population, 2015 – 2018.

	Experienced Incarceration N=3,713	General Medicaid Population N=38,837	Estimate*	p-value
<b>Inpatient</b>	0.16	0.10	0.08	<0.001
<b>Emergency department</b>	1.49	0.64	0.87	<0.001
<b>Outpatient mental health</b>	1.81	0.85	0.95	<0.001
<b>Primary care</b>	1.71	2.19	-0.16	0.004
<b>Specialty care</b>	0.68	1.08	-0.19	<0.001
<b>Any dental</b>	0.52	0.58	-0.06	0.021

\*adjusted for age, gender, language, race

Compared to the general Medicaid population, adults who had experienced incarceration were more likely to have had at least one inpatient stay, emergency department visit, and outpatient visit; and less likely to have had at least one primary care or specialty care visit. They also had a greater number of

inpatient stays, emergency department visits, and outpatient mental health visits per member per year, and fewer primary care, specialty care, and dental care visits.

We next explored associations with several quality of care indicators: hospitalization for ambulatory care sensitive conditions; hospital readmission within 7 and 30 days of discharge; and follow-up with a primary care provider within 7 and 30 days of hospital discharge (Table 33). Individuals who had experienced incarceration were more likely to have hospitalizations for ambulatory care sensitive conditions and readmissions at both 7 and 30 days post discharge, and were less likely to follow-up with a primary care provider after hospitalization.

**Table 33.** Ambulatory care sensitive conditions, hospital readmissions, and follow-up after hospitalization, stratified by experience of incarceration, 2015 – 2018.

	Experienced Incarceration N=5,406	General Medicaid Population N=47,136	RR*	95% CI	p-value
<b>Hospitalization for ambulatory care sensitive condition</b>	6.20%	3.97%	1.97	1.78-2.18	<0.001
<b>Readmission within 7 days</b>	5.98%	4.00%	1.25	0.99-1.58	0.065
<b>Readmission within 30 days</b>	12.68%	7.44%	1.45	1.22-1.72	<0.001
<b>Follow-up with a PCP in 7 days</b>	17.55%	25.19%	0.72	0.61-0.83	<0.001
<b>Follow-up with a PCP in 30 days</b>	39.25%	51.92%	0.70	0.62-0.78	<0.001

\*adjusted for age, gender, language, race

Finally, we used a difference-in-differences analysis to assess the short-term and long-term impact of interactions with the legal system on receipt of different types of health care (Tables 34 and 35). We compared the change in utilization from pre- to post-index date. For adults who had experienced incarceration, the index date was the date of incarceration. For adults in the general Medicaid population were assigned an index date within the study window; these index dates followed approximately the same date distribution as the index dates for those who had experienced incarceration.

At three months, we observe little to no change in the amount of care across all domains used by the general Medicaid population; in contrast, we see a sharp decrease in primary care and specialty care visits among those who had experienced incarceration.

At twelve months, we see the same trend for primary care; however, specialty care visits have increased substantially among those who had experienced incarceration, reversing the pattern observed at three months.

There was no impact on either type of acute care utilization or outpatient mental health care.

**Table 34.** Difference-in-differences analysis of the impact of experiencing incarceration on the amount of each type of health care within 3 months of leaving jail, 2015 – 2018.

	Experienced incarceration N = 3,713				General Medicaid Population N=38,837				Difference-in-Differences	
	Pre-Incarceration		Post-Incarceration		Pre-Index Date		Post-Index Date		Est	p-value
	Mean	SE	Mean	SE	Mean	SE	Mean	SE		
<b>Inpatient</b>	0.16	0.55	0.15	0.91	0.11	0.42	0.10	0.67	0.00	0.840
<b>Emergency department</b>	1.47	2.68	1.42	3.78	0.62	1.73	0.61	2.46	-0.05	0.508
<b>Outpatient mental health</b>	1.61	7.38	1.65	7.66	0.83	4.43	0.84	5.21	0.06	0.734
<b>Primary care</b>	1.85	3.11	1.62	3.84	2.17	3.13	2.17	4.25	-0.22	0.009
<b>Specialty care</b>	0.78	3.04	0.61	2.58	1.04	2.30	1.05	3.16	-0.17	0.012
<b>Any dental</b>	0.61	1.55	0.48	1.99	0.67	1.52	0.59	2.21	-0.05	0.238

\*adjusted for age, gender, language, race

**Table 35.** Difference-in-differences analysis of the impact of experiencing incarceration on the amount of each type of health care within 12 months of leaving jail, 2015 – 2018.

	Experienced incarceration N = 3,713				General Medicaid Population N=38,837				Difference-in-Differences	
	Pre-Incarceration		Post-Incarceration		Pre-Index Date		Post-Index Date		Est	p-value
	Mean	SE	Mean	SE	Mean	SE	Mean	SE		
<b>Inpatient</b>	0.16	0.56	0.17	0.59	0.11	0.43	0.10	0.42	0.01	0.492
<b>Emergency department</b>	1.11	2.95	1.12	3.26	0.62	1.70	0.62	1.74	0.00	0.927
<b>Outpatient mental health</b>	2.41	9.07	2.44	8.71	0.86	4.52	0.87	4.68	0.06	0.670
<b>Primary care</b>	2.99	3.90	2.85	4.02	2.19	3.18	2.15	3.28	-0.11	0.089
<b>Specialty care</b>	1.35	2.78	1.60	3.09	1.02	2.26	1.09	2.49	0.18	<0.001
<b>Any dental</b>	0.85	1.69	0.81	1.61	0.67	1.53	0.60	1.43	0.04	0.218

\*adjusted for age, gender, language, race

We next estimated associations between having experiencing housing instability and two measures of health care utilization: the proportion of individuals who used each domain of health care (Table 36); and the average amount of health care used per member per year (Table 37). We estimated these associations for two forms of acute care (inpatient stays and emergency department visits), as well as primary, specialty, outpatient mental health, and dental care.

All regressions are adjusted for age, gender, language, and race, and are presented with 95% confidence intervals and p-values. All findings are statistically significant at  $p < 0.05$ ; however, as stated previously, statistical significance is partially driven by sample size (that is, studies with large sample sizes are more likely to show statistical significance even when there is no scientifically meaningful difference between groups). The statistical significance of all findings should therefore be interpreted with caution. Instead, the magnitude of the difference between groups should be used to determine whether differences are meaningful.

**Table 36.** Proportion of individual who used each type of health care at least once in the 12 months after applying for housing, compared to the general Medicaid population, 2015 – 2018.

	Experiencing Housing Instability N=7,031	General Medicaid Population N=37,681	RR*	95% C.I.	p-value
<b>Inpatient</b>	11.5%	7.7%	1.32	1.23, 1.41	<0.001
<b>Emergency department</b>	37.5%	25.6%	1.54	1.48, 1.61	<0.001
<b>Outpatient mental health</b>	19.9%	9.0%	2.10	1.99, 2.21	<0.001
<b>Primary care</b>	67.4%	57.7%	1.37	1.31, 1.44	<0.001
<b>Specialty care</b>	46.7%	35.7%	1.37	1.32, 1.44	<0.001
<b>Any dental</b>	30.4%	22.8%	1.38	1.31, 1.44	<0.001

\*adjusted for age, gender, language, race

**Table 37.** Amount of each type of health care (per member per month) used in the 12 months after applying for housing, compared to the general Medicaid population, 2015 – 2018.

	Experiencing Housing Instability N=7,031	General Medicaid Population N=37,681	Estimate*	p-value
<b>Inpatient</b>	0.17	0.10	0.05	<0.001
<b>Emergency department</b>	1.12	0.62	0.49	<0.001
<b>Outpatient mental health</b>	2.44	0.87	1.61	<0.001
<b>Primary care</b>	2.85	2.15	0.59	<0.001
<b>Specialty care</b>	1.60	1.09	0.41	<0.001
<b>Any dental</b>	0.81	0.60	0.22	<0.001

\*adjusted for age, gender, language, race

Compared to the general Medicaid population, adults experiencing housing instability were more likely to have had at least one visit across all the health care domains; they also had a greater number of visits

in each domain per member per year. These differences ranged in magnitude from being approximately 30% more likely to have an inpatient stay to being over twice as likely to have an outpatient mental health visit. Likewise, inpatient stays had the smallest observed difference, and outpatient mental health care had the greatest observed difference, in amount of visits per member per year.

We next explored associations with several quality of care indicators: hospitalization for ambulatory care sensitive conditions; hospital readmission within 7 and 30 days of discharge; and follow-up with a primary care provider within 7 and 30 days of hospital discharge (Table 38). Individuals experiencing housing instability were more likely to have hospitalizations for ambulatory care sensitive conditions, hospital readmission, and follow-up with a primary care provider. The magnitude of the differences ranged from being under 10% more likely to have a follow-up visit with a primary care provider within 7 days of hospital discharge to being 50% more likely to have a hospitalization for an ambulatory care sensitive condition.

**Table 38.** Ambulatory care sensitive conditions, hospital readmissions, and follow-up after hospitalization, stratified by experiencing housing instability, 2015 – 2018.

	Experiencing Housing Instability N=9,052	General Medicaid Population N=46,452	RR*	95% CI	p- value
<b>Hospitalization for ambulatory care sensitive condition</b>	7.4%	4.0%	1.50	1.40, 1.61	<0.001
<b>Readmission within 7 days</b>	3.9%	4.2%	1.12	0.93, 1.35	0.217
<b>Readmission within 30 days</b>	7.4%	8.6%	1.15	1.01, 1.32	0.038
<b>Follow-up with a PCP in 7 days</b>	25.2%	28.0%	1.08	0.99, 1.17	0.098
<b>Follow-up with a PCP in 30 days</b>	54.5%	51.0%	1.10	1.02, 1.19	0.014

\*adjusted for age, gender, language, race

Finally, we used a difference-in-differences analysis to assess the short-term and long-term impact of obtaining housing through VHA on receipt of different types of health care (Tables 39 and 40). We compared the change in utilization from pre- to post-index date. For adults who were housed through VHA, the index date was the date of receipt of housing. For adults in the general Medicaid population were assigned an index date within the study window; these index dates followed approximately the same date distribution as the index dates for those who were housed through VHA.

At three months, we observe little to no change in the amount of care across all domains used by the general Medicaid population; in contrast, we see a decrease in outpatient mental health and primary care visits, and an increase in specialty care visits, among the population receiving housing through VHA. This pattern persists at twelve months.

There was no impact on either type of acute care utilization or dental care.

**Table 39.** Difference-in-differences analysis of the impact of receiving housing through VHA on the amount of each type of health care within 3 months of obtaining housing, 2015 – 2018.

	Housed through VHA N = 2,631				General Medicaid Population N=37,402				Difference-in-Differences	
	Pre-Incarceration		Post-Incarceration		Pre-Index Date		Post-Index Date		Est	p-value
	Mean	SE	Mean	SE	Mean	SE	Mean	SE		
<b>Inpatient</b>	0.13	0.42	0.12	0.76	0.11	0.41	0.10	0.69	-0.01	0.657
<b>Emergency department</b>	0.76	2.34	0.70	2.62	0.59	1.61	0.61	2.37	-0.11	0.145
<b>Outpatient mental health</b>	2.13	9.08	1.72	7.53	0.79	4.39	0.82	5.36	-0.41	0.068
<b>Primary care</b>	2.89	3.72	2.72	4.53	2.13	3.07	2.19	4.23	-0.23	0.054
<b>Specialty care</b>	1.22	2.45	1.74	3.84	0.97	2.15	1.10	3.15	0.38	<0.001
<b>Any dental</b>	0.88	1.66	0.96	2.64	0.69	1.57	0.72	2.49	0.07	0.249

\*adjusted for age, gender, language, race

**Table 40.** Difference-in-differences analysis of the impact of receiving housing through VHA on the amount of each type of health care within 12 months of obtaining housing, 2015 – 2018.

	Housed through VHA N = 2,631				General Medicaid Population N=37,402				Difference-in-Differences	
	Pre-Housing		Post-Housing		Pre-Index Date		Post-Index Date		Est	p-value
	Mean	SE	Mean	SE	Mean	SE	Mean	SE		
<b>Inpatient</b>	0.13	0.42	0.14	0.48	0.11	0.41	0.10	0.43	0.01	0.435
<b>Emergency department</b>	0.76	2.35	0.74	1.69	0.59	1.61	0.62	1.75	-0.06	0.249
<b>Outpatient mental health</b>	2.13	9.07	1.72	6.58	0.79	4.39	0.80	4.63	-0.41	0.014
<b>Primary care</b>	2.89	3.72	2.41	3.42	2.13	3.07	2.05	3.17	-0.42	<0.001
<b>Specialty care</b>	1.22	2.45	1.68	2.99	0.97	2.15	1.06	2.38	0.36	<0.001
<b>Any dental</b>	0.88	1.66	0.85	1.63	0.69	1.57	0.64	1.47	0.04	0.402

\*adjusted for age, gender, language, race



## Limitations

The findings presented in this report and appendix should be interpreted within the context of the limitations of the data. Because all findings come from secondary analysis of administrative data that was collected for purposes other than research, each data source has limitations on interpretation. For example:

- Medicaid enrollment and claims data can tell us if an individual has been diagnosed with a condition, but lack of diagnosis does not necessarily mean absence of the condition. Many conditions, especially those that do not always require consistent treatment, are often substantially underdiagnosed in the claims data. In addition, lack of diagnosis is sometimes a proxy for decreased access to care, because in order to receive a diagnosis, an individual usually must receive treatment for that specific condition.
- The legal data is only from the Clark County Sheriff's Office, and does not include incarceration that resulted in prison stays or jails stays outside of the Clark County system. Not having this information meant that some individuals who may have experienced incarceration were not categorized as such in our analysis because the rearrest occurred outside of the data we had.
- Our only indicator of housing instability is presence in the VHA data. Many adults may experience housing instability but not apply for housing through VHA's housing programs, and these individuals would therefore be misclassified into the general Medicaid population.

This report is meant primarily to describe the experiences of adults experiencing incarceration and housing instability in southwest Washington, and not necessarily to make broader statements about individuals in the entire United States. However, there are critical lessons here about the connectedness of incarceration, housing instability, and health care, and it is therefore important, when thinking about broader lessons learned, to consider some limitations to the generalizability of the findings. In particular, the demographic makeup of southwest Washington – and the entire Pacific Northwest – tends to be substantially different from much of the country. Major driving social forces such as structural racism will have a differential impact on findings, depending on the demographics of the population being studied