Inequity in access to paid sick leave in the Seattle area leading up to the COVID-19 pandemic

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Abstract

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Objectives: To examine inequity in access to paid sick leave (PSL) by race/ethnicity, income, and sex and to examine the association of PSL access with leave-taking, health behaviors, and respiratory pathogen presence among Seattle-area workers.

Methods: Survey responses were collected online and in-person from individuals experiencing acute respiratory illness (ARI) symptoms between November 2019 and March 2020 as part of a community-based respiratory viral surveillance study. We used chi-square tests and logistic regression models to assess the association between PSL access and race/ethnicity, household income, and sex.

Results: A total of 66.6% of respondents reported having access to PSL. By race/ethnicity, the proportion of participants who reported access to PSL was highest in the Asian group (70.5%), followed by White (68.7%), Latinx (58.4%), two or more races (57.1%), Black (47.1%), and Other (43.1%) (χ^2=53.3, p<0.001). Access to PSL increased with household income with the highest income category having the most access to PSL (83.1%) while the lowest had the least (52.9%) (χ^2=349.9, p<0.001). Fewer females (65.2%) than males (70.7%) reported access to PSL (χ^2=349.9, p=0.002).

Conclusions: Access to PSL is inequitably distributed across income, race/ethnicity, and sex. When low-income workers are forced to choose between wages and personal health, it leads to compounding vulnerability for themselves and their families. Providing universal access to PSL will have substantial benefits for all, especially for low-income, BIPOC, and female workers.

BACKGROUND

In many ways, the COVID-19 pandemic has illuminated the health and social inequity that Black, Indigenous, and people of color (BIPOC) face in the United States. But long before the current coronavirus pandemic, there have been stark disparities in health outcomes for BIPOC people and groups with lower socioeconomic status (SES).

However, Chowkwanyun and Reed (2020)[1] caution us against discussing racial health disparities without adequate context. Generations of institutionalized racism and classism in the healthcare industry and across social and political systems have led us to our current public health crisis, with low-income and BIPOC individuals bearing a disproportionate share of COVID-19 cases and deaths.[2] The current pandemic has adversely affected the health of already vulnerable populations in more ways than an increased risk of COVID-19 infection. A global systematic review found that female and lower SES populations suffered from disproportionately higher psychological stress during the COVID-19 pandemic.[3]

Beyond discrimination in clinical settings and inequity in health care access, there are many compounding social and environmental factors that contribute to disparities in health outcomes. As a result of a growing body of evidence, and instigated by growing sociopolitical pressure, local and national public health bodies have begun to declare racism a public health crisis.[4]

Policies can disproportionately harm some groups, while upholding the economic and social power of others. One example of this is labor policy, which encompasses a wide range of regulations and mandates (or lack thereof) with considerable downstream health effects, especially in the United States. One such contributing factor is the ability or inability to miss work due to sickness. Paid sick leave (PSL) is widely regarded as essential for protecting the health of workers and their families.[5] Even so, the United States is one of the few high-income

countries with no national PSL mandate.[6] Additionally, about half of all Americans relied on employer provided insurance coverage for their health care in 2019.[7] As a result, many facets of preventive health and health care access are determined by one's employer.

Some states, including Washington, have implemented statewide PSL mandates. The passage of Washington state's PSL mandate in January 2018 increased PSL access by 28%.[8] However, these mandates do not cover all workers, and many employers require a certain duration of employment before allowing workers to use PSL.[9] This leaves some workers with the choice of sacrificing wages for their health or the health of their dependents versus continuing to work while sick or injured. In a nation where high health care costs are already prohibitive to accessing necessary care,[10] the added prospect of losing wages due to illness is untenable for many low-income workers.

The ability to take paid leave when sick is important for several reasons. First, going to work while sick can put others' health at risk. Many jobs, especially in the care provision, health, or food service industry, require close contact with co-workers, customers, or patients. Coined "contagious presenteeism" by Pichler and Ziebarth,[11] being at work while contagious increases the risk of transmission in the workplace, as evidenced by several studies of influenza-like-illness and H1N1.[12,13] This phenomenon has also been reported in studies of COVID-19 in the workplace.[14,15]

Additionally, PSL is important for protecting one's own health and the health of their household members. Access to PSL has been linked to increased usage of preventive health services (e.g. screening or dental check-ups)[16,17] and overall lower mortality.[18] The workers themselves are not the only ones affected by PSL policies. A 2017 study using data from the National Health Interview Survey (NHIS) found that parental access to PSL was associated with higher odds of

flu vaccination and medical check-ups for children.[19] A 2020 paper also using NHIS data similarly found that lack of parental PSL was a barrier for children's access of non-emergency care.[20]

Additionally, without access to PSL, workers are less likely to seek care or treatment for their illness or injuries, prolonging recovery and decreasing productivity.[21] Workers without sick leave are more likely to miss recommended screenings and immunizations, which contributes to heightened economic and health vulnerability.[22]

A study in the United States showed that around 70% of civilian full-time workers had access to PSL, while access was only about 20% for part-time workers.[23] According to the Bureau of Labor Statistics, the proportion of workers in the U.S. with access to PSL has remained relatively constant over the past decade,[24] however, they have not published data showing how sick leave access may have changed since the beginning of the COVID-19 pandemic.

Additionally, there is the potential for employers to officially provide PSL, while also not disclosing the access or discouraging workers from taking it, resulting in discordance between policies and workers' lived experiences. This lack of transparency and accountability further contributes to health vulnerability, calling the 'access' to PSL into question.[7]

Prior to the COVID-19 pandemic, an estimated 75% of the American labor force had jobs that require in-person work.[25] A study using 2018 BLS employment statistics showed that jobs with higher wages on average were more likely to be able to work from home,[26] while Asian and White workers are more likely to work in industries that allow for remote work than Black or Latinx workers.[27]

A recent study by the CDC[28] provided evidence in support of the public health benefit of

teleworking during the COVID-19 pandemic. In Washington state, workers in high hazard, low compensation jobs were majority female and disproportionately non-White.[29,14] This report showed that such jobs with the highest numbers of workers included retail, fast food, office workers, cashiers, home health aides, customer service representatives, and restaurant servers.

OBJECTIVES

The main objective of this analysis is to use data from a community-based respiratory viral surveillance study to assess the sociodemographic disparities in access to PSL, comparing race and ethnicity, annual household income, and sex. The secondary objective is to examine the differences access to PSL with leave-taking, health behaviors, and respiratory pathogen presence within this population.

METHODS

STUDY DESIGN & DATA COLLECTION

This analysis uses data from a cross-sectional study from 2019-2020 called the Seattle Flu Study (SFS), conducted in the Seattle metropolitan area of Washington state.[30] The SFS is a multi-arm community-based prospective study for assessing respiratory pathogen prevalence and transmission through enrollment of individuals with acute respiratory illness (ARI), with collection of a nasal swab and testing for multiple respiratory pathogens. This analysis uses data from two arms of SFS: the home-based Swab-and-Send enrollments[31] and the in-person Kiosk enrollments.[30]

STUDY POPULATION

Children and adults with an ARI, defined as experiencing at least two protocol-defined symptoms or a new or worsening cough, were eligible to enroll in the study.

For inclusion in this analysis, participants must have completed their full enrollment questionnaires, be 18 years or older, and be employed (see Figure 1 for inclusion flowchart). For individuals with multiple enrollments, only the data from the individuals first enrollment was included.

STUDY SETTING

For the Kiosk study arm, data collection locations were set up at various public locations across the county, such as airports, university campuses, and public transit stations. Eligible and interested participants were able to consent, enroll, and have a nasal swab collected by trained study personnel at the kiosk.

For the Swab-and-Send study arm, participants were recruited through posters, media, or online through social media. All study data was collected through a series of self-administered online questionnaires. Participants provided informed consent and completed a questionnaire to gather contact information (see Appendices A, B). After completing the enrollment questionnaire, a swab kit was mailed to the participant's home, which contained a mid-turbinate nasal swab, a viral transport media tube with an identifier on the tube, a card with instructions on how to correctly self-collect a mid-nasal swab, and a prepaid shipping label so the kit could be returned to the laboratory. Upon receipt of the kit, participants completed an online illness questionnaire to ascertain demographic, household, and illness characteristics, and receive instructions (see Appendix C). A link to an optional follow-up questionnaire was emailed or sent via text one week after the initial questionnaire. The follow-up questionnaire contained questions about the impact their illness episode had on their normal day-to-day activities (see Appendix D).

Participants received a link to a digital gift card via email within one month of receipt of their nasal swab as an incentive. Participants were also emailed an additional digital gift card link within one month of completion of their one-week follow-up questionnaire.

For both arms of the study, detailed specimen collection and laboratory pathogen testing methods are described in previous papers.[30,31]

MEASURES

Primary exposures of interest were annual household income, race/ethnicity, and sex. All measures in this analysis were self-reported by the participants on the study questionnaires.

Race was self-reported based on the U.S. OMB race categories[32] and respondents were able to select all that apply (see Appendix B). Ethnicity was assessed by asking respondents if they identified as Hispanic/Latino (hereto referred to as 'Latinx'). To make categories mutually exclusive, those who selected 'Yes' to Latinx ethnicity were not included in any of the other race categories. To obtain adequate sample size in each category, those who selected only 'Native Hawaiian or Pacific Islander', 'American Indian or Alaska Native', or 'Other' were combined into the 'Other, Non-Hispanic' group. In this paper, we will shorten the race/ethnicity names, e.g. refer to the 'White, Non-Hispanic' category as 'White'.

Household income was assessed with the question, "Please choose the range that best represents your household income last year (before taxes). If you are still considered a "dependent" for tax purposes, choose the range that describes your parent/legal guardian's household income."

Sex was asked as 'What is your sex?' and respondents were able to choose "Male," "Female," "Other," or "Prefer Not to Say." The study did not collect data on participants' gender identity.

The outcome of interest, access to PSL, was assessed with the question, “At my place of work, employees are encouraged to take time off or work from home if they are sick.” Respondents could answer with one of the following options: “I am not currently employed” (excluded), “Yes, and I would be paid for hours missed,” “Yes, but I would not be paid for hours missed,” or “No.” Those who answered with "Yes, but I would not be paid for hours missed" or "No" were categorized as not having access to PSL, while those who answered "Yes, and I would be paid for hours missed" were categorized as having access to PSL.

The secondary exposures of care-seeking and leave-taking behavior were measured through several questions. Participants were asked, “Have you sought clinical care for your illness?” at the one-week follow-up survey. Swab-and-Send participants were asked the same question in both the enrollment questionnaire and the one-week follow-up survey. Receipt of flu vaccination, a form of preventive care-seeking, was assessed with the question, “Have you received this season's influenza (flu) vaccine?” Leave-taking was measured with the question: “Did any of the following occur because you were feeling sick?” Participants were able to select all that apply with options including “I missed work”, “I worked from home”, “I worked fewer hours than usual”, or “None of the above.”

All nasal swab samples were screened using a custom, TaqMan-based Open Array panel (Thermo Fisher) for influenza A H3N2 and H1N1; pan influenza A, influenza B, and influenza C; respiratory syncytial viruses (RSVs) A and B; human coronaviruses 229E, NL63, OC43, and HKU1; SARS-CoV-2; adenovirus; human rhinovirus; human metapneumovirus; human parechovirus; enteroviruses A, B, C, D, D68, and G; human bocavirus; *Streptococcus pneumoniae*; *Mycoplasma pneumoniae*; and *Chlamydia pneumoniae.* See Kim et al (2021)[30] for detailed pathogen testing methods.

DATA ANALYSIS

A Pearson's chi-square test of independence was performed to examine the relation between race/ethnicity, household income, and sex, respectively with access to PSL. Additional chi-square tests were performed to examine the relation between access to PSL with leave taking, flu vaccination, care seeking behavior, and pathogen presence, respectively.

For the combined race and ethnicity variable, those who responded with "Prefer not to say" were excluded in the chi-square tests and regression models. Those who responded "Don't know" or "Prefer not to say" to the annual household income question were also excluded from the chi-square tests and regression models. For lack of adequate sample size, those who responded "Other" or "Prefer not to say" for their sex were excluded from the data analyses.

A multivariate logistic regression model was used to assess the adjusted association between household income and binary access to PSL, adjusting for race/ethnicity and sex. For simplicity, no other covariates were included in the model. Since household income is presumed to be on the causal pathway between both sex and PSL and race/ethnicity and PSL (see the directed acyclic graph in Figure 2), the associations between both variables and PSL, respectively, were analyzed without including other covariates in the models. For all regression models, for each variable, the category with the largest number of participants was used as the reference category.

For all analyses, 95% confidence intervals and p-values were calculated using 2-sided Wald tests. P-values were considered significant at an alpha level of 0.05. All analyses were performed using R version 3.6.3.[33]

RESULTS

There were 3,513 participants who met inclusion criteria; of these, 97 individuals had multiple enrollment instances and only the data from the individual's first enrollment was included in this analysis. 80% (n=2,733) of participants completed the week-follow-up questionnaire and were included in the analysis of association between access to PSL with leave-taking and health behavior.

Descriptive statistics of the study population are presented in Table 1. The analysis consisted of a total of 3,416 individuals, with 2,751 from the Swab-and-Send sub-study and 665 from the Kiosk sub-study. Study participants lived in 110 unique zip codes in the state of Washington. Overall, 66.6% (n=2,276) of participants reported access to PSL. Median age of the study population was 35 years (range: 18-82). About two-thirds of study participants identified as female (n=2,257, 66.1%). There were 33 participants (1.0%) who identified their sex as "Other" or declined to say.

Regarding participant race/ethnicity, the largest proportion of participants identified as White (62.3%, n=2,128), followed by Asian (20.2%, n=690) and Latinx (6.5%, n=222) (see Table 1). Figure 3A shows the representativeness of the study sample in terms of race and ethnicity compared to the surrounding county and the U.S.

The household income category with the highest number of participants was 'Over $150,000' (n=952, 27.9%), while the 'Less than or equal to $25,000' had the smallest number (n=219, 6.4%). Figure 3B shows the income representativeness of the study sample compared to the surrounding county and the U.S.

SOCIODEMOGRAPHIC DIFFERENCES IN ACCESS TO PSL

White participants made up 64.2% of those with access to PSL, but only 58.5% of those without it. Table 2 and Figure 4 shows the proportion of participants within each category with access to PSL and the chi-square (χ^2) value by race/ethnicity, household income, and sex. The proportion of participants who reported access to PSL was highest in the Asian group (70.5%), followed by White (68.7%), Latinx (58.4%), Two or more races (57.1%), Black (47.1%), and Other (43.1%) (see Figure 4A). These proportions were statistically significant, χ^2 (5, N = 3,416) = 53.3, p < .001.

Proportion with access to PSL increased with each categorical increase in household income (see Figure 4A) and differed significantly, χ^2 (6, N=3,028) = 349.9, p < .0001. Only 23.3% of those in the lowest annual household income category ("Less than or equal to $25,000") reported access to PSL, while 83.1% of those in the highest category had access to PSL.

The association between sex and access to PSL was significant. Of females, 65.2% reported access to PSL, compared with 70.7% of males, χ^2 (1, N=3,383) = 9.9, p=0.002 (see Figure 4C).

Results from the regression models are summarized in Table 3 and Figure 5. Compared to White participants, the crude odds ratio of having access to PSL were 8% higher in Asians (OR: 1.08, 95% CI: 0.9-1.3), 61% lower among Black participants (OR: 0.39, 95% CI: 0.25-0.60), 35% lower among Latinx participants (OR: 0.65, 95% CI: 0.49, 0.86), 40% lower among those who selected two or more race categories (OR: 0.6, 95% CI: 0.43-0.83), and 47% lower among those in the other race category (OR: 0.53, 95% CI: 0.37, 0.76). The odds ratios of all race/ethnicity categories, apart from Asian, compared to White, were significant at the alpha=0.05 level.

The odds of having access to PSL among males were 27% higher than that of females (OR: 1.27, 95% CI: 1.09, 1.49) and was statistically significant (p=0.002).

The crude odds ratios of all annual household income categories compared to those in the annual household income category of $150,000 or more were statistically significant at the alpha=0.05 level. The associations in each of the categories compared to the reference category remained significant after adjusting for race/ethnicity and sex. The odds of having access to PSL among those in the lowest income category was 93% lower than those in the highest income category (adjusted OR: 0.07, 95% CI: 0.04, 0.09).

PSL AND CARE-SEEKING BEHAVIOR

Overall, 79.2% of participants answered the question which asked whether they sought clinical care for their current illness. In the entire study sample, 1,066 (31.2%) responded that they had sought clinical care, while 1,639 (48.0%) had not.

Figure 6 and Table 4 show the proportions of participants with and without access to PSL who engaged in care seeking and leave taking behavior. In terms of preventive health care behavior, those with PSL were 1.2 times more likely to have received the flu vaccine than those without (68.0% and 56.0%, respectively) (Figure 6A). These proportions differed significantly, χ^2 (1, N=3,416) = 47.5, $p<0.001$. However, a higher proportion of those without PSL who completed the follow-up questionnaire reported seeking access to care for their illness; χ^2 (6, N=2,705) = 9.42, p=0.001 (Figure 6B).

85.0% of participants answered the question of whether they had missed work or worked from home due to their illness. Missing a full day of work or working fewer hours due to illness was similar between those with access to PSL (55.2% missed work, 40.9% worked fewer hours) and those without (54.2% missed work, 45.0% worked fewer hours) (Figure 6C). The association between missing a day of work and PSL access was not statistically significant χ^2 (1, N=2,905) =

0.54, p=0.462, however, working fewer hours was found to be associated with PSL access χ^2 (1, N=2,905) = 4.02, p=0.045.

Participants who had access to PSL were more likely to have worked from home during their illness episode, χ^2 (1, N=2,905) = 110.36, p<0.001 (Figure 6D).

PATHOGEN PRESENCE

We investigated the respiratory pathogens detected from the nasal swabs (Figure 7). There was no significant difference in pathogen presence comparing the two groups, those with and without PSL. Of all participants without access to PSL, 41.4% had any pathogen detected in their sample, while that was 40.8% of those with access to PSL, χ^2 (1, N=3,416) = 0.11, p=0.74. Overall, the most detected pathogens were influenzas A, influenza B, and rhinovirus. A lower proportion of those without paid sick leave had influenza A or B detected in their sample compared to those with paid sick leave (14.3% vs. 16.2%, respectively). A higher proportion of those without paid sick leave had rhinovirus detected in their sample compared to those with paid sick leave (11.4% vs. 9.4%, respectively).

DISCUSSION

This analysis of workers in the Seattle metropolitan area who participated in a respiratory viral surveillance study found significant differences in access to PSL across household income categories, race/ethnicity, and sex.

This analysis highlights one of many mechanisms through which intersectional inequity is tied to health. Two further developments in national employment circumstances during COVID-19 have put low SES and BIPOC individuals at higher risk of poor health outcomes: unemployment and essential worker status. While this analysis focuses on occupational circumstances, it should be

noted that the skyrocketing unemployment rates in the United States during the COVID-19 pandemic have also disproportionately affected low SES and BIPOC people.[34] On top of that, Black and Latinx workers especially are more likely to have jobs that are considered essential.[24] The results from this study reinforce the existing evidence that access to PSL is unequally distributed, with low-income and BIPOC individuals and their families' bearing a higher burden.[23,35] When sick, these workers are left with two options: continue working while sick, being potentially contagious and having little time to rest, heal, or get care, or the alternative: sacrifice much-needed wages. We should not be asking low-income workers to make this choice.

The disparities in PSL between race/ethnicity groups was evidenced by the chi-squared test results and the significant regression results. It has been widely documented that in the United States, on a population scale, race/ethnicity and income are closely linked.[36]

While data included in this analysis were collected prior to the COVID-19 pandemic, it provides strong implications for the increased vulnerability of workers who were not able to work remotely or take PSL. Although this study did not capture the occupations or essential work status of study participants, those with access to PSL were 2.2 times more likely to work from home when sick than those without access to PSL. This provides evidence that those working in jobs without sick leave were most likely able to work remotely, which would situate them and their families in even more precarious health situations during the COVID-19 pandemic. As part of the federal government's COVID-19 relief bill, the Families First Coronavirus Response Act did include a temporary provision for paid sick leave for certain employers.[37] Even so, PSL has not been discussed widely in the literature as a contributing factor to economic and racial disparities in COVID-19 incidence and mortality.

This study found that 66.6% of participants reported access to PSL, a lower proportion than the Bureau of Labor Statistics estimate of 76% of civilian workers.[38] Our findings that workers without PSL were less likely to have received a flu shot is consistent with prior findings from studies in the U.S. regarding preventive health care access and use.[17,39] However, where we observed that PSL access was not associated with increased care-seeking due to the illness, other studies have reported an association between no PSL and delayed or forgone care.[22]

Although we did not find an obvious difference in pathogen presence in the samples varying by access to PSL, the distinction lies in the ability to stay home. The 41.4% of participants without PSL who had respiratory pathogens detected in their sample do not have the incentive to stay home, whether on leave or working from home, leading to contagious presenteeism in the workplace.

Monitoring of access to PSL (among other workers' rights) should be done at the employee-level, rather than the employer-level, since workers' lived experiences and the policies on-paper have been shown to differ.[7,40] Furthermore, employees in more precarious employment circumstances (e.g. undocumented immigrants or people who have been previously incarcerated) may be less likely to know about or report employers for violations of PSL laws for fear of retribution or firing. This can lead to situations where workplaces provide PSL access on paper but not in practice. Ultimately, PSL must be both written into policy and be acceptable and encouraged by one's workplace, or else it is not truly accessible.

LIMITATIONS

There were several limitations to this study. One main limitation is the potential selection bias of participants due to the convenience sampling strategy, which may have impacted the representativeness of the sample (see Figures 5A, B). The median household income in King

County in 2018 was $95,009.[41] In our study sample, the median household income category was between $100,001 to $125,000, indicating potentially a slightly higher average income among the study sample than the greater King County population. Additionally, median household income in the United States in 2019 was $68,703.[42] These data indicate that the study population included here was significantly wealthier, on average, than the United States population, which affects the generalizability of the findings.

We must use caution when drawing inferences on race/ethnicity inequities from this study. There are many more racial and ethnic identities and experiences that were not captured by the survey's questionnaire. Limited race/ethnicity categories and statistical power requirements meant that participants of many different racial and ethnic identities were combined, however, this is not meant to infer that all are equally affected by access to PSL.

This study sample included participants aged 18 years and older, and since one of the data collection kiosk locations was located on a major public university campus, there is potential for information bias introduced by the number of university students with part-time and/or lower wage employment, but who may be considered dependents of other adults for tax purposes, and would report a higher household income. This classification represents a different scenario than what we intended to capture; however, in our estimation, this has not biased our results. It was important to capture inequities in access to PSL for all workers, regardless of university affiliation, full/part-time employment status, or hourly/salaried. Therefore, we opted to include university students in this analysis.

This study had several potential unmeasured confounding variables. For example, participants were not asked about their immigration status, occupation, industry, hourly vs salaried worker, or part-time/full-time status, so we were not able to include these variables in the analysis.

POLICY IMPLICATIONS

Our findings have implications for one way in which labor policy can exacerbate existing health disparities. While working across systems towards health equity, we must expand policies that enable access to PSL to include all workers, regardless of length of occupation, industry, full-time status, or salaried vs hourly. Doing so would not only improve access to preventive care services such as flu vaccination, but could reduce infectious disease transmission in the workplace, and protect the most economically vulnerable workers from losing wages in the event of illness.

CONCLUSION

We have shown that in our study population, access to PSL is inequitably distributed across income, race/ethnicity, and sex. Forcing low-income workers to choose between their health and wages leads to compounding vulnerability for themselves and their families. Future studies should investigate barriers to equitable access to PSL and healthcare seeking behaviors on a large sample population, using data collected from workers' point-of-view. Integrating qualitative research methods would be valuable to better understand the occupational circumstances that affect the health of employees. While a whole systems approach is needed to address health inequities in the United States, providing equitable and adequate PSL to all workers is a simple step in the right direction.

TABLES

Table 1. Sociodemographic Characteristics of Seattle Flu Study, Washington, 2019-2020

	Access to PSL		Overall (N=3416)
	No (N=1140)	Yes (N=2276)	
Age at Enrollment (years)*			
Mean (SD)	36.3 (13.6)	37.7 (10.8)	37.2 (11.9)
Median [Min, Max]	34.0 [18.0, 82.0]	36.0 [18.0, 73.0]	35.0 [18.0, 82.0]
Sex			
Female	788 (69.1%)	1469 (64.5%)	2257 (66.1%)
Male	334 (29.3%)	792 (34.8%)	1126 (33.0%)
Other/Don't Say	18 (1.6%)	15 (0.7%)	33 (1.0%)
Race/Ethnicity			
Asian	205 (18.0%)	485 (21.3%)	690 (20.2%)
Black	48 (4.2%)	41 (1.8%)	89 (2.6%)
Latinx	92 (8.1%)	130 (5.7%)	222 (6.5%)
Multiple Races	68 (6.0%)	89 (3.9%)	157 (4.6%)
Other	60 (5.3%)	70 (3.1%)	130 (3.8%)
White	667 (58.5%)	1461 (64.2%)	2128 (62.3%)
Household Income Level**			
Less than or equal to $25,000	168 (14.7%)	51 (2.2%)	219 (6.4%)
$25,001 to $50,000	178 (15.6%)	200 (8.8%)	378 (11.1%)
$50,001 to $75,000	145 (12.7%)	266 (11.7%)	411 (12.0%)
$75,001 to $100,000	142 (12.5%)	277 (12.2%)	419 (12.3%)
$100,001 to $125,000	100 (8.8%)	277 (12.2%)	377 (11.0%)
$125,001 to $150,000	65 (5.7%)	207 (9.1%)	272 (8.0%)
Over $150,000	161 (14.1%)	791 (34.8%)	952 (27.9%)
Missing	181 (15.9%)	207 (9.1%)	388 (11.4%)
Education Level			
Less than high school	15 (1.3%)	7 (0.3%)	22 (0.6%)
High school/GED	107 (9.4%)	54 (2.4%)	161 (4.7%)
Some college	315 (27.6%)	264 (11.6%)	579 (16.9%)
Bachelor's	369 (32.4%)	919 (40.4%)	1288 (37.7%)

Advanced degree	309 (27.1%)	1006 (44.2%)	1315 (38.5%)
Prefer not to say	19 (1.7%)	25 (1.1%)	44 (1.3%)
Missing	6 (0.5%)	1 (0.0%)	7 (0.2%)
Sought Care for Illness			
No	468 (41.1%)	1171 (51.4%)	1639 (48.0%)
Yes	368 (32.3%)	698 (30.7%)	1066 (31.2%)
Missing	304 (26.7%)	407 (17.9%)	711 (20.8%)
Received Flu Vaccine			
No	502 (44.0%)	728 (32.0%)	1230 (36.0%)
Yes	638 (56.0%)	1548 (68.0%)	2186 (64.0%)
Worked from Home due to Illness**			
No	624 (54.7%)	1064 (46.7%)	1688 (49.4%)
Yes	230 (20.2%)	987 (43.4%)	1217 (35.6%)
Missing	286 (25.1%)	225 (9.9%)	511 (15.0%)
Worked Fewer Hours due to Illness**			
No	505 (44.3%)	1128 (49.6%)	1633 (47.8%)
Yes	349 (30.6%)	923 (40.6%)	1272 (37.2%)
Missing	286 (25.1%)	225 (9.9%)	511 (15.0%)
Missed Work due to Illness**			
No	363 (31.8%)	904 (39.7%)	1267 (37.1%)
Yes	491 (43.1%)	1147 (50.4%)	1638 (48.0%)
Missing	286 (25.1%)	225 (9.9%)	511 (15.0%)
**Numbers in parentheses show percentage of column total*			

Table 2. Pearson's Chi-Squared Results for Sociodemographic Characteristics' Association with Access to PSL

	PSL		*X2*	*DF*	*p*
	n	**%**			
Race/Ethnicity*			53.3	5	<0.001
Asian	485	70.3%			
Black	41	46.1%			
Latinx	130	58.6%			
Two or more races	89	56.7%			
White	1461	68.7%			
Other	70	53.8%			
Household Income**			349.9	6	<0.001
Less than or equal to $25,000	51	23.3%			
$25,001 to $50,000	200	52.9%			
$50,001 to $75,000	266	64.7%			
$75,001 to $100,000	277	66.1%			
$100,001 to $125,000	277	73.5%			
$125,001 to $150,000	207	76.1%			
Over $150,000	791	83.1%			
Sex***			9.9	1	0.002
Female	1467	65.2%			
Male	792	70.7%			
**Those who responded 'Prefer Not to Say' or had missing response were omitted (n=87)*					
***Those who responded 'I Don't Know' or 'Prefer Not to Say' were omitted (n=385)*					
****Those who responded 'Other' or 'Prefer Not to Say' were omitted (n=33)*					

Table 3. Logistic regression results

	Crude OR	Crude 95% CI	Adjusted OR*	Adjusted 95% CI
Race/Ethnicity				
White	Ref	Ref	—	—
Asian	1.08	0.90, 1.30	—	—
Black	0.39	*0.25, 0.60*	—	—
Latinx	0.65	*0.49, 0.86*	—	—
Multiple	0.6	*0.43, 0.83*	—	—
Other	0.53	*0.37, 0.76*	—	—
Sex				
Male	1.27	*1.09, 1.49*	—	—
Female	Ref	Ref	—	—
Household Income				
>150k	Ref	Ref	Ref	Ref
<25k	0.06	*0.04, 0.09*	0.07	*0.04, 0.09*
25k-50k	0.23	*0.18, 0.30*	0.24	*0.19, 0.32*
50k-75k	0.37	*0.29, 0.49*	0.39	*0.30, 0.52*
75k-100k	0.4	*0.30, 0.52*	0.41	*0.31, 0.54*
100k-125k	0.56	*0.42, 0.75*	0.58	*0.43, 0.77*
125k-150k	0.65	*0.47, 0.90*	0.65	*0.47, 0.90*

OR=odds ratio. CI=confidence interval. Italics indicated statistical significance at alpha level = 0.05.

**Income ORs are adjusted for race/ethnicity and sex. We only present crude ORs for sex and race/ethnicity because we cannot interpret adjusted ORs due to household income being on the causal pathway between exposure and outcome.*

Table 4. Association between Access to PSL and Care-Seeking and Leave-Taking Behaviors (with Pearson's Chi-Squared Results)

	PSL				
	n	%	***X2***	***DF***	***P***
Received Flu Vaccine			47.5	1	<0.001
No	728	59.2%			
Yes	1548	70.8%			
Sought Care for Illness*			9.42	1	0.001
No	1171	71.4%			
Yes	698	65.5%			
Missed Work due to Illness**			0.54	1	0.462
No	971	70.9%			
Yes	1147	70.0%			
Worked from Home due to Illness**			110.36	1	<0.001
No	1064	63.0%			
Yes	987	81.1%			
Worked Fewer Hours due to Illness**			4.02	1	0.045
No	1128	69.1%			
Yes	923	72.6%			

**711 participants did not answer this question and were omitted*
***511 participants did not answer this question and were omitted*

FIGURES

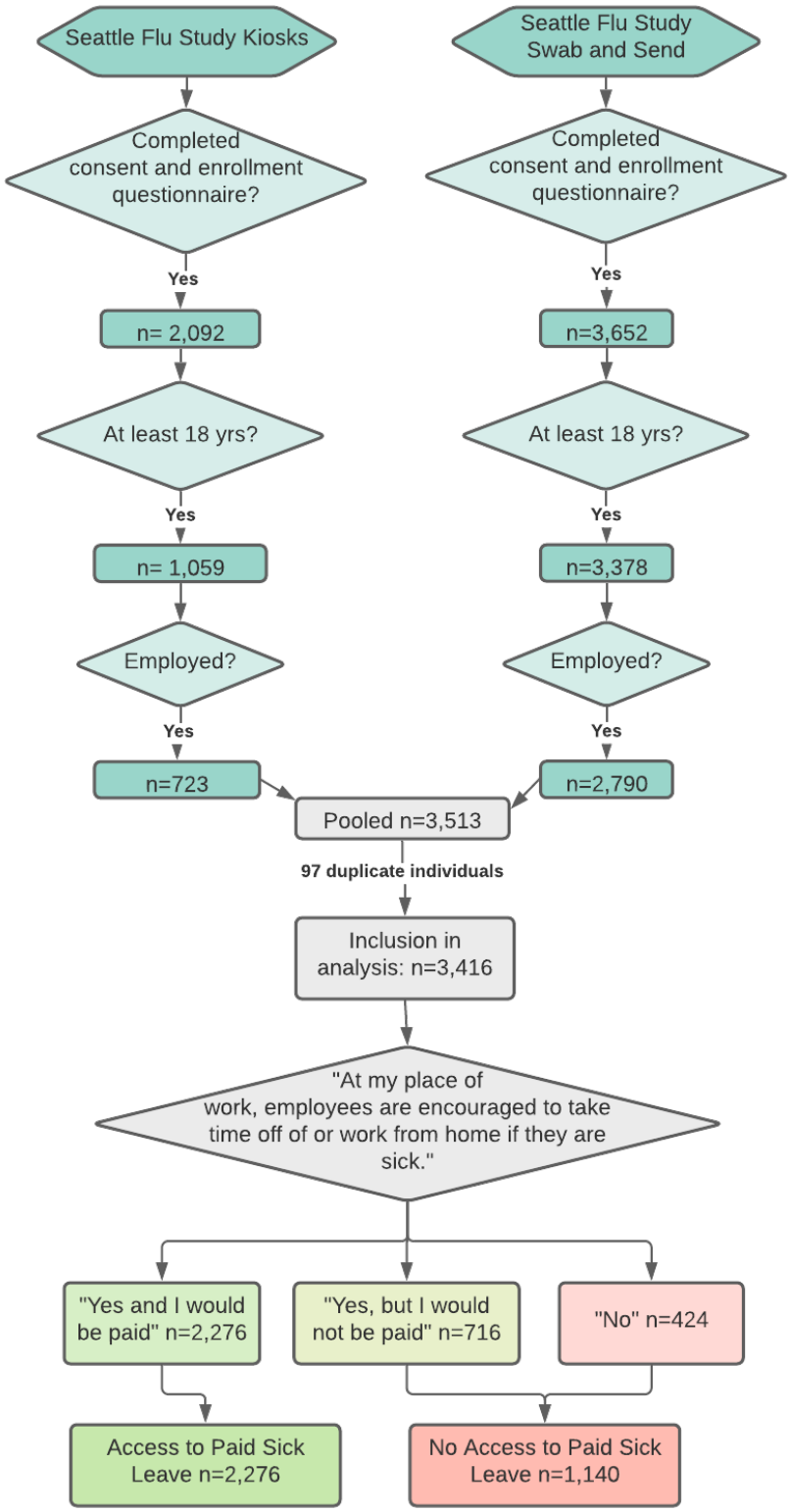


Figure 1. Study inclusion flowchart

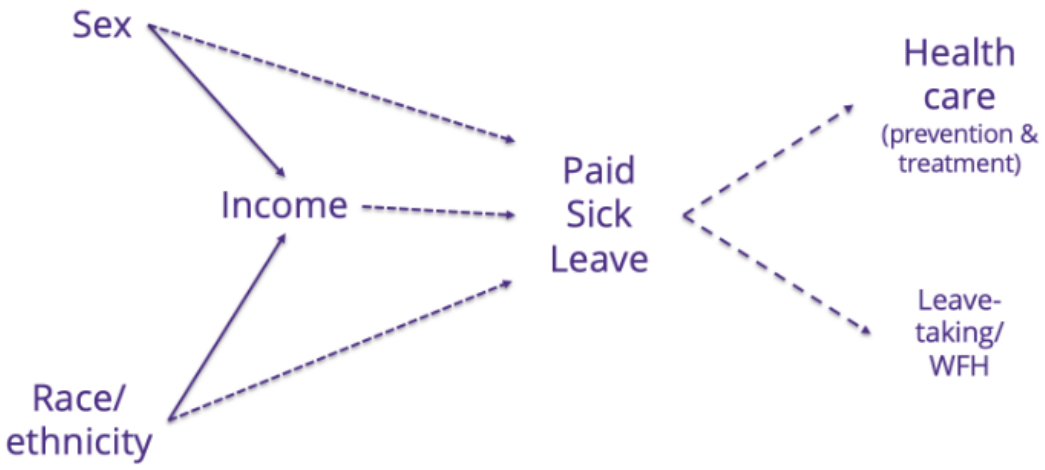
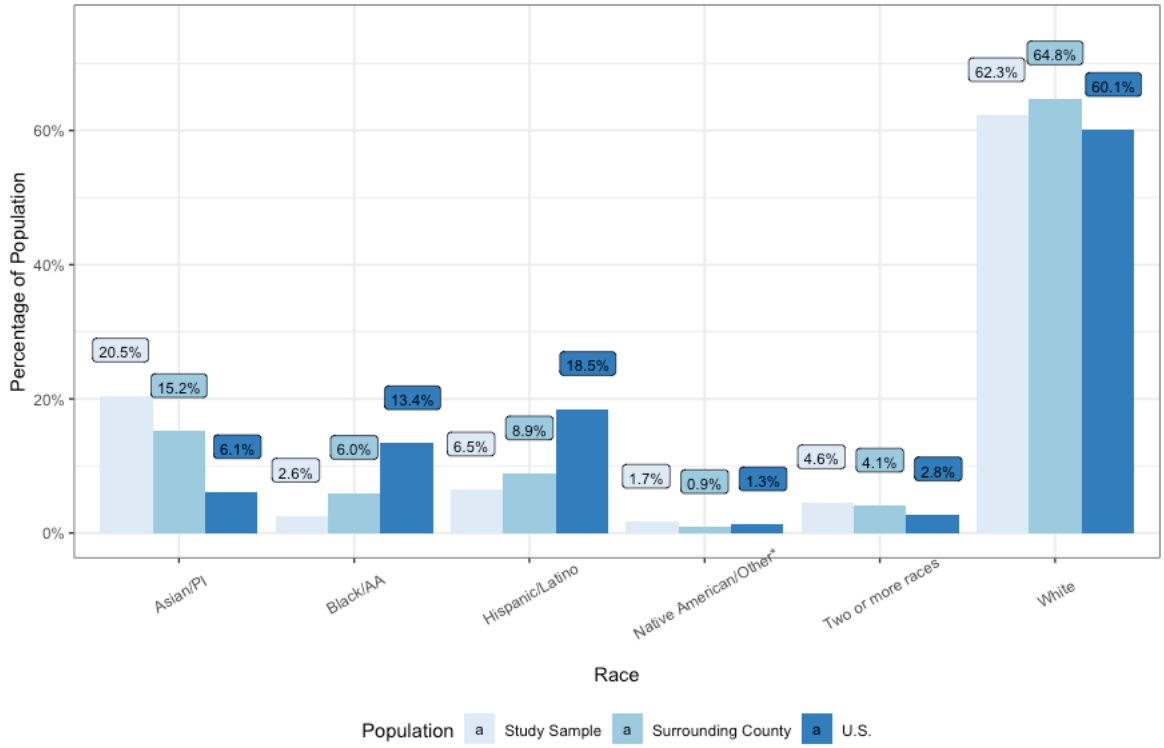


Figure 2. Directed acyclic graph (DAG) of the variables of interest
Dashed lines indicate associations that we explore in this analysis.

A.



B.

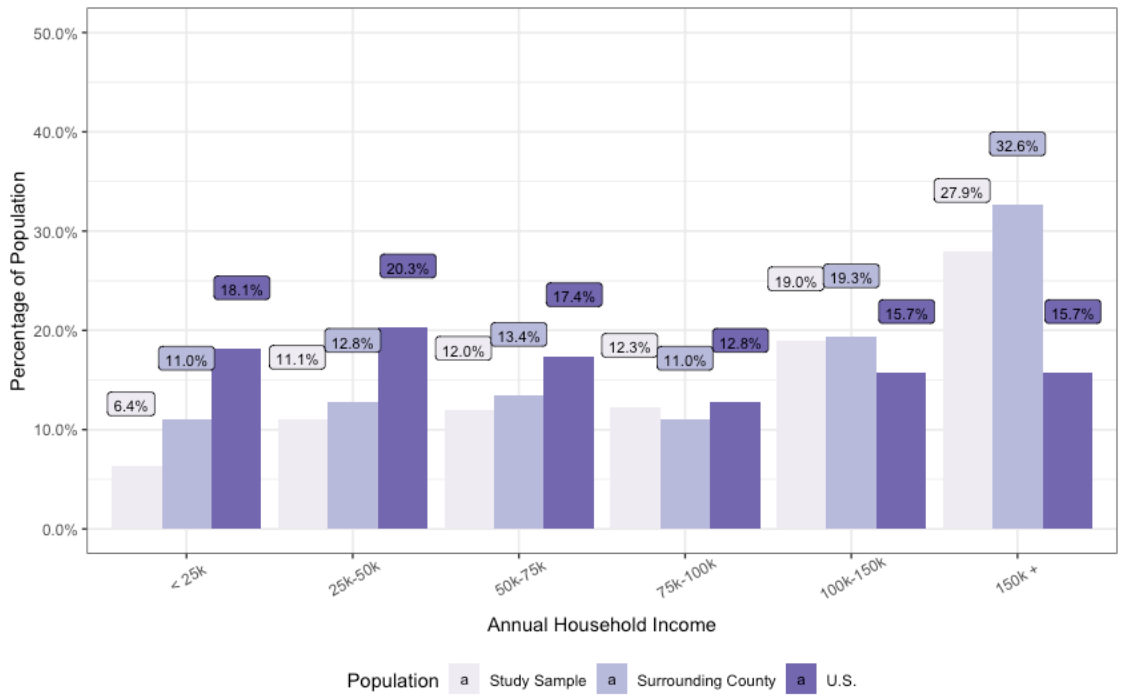


Figure 3. Representativeness of study population compared to surrounding county and the U.S.
(A) Sample race/ethnicity representativeness compared to King County and U.S.[43,44]
(B) Sample household income representativeness compared to King County and U.S. [32,33]
**In King County, this is Native American and Other, but for the U.S. data, it is just Native American or Alaska Native. US data does not have an 'other' category.*

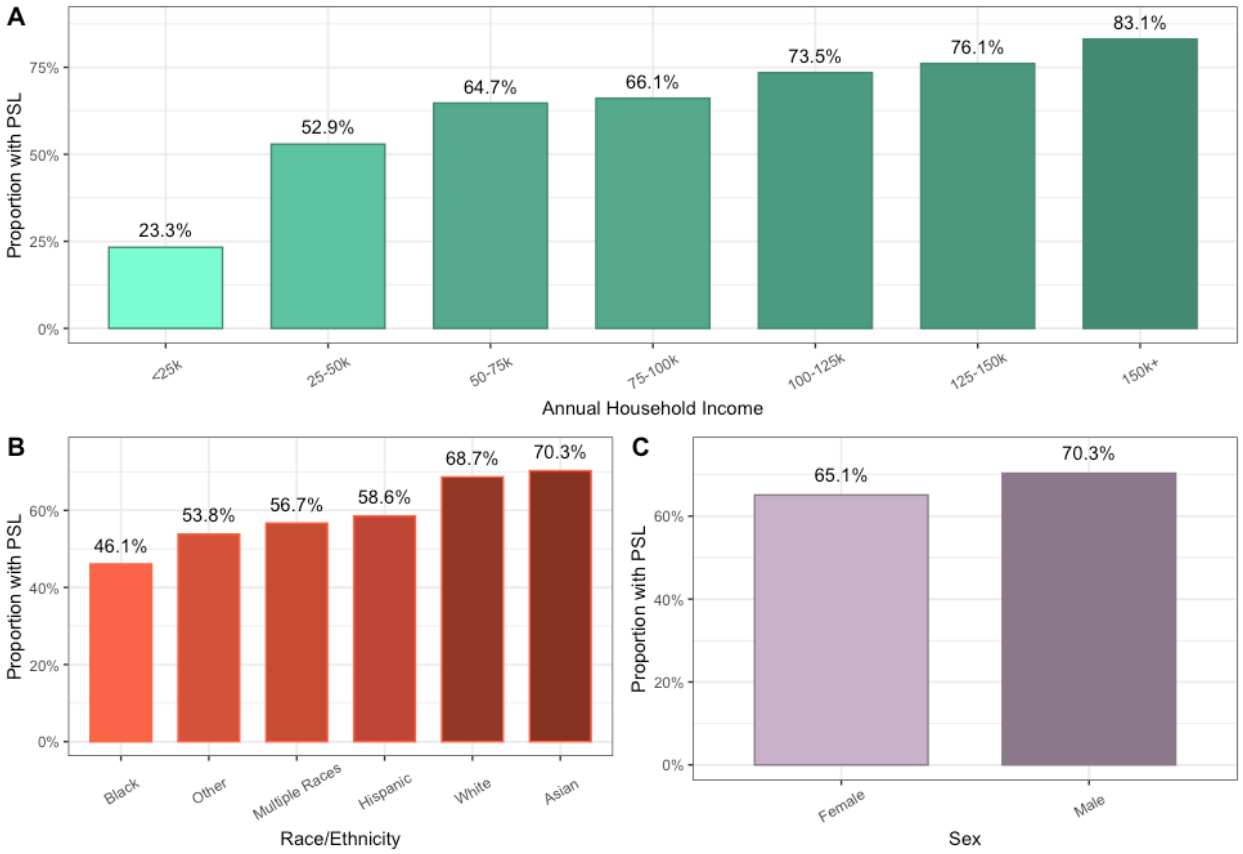


Figure 4. Access to PSL by (A) annual household income, (B) race/ethnicity, and (C) sex

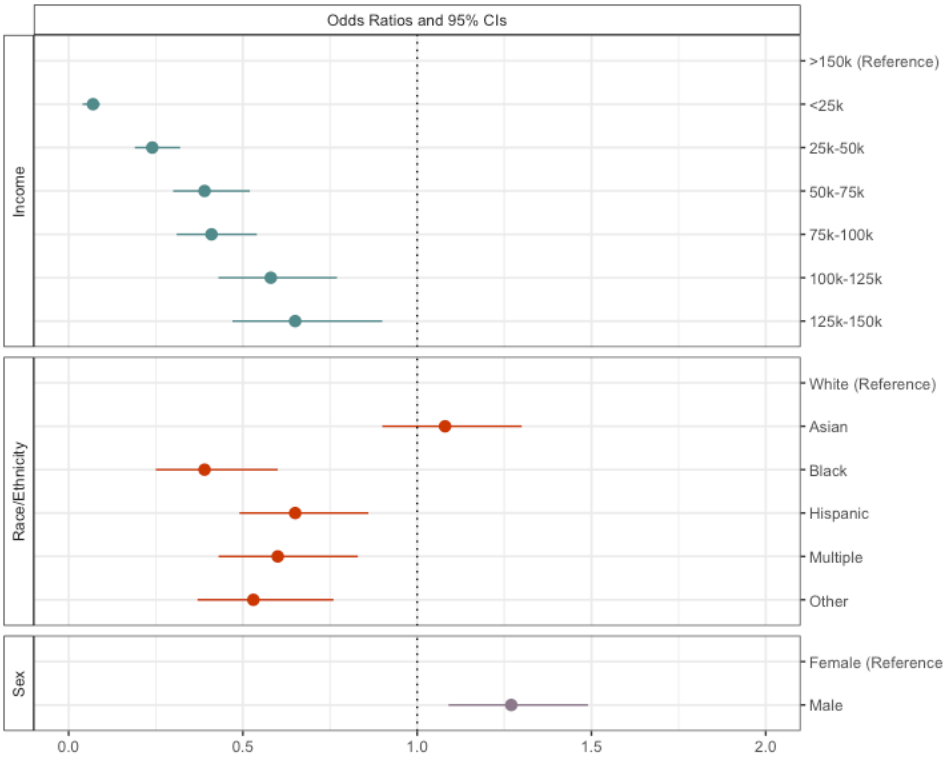


Figure 5. Forest plot showing adjusted odds ratios and 95% confidence intervals from the multiple logistic regression models

For race/ethnicity, White served as the reference category. For annual household income, over $150,000 per year was the reference category. For sex, female was the reference category.

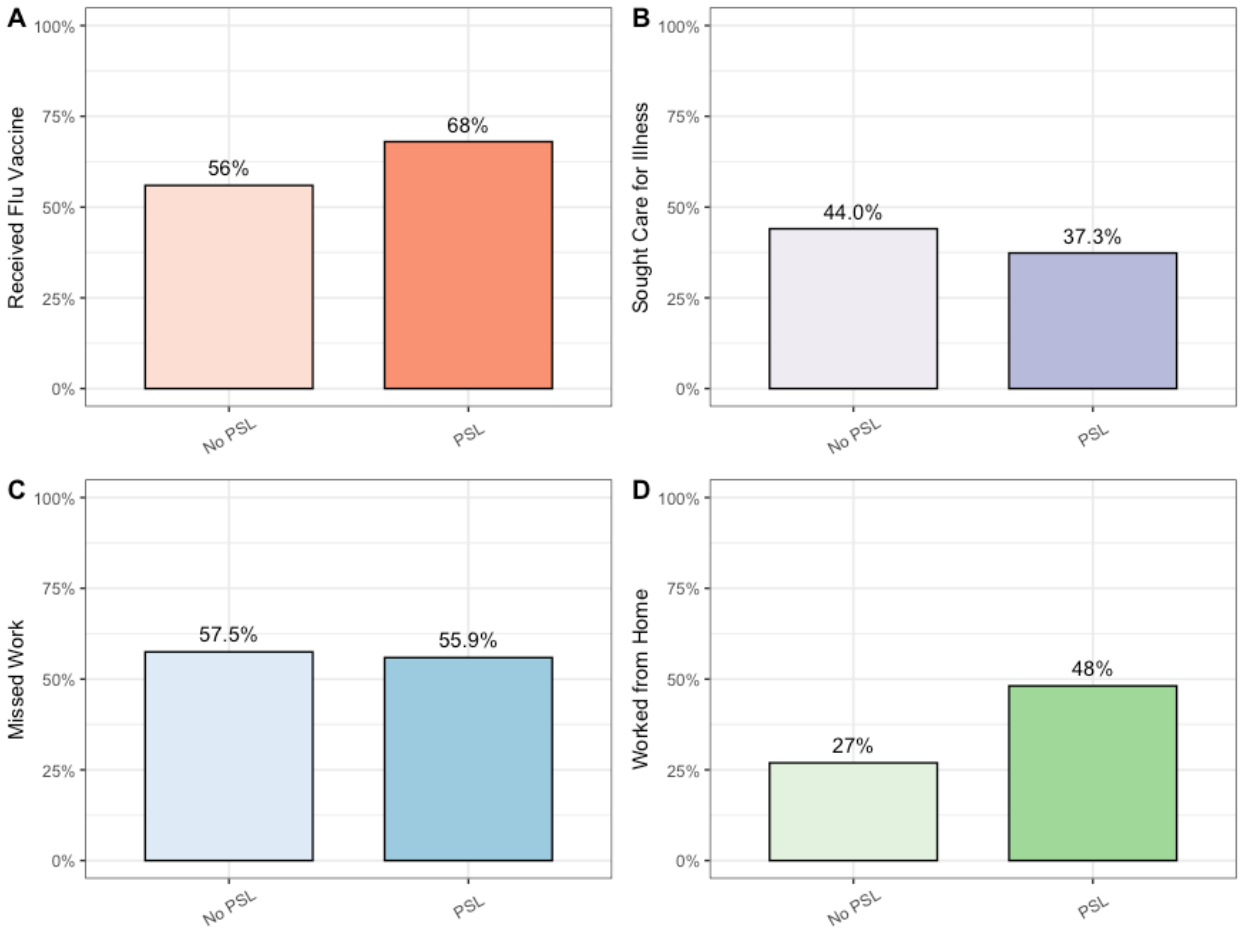


Figure 6. Behaviors by access to PSL.
(A) Proportion of participants with and without PSL who had received a flu vaccination that year
(B) Proportion of participants with and without PSL who sought care for their current illness
(C) Proportion of participants with and without PSL who missed work due to their current illness
(D) Proportion of participants with and without PSL who worked from home due to their current illness

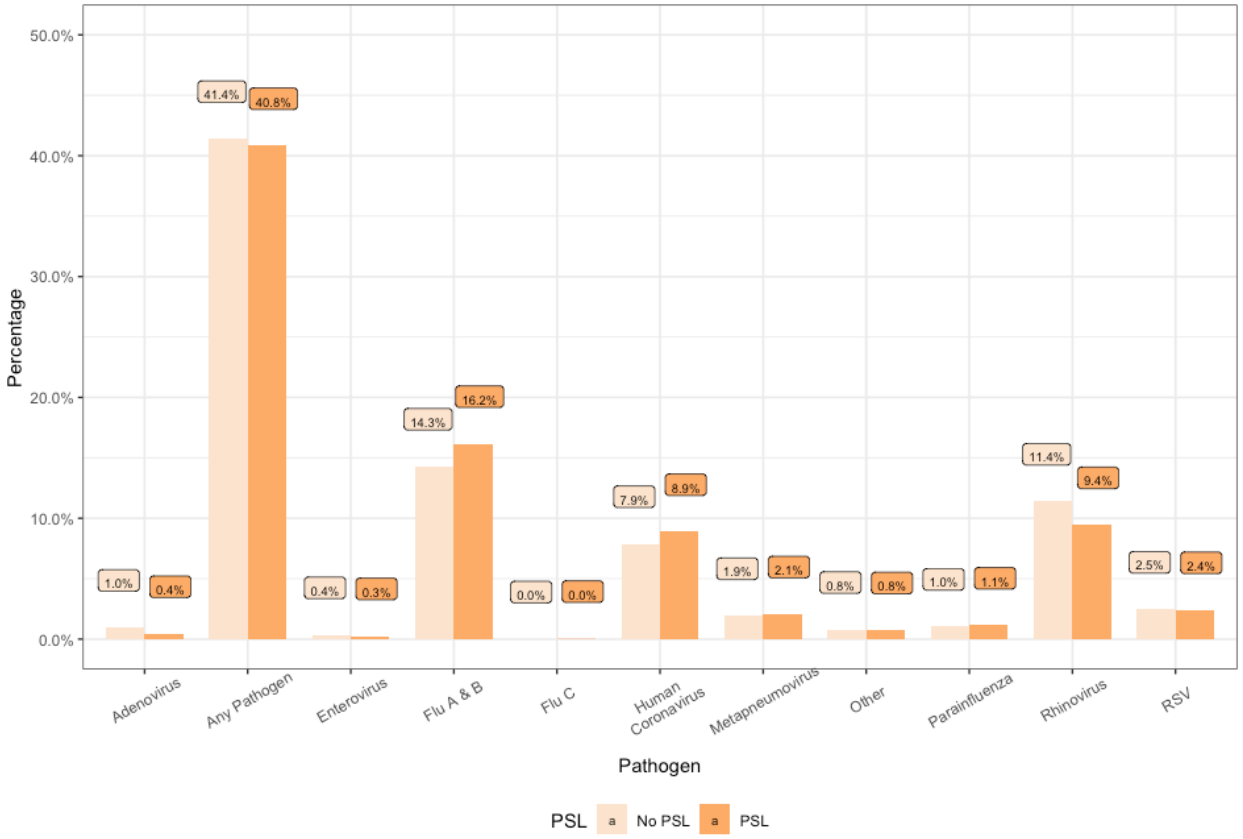


Figure 7. Respiratory pathogen presence among nasal swab samples from participants with and without access to PSL.

APPENDICES

Appendix A: Consent Forms

- A1: Kiosk Consent Form
- A2: Swab-and-Send Consent Form

Appendix B: Enrollment Questionnaire

Appendix C: Illness Questionnaire

Appendix D: One Week Follow-Up Questionnaire

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