

COVID-19 Surveillance in Washington Workers' Compensation Data Final Report, March 2020 to May 2024

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Introduction

In this final report, we summarize the Safety and Health Assessment & Research for Prevention (SHARP) Program's methods and findings from the lifetime of a surveillance system for occupational COVID-19, as well as the impact of presumptive coverage laws [1]. It is important to evaluate the impact of the workers' compensation presumption laws enacted during the COVID-19 pandemic as similar laws could be used in future public health emergencies in Washington State.

The system collected and disseminated data on Washington workers' compensation claims for COVID-19 exposure and illness from February 2020 through May 2024. The first confirmed case of COVID-19 in Washington State was identified by the Washington State Department of Health (DOH) on January 21, 2020 [1]. In March and April of 2020 the Washington State Department of Labor and Industries (L&I), which administers the state's industrial insurance program, adopted a policy for healthcare workers and first-responders to "assume these individuals' exposure meets workers' compensation criteria unless there is evidence that no on-the-job exposure occurred", as clarified by memorandum from the governor [2]. Quarantined workers with evidence of a positive exposure at work did not require testing or COVID-19 contraction to be eligible for time-loss benefits. Workers outside of healthcare and first responders were encouraged to apply for workers' compensation benefits under the standard industrial insurance process [3].

On May 11, 2021, the Health Emergency Labor Standards Act (HELSEA) enacted presumptive coverage for all frontline workers, including occupations outside of healthcare and first responders (RCW 51.32.181) [4]. Frontline workers could be found across all industries, such as manufacturing, agriculture, maintenance, food service, retail, and public transit. For workers who met the definition of 'frontline employee' under HELSEA, the presumption coverage reduced their burden of proof that their COVID-19 was work-related. Rebuttal to presumption was allowed when contraction occurred through non-employment activities, other employment, work-from-home, and leave of absence. Workers covered by HELSEA were required to provide disease verification to have their claim accepted. Verification could include a positive PCR or rapid antigen test administered by an employer, pharmacy, local health jurisdiction, or commercial testing facility [3]. Workers without presumptive coverage were required to have a positive PCR test, be at increased risk due to their occupation, and have a medical provider certify that the illness was work-related [3]. Presumptive coverage ended April 10, 2023 when the federal state of emergency ended [3]. Restrictions on business activity in Washington State were entirely lifted on June 30, 2021 [5].

The purpose of this report is to a) characterize the demographics, industry, and occupation for work-related COVID-19 claims; b) characterize trends in workers' compensation claim filing and claim acceptance rates among different occupational groups before, during, and after workers' compensation presumption laws were in effect; and c) compare occupational COVID-19 case counts reported through workers' compensation with COVID-19 case counts in the general population. Major findings from previously published reports are included here [6].

Methods

Data Sources

Workers' compensation

Our primary data source is the Washington State workers' compensation (WC) system, administered by the Department of Labor and Industries (L&I). In Washington State, with a few exceptions, all nonfederal employers must obtain WC insurance through the State Fund insurance program [7]. About 72% of all employees and 99.7% of employers are covered through the State Fund. Exemptions to the mandatory coverage include insurance through an alternative WC program (e.g. Federal Employees' Compensation Act, Longshore and Harbor Workers' Compensation Act), self-employment, a small number of statutory exemptions for specific occupations or employment arrangements, or employers who meet the requirements to self-insure. L&I provides workers' compensation oversight of self-insured employers.

Our COVID-19 surveillance system included claims from the State Fund and self-insured systems. We included rejected claims, as we are primarily interested in measuring the burden of COVID-19 across occupation. Workers covered by Washington WC exposed during out-of-state work were also included. For this report, we included claims established between February 1, 2020 and May 31, 2024.

Secondary sources

To adjust case counts by industry size, we used payroll data submitted quarterly to L&I for the purposes of calculating insurance premiums. Employers submit total hours worked per quarter and each account is assigned a North American Industry Classification Coding System (NAICS) code [8]. Quarterly hours were aggregated by NAICS industry sector (2-digit level). As our reporting period begins and ends in the middle of quarters (2020-Q1 and 2024-Q3), hours for the partial quarters were adjusted by multiplying the quarter's hours by the percentage of the quarter's days within the reporting period.

A dataset of PCR laboratory tests from the Washington State Department of Health (DOH) Washington Disease Reporting System (WDRS) was obtained through a data sharing agreement and provides an additional data source on WC cases' laboratory testing status. WC cases were probabilistically linked with the WDRS dataset.

The DOH Case Investigation and Contact Tracing (CICT) team collected information on occupation and industry during COVID-19 contact tracing interviews. Ideally, this data would be used to adjust WC COVID-19 case counts by the overall COVID-19 cases within each industry or occupation, to better understand WC utilization over time. However, this data is incomplete. A 2021 collaborative report between CICT and L&I found that only 38% of cases among working age adults (18-64) had occupational data [9]. Furthermore, effective January 2022, the CICT team prioritized case interviews for individuals younger than 22 years old and greater than 64 years old, and the collection of industry and occupation data declined more [10].

Instead, we compared occupational cases of COVID-19 reported through WC to the total number of COVID-19 cases in the working-age population (18-64 y.o.) using data provided by the CICT team through a public data request. This dataset includes positive PCR and antigen tests reported by laboratories and local health jurisdictions, and excludes at-home rapid tests.

Using the US Census Current Population Survey (CPS 2020-2024), we estimated that 64% of the population aged 18-64 in Washington State met a simplified definition of WC eligibility: currently employed for salary or wages outside of self-employment, the federal government, the armed forces, and private households (Census industry code 9290). The data was accessed and analyzed using the IPUMS Survey Documentation and Analysis tool [11]. We adjusted the total number of COVID-19 cases in the working-age population reported to the DOH by this estimated proportion to better evaluate underreporting of COVID-19 cases in the WC system.

Potential case identification

Potential COVID-19 cases were identified weekly from L&I's Industrial Insurance Data Warehouse using any of the following criteria. The criteria evolved over the course of the pandemic to include new administrative practices and ICD-10 codes. A complete list of the criteria can be found in Appendix A.

- **Keywords** for COVID-19 in the injury description fields on the Report of Accident form submitted by the worker, employer, or provider. Keywords included variations of *SARS COVID-19* and *coronavirus*, allowing for abbreviations, colloquial terms, and misspellings.
- **Occupational Injury and Illness Classification System (OIICS version 1.01) codes** for infectious disease, assigned by claim administrators to classify injuries [12]. There is no specific OIICS code for COVID-19. Due to this lack of specificity, these codes yielded many false positives and ceased being used in January 2022.
- **Medical diagnoses codes (ICD-10-CM)** found in medical bills submitted to L&I for reimbursement [13]. Early in the pandemic, before medical coding for COVID-19 had become standardized, we identified claims with a combination of ICD-10 codes for COVID-19 symptoms (ex. cough, dyspnea, fever) or codes for unspecified coronavirus or pneumonia infections. This approach was phased out in August 2020. Once specific ICD-10 codes for COVID-19 were announced by the Centers for Disease Control (CDC), they were added to the case identification criteria.
- **Administrative orders** for COVID-19 exposure or contraction. In the workers' compensation system, administrative orders are written communications to workers, employers, and providers regarding official department decisions. They are generated by an automated system after a department determination on a claim has been made. COVID-19 orders were introduced by mid-March 2020, and became our primary and most reliable method for capturing COVID-19 claims. Rejected claims did not receive these orders and were identified based on the other criteria.

Case definition and review procedure

Potential cases were reviewed by program staff to determine if each meets the **case definition - suspected or confirmed occupational exposure to COVID-19, with or without COVID-19 infection**. Supporting evidence was gathered from medical records, claim initiation forms, and correspondence with L&I. We accepted attestations of a probable or known exposure made by workers, employers, or providers. Potential cases that meet this definition are "cases". If there was clear information that contradicts the case definition or there was insufficient information, it is not a case. Determining if there is sufficient evidence can be a subjective process. We do not use workers' compensation claim adjudication status or occupation in our case definition.

The review process evolved over time. From March 2020 to February 2022, all potential cases were reviewed by program staff six weeks after the claim was established. We collected data on COVID-19 testing, source of exposure, quarantine status, and out-of-state travel. All forms of COVID-19 testing were included (PCR, rapid testing, antibody testing, etc.). In February 2022, the Omicron wave of the pandemic brought a rapid increase in the number of claims and exceeded staff resources. We introduced automated methods for case review and only collected data on COVID-19 testing. Claims with COVID-19 administrative orders were automatically determined to be cases, as these claims had already undergone industrial insurance confirmation for work-related exposure and/or COVID-19 disease. Claims without administrative orders were manually reviewed to determine whether they met the case definition.

COVID-19 testing data was gathered through two automated methods. Workers with specific administrative orders for COVID-19 *contraction* had been flagged as having tested positive by a claim administrator. Claims were probabilistically linked with lab-confirmed PCR tests reported to the Department of Health. If neither of these pathways succeeded, claim's medical records were reviewed to determine testing status.

Claimant and employer characteristics come from L&I's Industrial Insurance Data Warehouse. The business' industry is coded by L&I using the 2007 North American Industry Classification Coding System (NAICS) and the claimants' occupation is coded using the 2002 Standard Occupational Classification (SOC).

Presumptive coverage variables

To evaluate the effect of presumptive coverage legislation (HELSEA) on claim filing trends, we aggregated cases into three periods by claim established date:

- **Pre-HELSEA (2/1/2020 - 5/10/2021):** the period from the start of reporting to the eve of the enactment of HELSEA, when only healthcare and first-responders had presumption-like coverage in accordance with the governor's memorandum.
- **HELSEA (5/11/2021 - 4/9/2023):** the period HELSEA was in effect, when presumptive coverage was extended to include frontline workers with a positive test.
- **Post-HELSEA (4/10/2023 – 5/31/2024):** the period from when HELSEA was ended to the end of the reporting period, when no workers had presumptive coverage

Our next aim was to evaluate the impacts of presumptive coverage by occupation. **Healthcare workers and first-responders (HC&FR)** were readily identified using the NAICS and SOC codes listed in the next paragraph. HC&FR had presumption-like coverage before and presumption coverage during the period HELSEA was in effect. Outside of HC&FR, we could not determine which NAICS or SOC were covered by HELSEA. The law broadly defined "frontline workers" using contextual criteria such as contact with the public and essential job duties. Essential work included food processing, food service in facilities treating COVID-19 patients, bus operators for public mass transportation, and child care [14]. NAICS and SOC alone cannot capture all of the relevant work context. Therefore, we aggregated claims by HC&FR and **all other workers**, which included workers that may or may not meet the definition of a "frontline worker" under HELSEA.

The NAICS codes used to define HC&FR are: Health Care and Social Assistance (62-); Colleges, Universities, and Professional Schools (611310, includes teaching hospitals); Correctional institutions (922140); Fire Protection (922160); and Police Protection (922120). The SOC codes used to define HC&FR are: Healthcare Practitioners and Technical (29-); Healthcare Support (31-); Protective Service (33-); and Home health aides (399021).

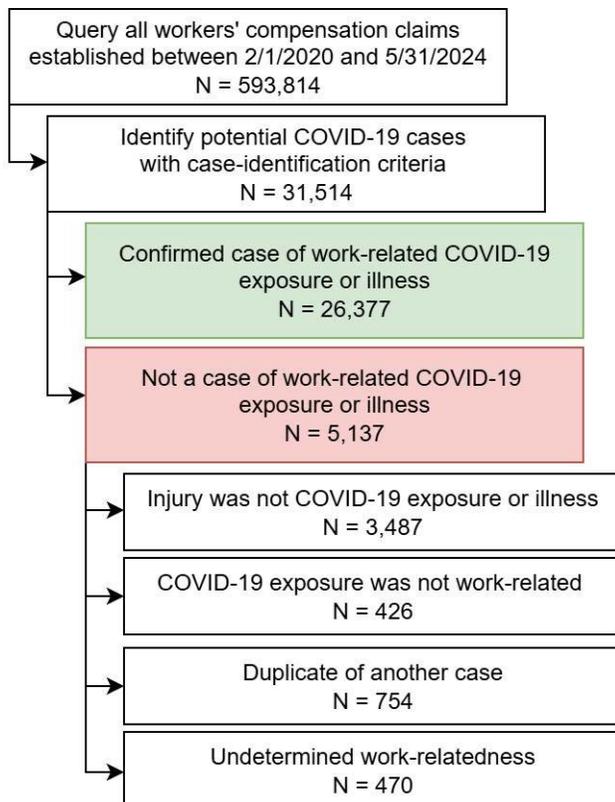
Results

Cohort characteristics

We identified 31,514 potential COVID-19 cases with established dates between February 1, 2020 and May 31, 2024 (Figure 1). For more information on the accuracy of the case-identification methods, see Appendix B. The majority of potential cases were identified using administrative orders (78%). An additional 6,930 potential cases were identified using keywords, ICD-10 codes, or OIICS codes (Appendix B Table 11).

Overall, 84% of potential cases met our case definition (N = 26,377, Figure 1). The earliest case was established February 26, 2020 with an exposure date of February 23, 2020. Sixteen percent of potential cases did not meet our case definition, most often because the injury wasn't a COVID-19 exposure or illness (N = 3,487). These cases often used keywords for COVID-19 to describe the context for a traumatic injury, were tested for COVID-19 before medical procedures, or were cases of other viral infections coded with the same broad OIICS code. Comparatively few potential cases did not meet the case definition because we determined the COVID-19 exposure was not work-related (N=426) or the work-relatedness could not be determined (N=470, Figure 1).

Figure 1. COVID-19 surveillance system steps



For the remainder of the report, we will only be discussing claims that met our case definition (“case”). Cases were predominantly female with a median age of 43 years at time of exposure, and 83% reported a positive test (Table 1). The median age among cases was slightly higher than the population median age of 41 years among employed Washington adults (American Community Survey 2018-2022)[15]. Two percent of cases filed claims in a language other than English, slightly lower than the population estimate of 3.5% limited English proficiency among employed adults (American Community Survey 2018-2022) [15]. Among cases established before February 2022, when data collection for these fields ceased, 94% of cases were quarantined and <1% were exposed to COVID-19 during out-of-state travel. Due to repeat exposure, individual claimants can have more than one valid case of COVID-19 exposure or contraction; 2,034 claimants had more than one case.

L&I rejected 13% of cases. Claims can be rejected for several reasons: lack of evidence that the exposure was work-related according to industrial insurance standards; submitting at-home rapid tests as proof of positivity without a test administered by an employer, pharmacy, health department, or commercial testing location; incomplete documentation; or ineligibility for workers’ compensation. Our case definition was more permissive than what was legally required by industrial insurance laws in determining if a potential case was work-related because we are interested in the overall burden of disease.

Among accepted cases, 96% were compensable (includes fatal, disability, and time-loss claims). Among accepted compensable claims, 50% of claims had one or more days paid with a median of 10 paid days and 12% had more than two weeks paid. Disability and fatal claims were rare (<0.5% all cases). The proportion of medical-aid only claims among COVID-19 cases (4%) was far lower than all claims established in the same date range (39%), likely due to the need for time-loss payments during quarantine periods.

Table 1. COVID-19 case characteristics

	Cases (N = 26,377)
<i>Claimant Characteristics</i>	
% Female	63%
Median age at exposure	43 years
Age range at exposure	
17-19 years	<1%
20-29 years	13%
30-39 years	28%
40-49 years	26%
50-59 years	20%
60+ years	12%
Missing age	<1%
Reported positive COVID-19 test	83%
<i>Claim Characteristics</i>	
% State Funded	57%
% Accepted	87%
% Compensable among accepted	96%
% Medical-only claims among accepted	4%
% Filed in language other than English	2%
# Claims accepted for fatality	56

Industry and occupation

Filing for COVID-19 was highly associated with the worker's industry and occupation. By industry sector (2-digit NAICS code), the industries with the most cases were 'Health Care and Social Assistance' (N=15,012), Public Administration (N=5,406), and Education (N=2,407, Table 2). Public Administration includes firefighters, police officers, and correctional officers. Education includes teaching hospitals affiliated with universities, which make up 53% of the COVID-19 cases in this sector. Healthcare workers can also be found in the 'Administrative and Support and Waste Management and Remediation Services' sector in temporary help and office administration services, including those placed in nursing homes. See Appendix C for case counts by full 6-digit NAICS code.

To adjust for industry size, we calculated cases per 10,000 full-time equivalent workers (1 FTE=2,000 hours worked per year). The industries with the highest number of cases per 10,000 FTE were Public Administration (N=394), Healthcare (N=387), and Education (N=150, Table 2).

Table 2. COVID-19 cases and case rate by industry

Industry Sector (2-digit NAICS)	Cases (% Total)	% Claim Accepted	% Positive COVID-19 Test	Case rate per 10,000 FTE
Health Care & Social Assistance	15,012 (57%)	92%	84%	387
Public Administration	5,406 (20%)	96%	81%	394
Educational Services	2,407 (9%)	88%	93%	150
Admin., Support, Waste Mgmt, Remed.	990 (4%)	82%	81%	49
Retail Trade	425 (2%)	57%	78%	14
Manufacturing	407 (2%)	13%	80%	17
Other Services	289 (1%)	83%	74%	28
Accommodation & Food Services	259 (1%)	49%	63%	16
Transportation & Warehousing	253 (1%)	53%	68%	27
Agriculture, Forestry, Fishing & Hunting	229 (1%)	59%	82%	26
Professional, Scientific, & Tech. Services	176 (1%)	62%	80%	8
Construction	155 (1%)	15%	60%	8
Wholesale Trade	123 (<1%)	33%	63%	9
Real Estate, Rental & Leasing	50 (<1%)	46%	66%	8
Information	49 (<1%)	82%	90%	4
Arts, Entertainment, & Recreation	24 (<1%)	29%	92%	10
Finance & Insurance	17 (<1%)	12%	71%	2
Utilities	9 (<1%)	78%	78%	6
Mgmt. of Companies & Enterprises	4 (<1%)	25%	100%	13
Mining, Quarry., Oil & Gas Extraction	0 (0%)	-	-	-
Unknown/Unclassified	93 (<1%)	11%	84%	-
Total	26,377 (100%)	87%	83%	96

The greatest number of cases by occupational group (2-digit SOC code) were in ‘Healthcare Practitioners and Technical’ (N=7,830), Protective Service (N=4,852), and Healthcare Support (N=4,313, Table 3). Unlike industry, we do not have data on the number of full-time equivalents per occupation. See Appendix D for counts by full 6-digit SOC code.

Table 3. COVID-19 cases and case rate by occupational group

Occupational Group (2-digit SOC)	Cases (% Total)	% Accepted	% Positive COVID-19 Test
Healthcare Practitioners & Technical	7,830 (30%)	95%	83%
Protective Service	4,852 (18%)	98%	81%
Healthcare Support	4,313 (16%)	96%	88%
Office & Administrative Support	1,388 (5%)	90%	84%
Personal Care & Service	1,372 (5%)	91%	86%
Education, Training, & Library	760 (3%)	91%	92%
Food Preparation & Serving Related	617 (2%)	77%	81%
Building & Grounds Cleaning & Maintenance	600 (2%)	87%	89%
Community & Social Services	524 (2%)	93%	89%
Management	498 (2%)	85%	86%
Transportation & Material Moving	464 (2%)	66%	77%
Installation, Maintenance, & Repair	318 (1%)	71%	88%
Production	239 (1%)	54%	74%
Farming, Fishing, & Forestry	190 (1%)	63%	82%
Sales & Related	185 (1%)	53%	79%
Construction & Extraction	157 (1%)	41%	69%
Business & Financial Operations	111 (<1%)	82%	94%
Life, Physical, & Social Science	94 (<1%)	90%	88%
Arts, Design, Entertainment, Sports, & Media	38 (<1%)	71%	84%
Architecture & Engineering	37 (<1%)	73%	81%
Computer & Mathematical	31 (<1%)	84%	87%
Legal	15 (<1%)	73%	80%
Unknown/Unclassified	1,744 (7%)	24%	72%
Total	26,377 (100%)	87%	83%

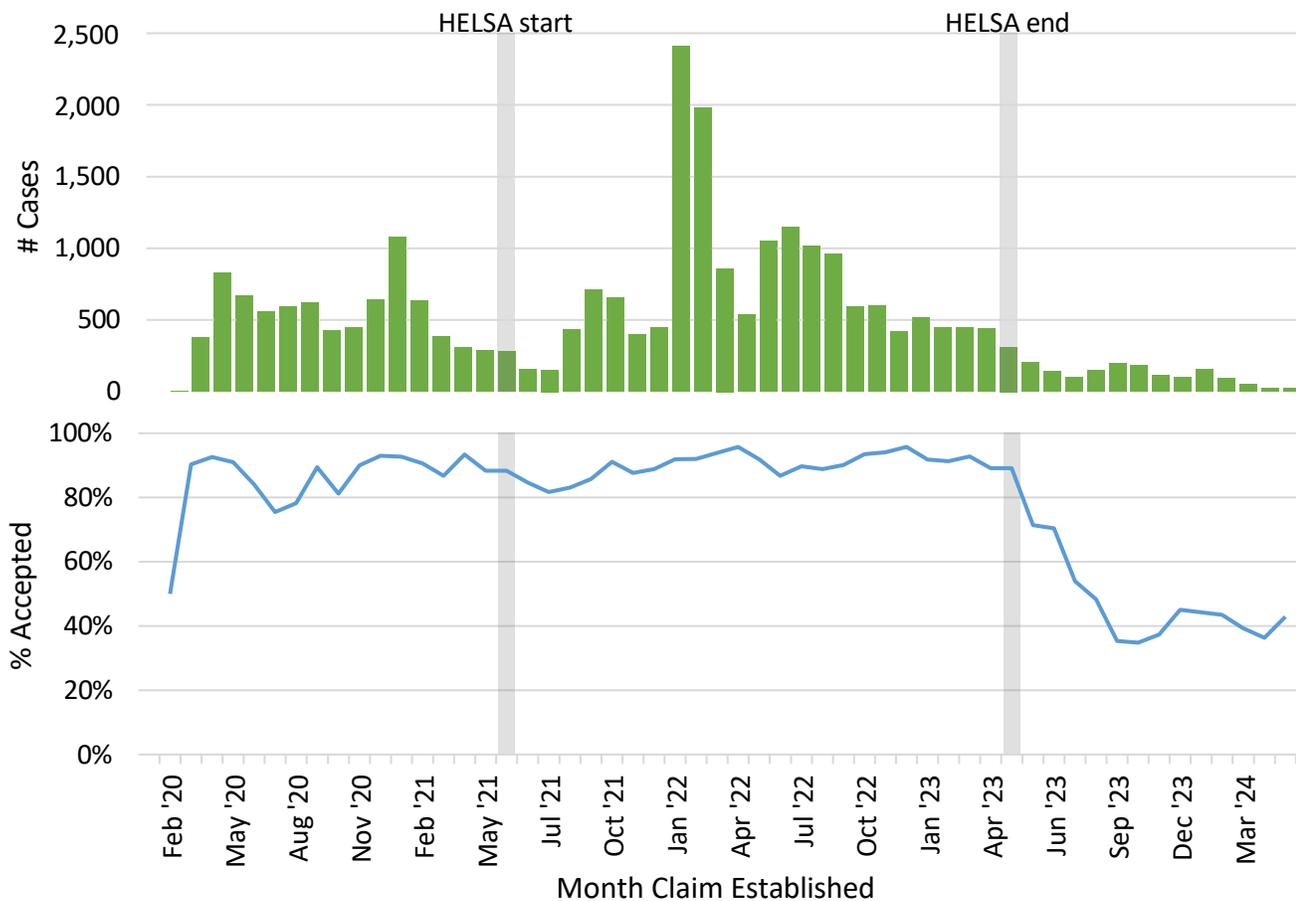
Trends by presumptive coverage period

The two years HELSA was in effect was associated with the highest number of cases filed per week, the highest claim acceptance rates, and a slight increase in the proportion of claims filed by workers other than healthcare or first responders (Table 4). Claim acceptance declined sharply when HELSA was no longer in effect (91% during HELSA, 53% post-HELSA, Table 4).

Table 4. Case counts and cases per week by presumptive coverage period

Claim established date in presumptive coverage period	# Cases All workers	# Cases per Week	% Accepted	% Cases filed by Healthcare or First Responders
Pre-HELSA	7,923	126	88%	87%
HELSA	16,699	167	91%	83%
Post-HELSA	1,755	30	53%	90%
Total	26,377	119	87%	85%

Figure 2. Case counts and acceptance rate by claim established month, all workers

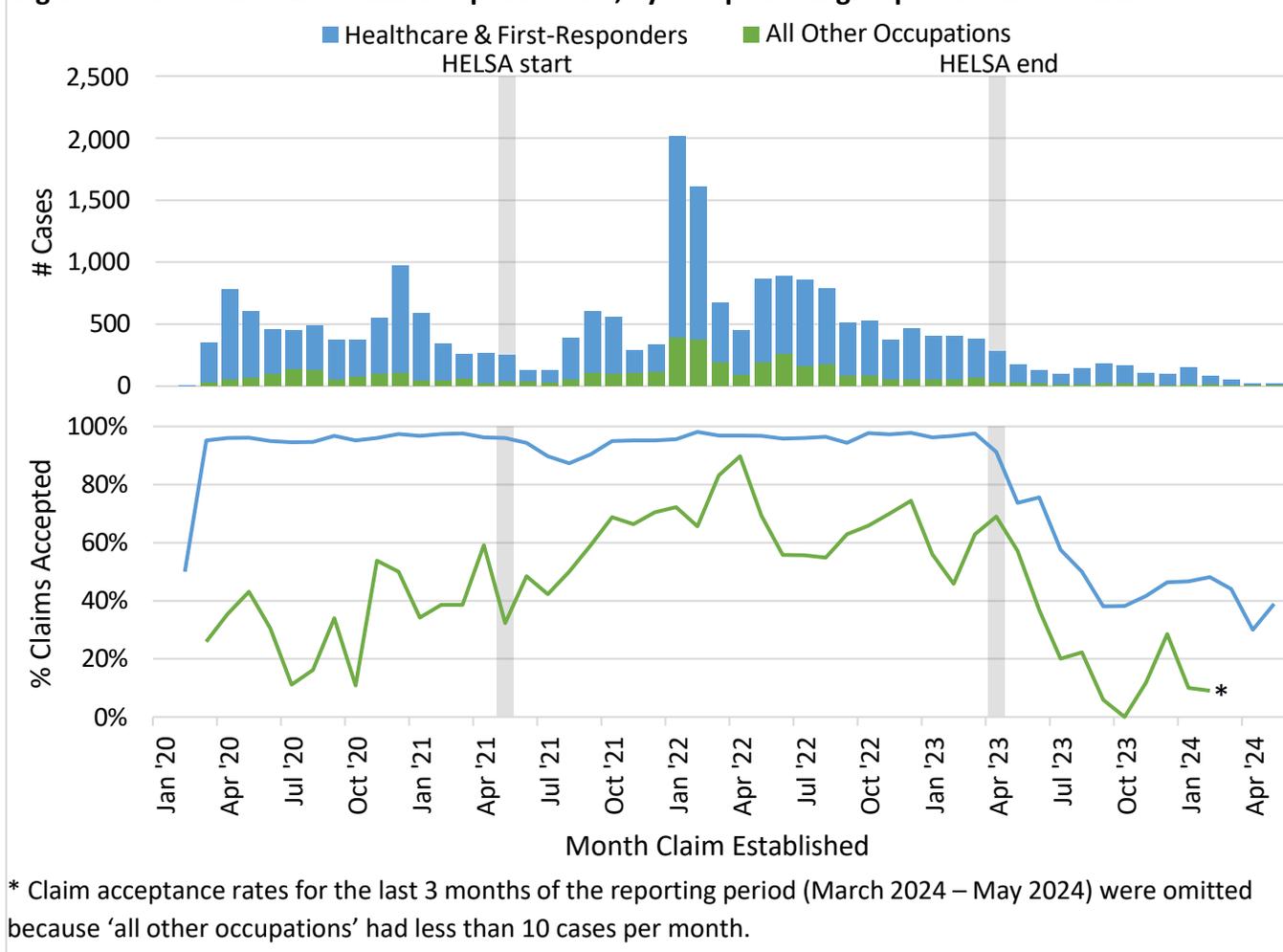


When HELSA was in effect, workers in occupations other than HC&FR (“all other”), who may or may not have met HELSA eligibility criteria as frontline workers, filed claims at almost twice the rate as the period before (from 16 claims per week to 28 claims per week), and the acceptance rate more than doubled (from 32% to 65%, Table 5). By month, claim acceptance among this group increased across the period HELSA was in effect, while claim acceptance among HC&FR remained relatively constant (Figure 3).

Table 5. Claim filing by occupational group and HELSA period

Claim established date in HELSA Period	Healthcare and First Responders			All Other Occupations		
	Total Cases	Cases per week	% Accepted	Total Cases	Cases per week	% Accepted
Pre-HELSEA	6,926	110	96%	997	16	32%
HELSEA	13,901	139	96%	2,798	28	65%
Post-HELSEA	1,584	27	55%	171	3	29%
Total	22,411	101	93%	3,966	18	55%

Figure 3. Case counts and claim acceptance rate, by occupational group and claim established date



* Claim acceptance rates for the last 3 months of the reporting period (March 2024 – May 2024) were omitted because ‘all other occupations’ had less than 10 cases per month.

When HELSA was in effect, all industry sectors saw an increase in the number of cases per week, except Construction and Agriculture (Table 6). The largest gains in cases per week were seen in the Education and Public Administration sectors. All sectors except Education and Healthcare saw an increase in the percentage of claims accepted, with the greatest gains seen in the Wholesale Trade, 'Accommodation and Food Services', and Retail (Table 6). The slight decline in claim acceptance in Healthcare is likely attributed to the fact that pre-HELSA, healthcare workers already had presumption-like coverage conferred by L&I at the direction of the Governor, so HELSA would not be expected to increase Healthcare claim acceptance in the same way it did for occupations newly covered by HELSA.

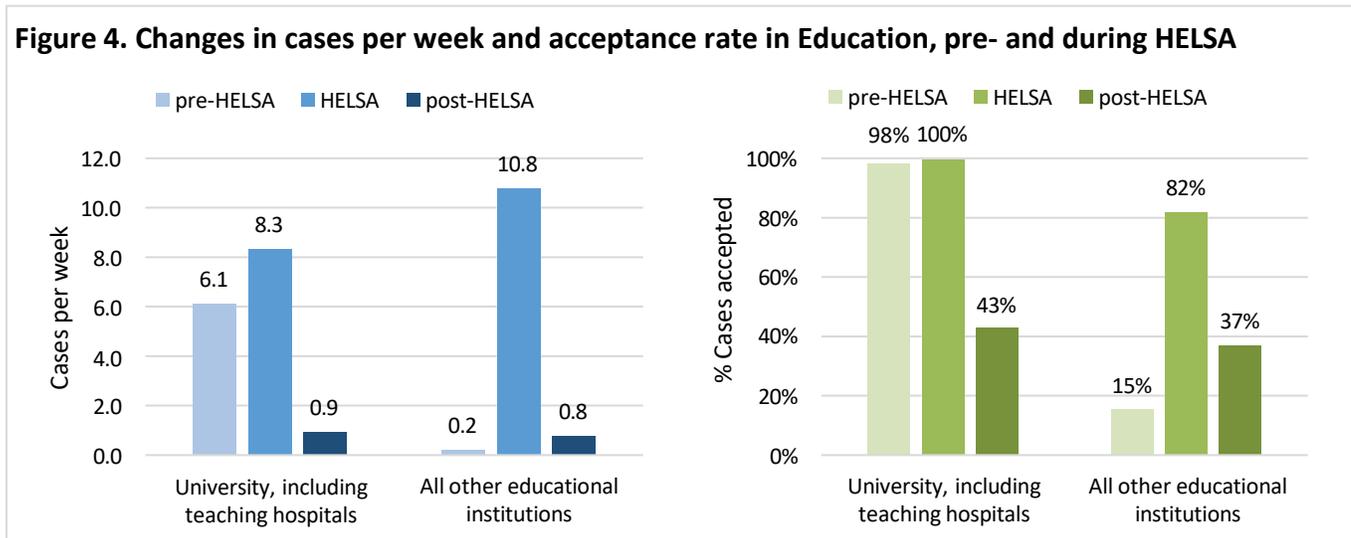
Table 6. Changes in cases per week and acceptance rate by Industry pre- and during HELSA

NAICS Sectors with >50 total cases*	Cases	% Change in Cases per week		% Change in C. Acceptance	
		Pre-HELSA vs. HELSA		Pre-HELSA vs. HELSA	
Health Care & Social Assistance	15,004	62%		-1%	
Public Administration	5,407	259%		5%	
Educational Services	2,407	381%		-6%	
Admin., Support, Waste Mgmt, Remed.	990	149%		6%	
Retail Trade	425	121%		163%	
Manufacturing	406	155%		25%	
Other Services	289	56%		9%	
Accommodation & Food Services	259	17%		165%	
Transportation & Warehousing	253	79%		123%	
Agriculture, Forestry, Fishing & Hunting	229	-1%		41%	
Professional, Scientific, & Tech. Serv.	176	195%		131%	
Construction	154	-22%		38%	
Wholesale Trade	123	20%		657%	
Real Estate & Rental & Leasing	50	53%		138%	

* Omitted NAICS sectors with less than 50 total cases: Information, 'Arts, Entertainment, & Recreation', Finance & Insurance, Utilities, 'Mgmt. of Companies & Enterprises'

Without accurate counts of COVID-19 by industry and occupation in the general population, it is very difficult to distinguish what is driving these increases in claim filing: the presumption laws encouraging claim filing, or the increased risk COVID-19 exposure as stay-at-home restrictions were lifted and the Omicron mutation predominated.

The Education sector exemplifies these challenges. In figure 4, we isolated universities (NAICS 611310) from the rest of the education sector; cases in universities were overwhelmingly from healthcare workers in large teaching hospitals. Pre-HELSEA claim filing rates were low among all other educational institutions such as primary and secondary schools, possibly due to restrictions on in-classroom learning. The probability of exposure and/or contraction increased when public schools reopened beginning in March 2021, one month before HELSEA was enacted [16]. However, there was a clear increase in claim acceptance among primary and secondary school employees when HELSEA was enacted.



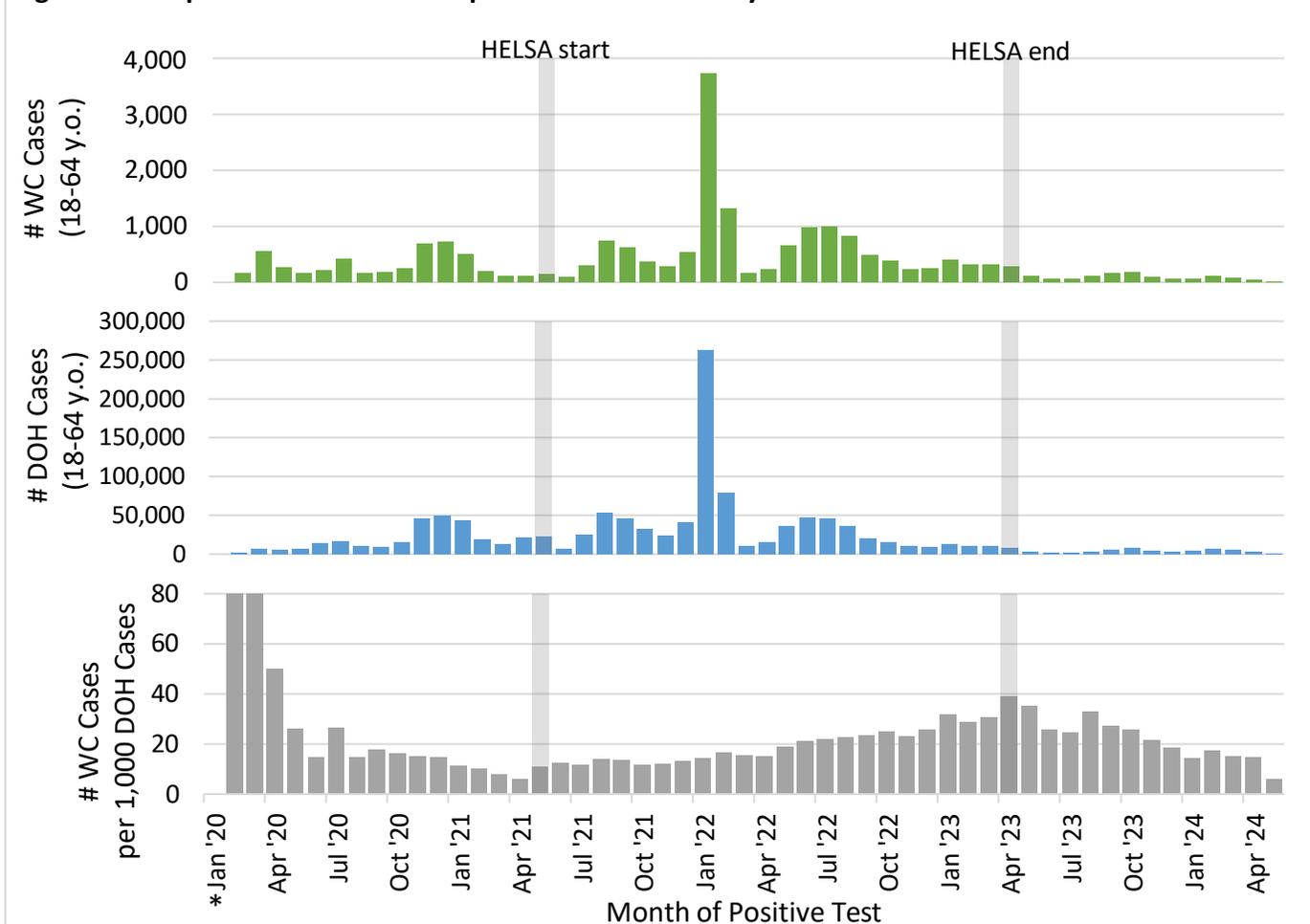
Comparison with COVID-19 general population estimates

Between January 2020 and May 2024, the Washington State Department of Health (DOH) reported over 1.2 million cases of lab-confirmed COVID-19 among individuals 18-64 years old (“DOH cases”, Table 7). In the same timeframe, we observed 20,726 cases of work-related COVID-19 among workers 18-64 years old with a known positive test (“WC cases”, Table 7). In the earliest months of the pandemic, new cases of COVID-19 were concentrated among healthcare workers, which is reflected in the high number of WC cases per 1,000 DOH cases (Figure 5). A progressive increase in the number of WC cases per 1,000 DOH cases can be seen during the period HELSA was in effect. However this is likely driven by declining case reporting by laboratories to the DOH as laboratory-based tests were replaced with unreported at-home tests.

Table 7. DOH case counts compared to WC case counts, by HELSA period

Period	Positive WC cases aged 18-64 (cases per week)	DOH Cases aged 18-64 (cases per week)	WC Cases per 1,000 DOH Cases
Pre-HELSEA	4,804 (77)	296,672 (4,731)	16.2
HELSEA	14,769 (148)	875,985 (8,772)	16.9
Post-HELSEA	1,153 (19)	55,576 (935)	20.7
Total	20,726 (93)	1,228,233 (5,533)	16.9

Figure 5. Comparison of WC vs DOH positive case counts by month



* Counts from January 2020 are omitted because there were fewer than 10 WC and DOH cases.

Naturally, not all individuals 18-64 y.o. are currently employed in positions eligible for WC. Using survey data from 2020-2024, we estimated that 64% of the population aged 18-64 in Washington State met a simplified definition of WC eligibility. After adjusting the DOH case counts for WC eligibility, an estimated 34 positive WC cases were filed per 1,000 WC-eligible DOH case (3.4%).

Discussion

We identified over twenty-six thousand cases of occupational exposure or disease to COVID-19 in the Washington State workers' compensation (WC) system from February 2020 to May 2024. This is likely an underestimate of the burden of work-related COVID-19, as not all workers exposed on the job will file a WC claim. The true proportion of COVID-19 exposures attributable to work has not been well studied. A 2020 survey of Michigan COVID-19 cases found that 30% of employed respondents reported being exposed at work [17]. A 2022 survey of a large general-population French cohort found that 20-40% of COVID-19 cases were attributable to work [18]. In our best estimate, 3.4% of COVID-19 cases among working age individuals reported by the Washington Department of Health (DOH) resulted in a workers' compensation claim, suggesting severe underreporting. However, these calculations were rudimentary estimates, as they oversimplify the WC eligibility criteria and presume that individuals who contracted COVID-19 have the same employment patterns as the general population.

As expected, over half of the cases in our surveillance system came from the 'Health Care and Social Assistance' industry sector (15,012 cases). However, after adjusting for industry size, we observed the highest rate of COVID-19 cases in the Public Administration sector (394 cases per 10,000 full-time-equivalents), which includes police officers, firefighters, correctional officers, and other government employees. By occupation, the greatest number of cases occurred among 'Healthcare Practitioners and Technical' (7,830 cases), Protective Service (4,852 cases), and Healthcare Support occupations (4,313 cases).

Before the enactment of Health Emergency Labor Standards Act (HELSEA) in May 2021, healthcare workers and first-responders (HC&FR) enjoyed presumption-like coverage for work-related COVID-19 per the governor's memorandum. Other frontline workers were providing essential labor during this public health emergency without the benefit of presumptive coverage. A thousand COVID-19 cases among occupations other than HC&FR were filed before May 2021, and less than one-third were accepted.

It appears that HELSEA was effective in reducing the barriers to claim filing and acceptance. Workers in occupations outside of HC&FR saw an 203% increase in claim acceptance rate and 175% increase in claim filing rate during the period HELSEA was in effect compared to before it's enactment. The largest increases in acceptance rate were seen in the Wholesale Trade, Education (excluding universities), 'Accommodation and Food Services', and Retail sectors. We estimate that 920 more claims were accepted due to HELSEA than would have occurred without the expanded coverage. All sectors saw an increase in total case counts during the period HELSEA was in effect, except for Construction and Agriculture. The overall WC case count was slightly higher in the HELSEA period compared to before, even after adjusting for the increased number of COVID-19 cases in the general population during the Omicron wave (16.2 vs. 16.9 WC cases per 1,000 DOH cases). However, the general population counts do not include positive cases identified through at-home testing, as they were not reported to the DOH. If at-home tests were included, there may be less or no increase in adjusted WC case counts during HELSEA.

Limitations

The data presented here is likely an underestimate for the true burden of work-related exposure and disease from COVID-19, as there were several critical limitations in this report. We could not determine if a worker qualified as a frontline worker based on occupation codes alone, as individuals in the same occupation may have differing exposures to the general public or essential job duties. Therefore, analyses were performed comparing healthcare workers and first-responders against all other occupations. The effects of HELSA on claim acceptance rates was likely underestimated due to the inclusion of non-covered workers.

The closure of business and schools in the pre-HELSA period reduced the number of workers exposed to COVID-19 in certain occupations, potentially reducing the claim filing rate. The reopening of business and schools during the HELSA period increased claim counts independent of the effects of HELSA, particularly during the Omicron wave of the pandemic. To account for this, we would ideally evaluate the WC claim filing rate adjusted for the total number of COVID-19 cases in that industry or occupation reported to DOH but this is not feasible as the DOH industry and occupation data is incomplete.

There are many historic barriers to WC claim filing, such as language-barriers, fear of retribution, complex paperwork, and lack of knowledge on the filing process [19]. Frontline workers may not have been aware of their enhanced eligibility for WC benefits through HELSA. Additionally, employers may provide their own COVID-19 benefits such as additional leave for quarantine, resulting in workers not filing a WC claim. It is difficult to estimate the impact these policies have on claim filing, as these policies vary widely between employers and change over time. The HELSA period also featured widespread vaccination, the use of novel anti-viral therapies, and the predominance of milder variants of the disease, all which reduced the severity of COVID-19 cases [20]. Less severe, non-hospitalized cases may be less likely to file for workers' compensation, in favor of other forms of leave that have lower barriers to access.

Conclusion

Workers' compensation proved to be a rich and timely source of information to understand worker's exposures and experiences during the pandemic. This surveillance system found increases in claim filing and claim acceptance across diverse industries after the enactment of HELSA. However, compared to case counts in the general working-age population, very few workers' compensation claims were filed. This suggests widespread underreporting.

The presumptive health insurance coverage for workers established by HELSA during the COVID-19 pandemic may be applied in future public health emergencies. It is therefore important to learn what we can from HELSA in preparation for the future. Evaluation efforts were hampered by the lack of industry and occupation data for COVID-19 cases in the general population. High quality industry and occupation data is critical to both the initial development and evaluation of presumptive coverage laws. Without it, we cannot accurately identify groups of workers at the highest risk of disease. The COVID-19 pandemic demonstrated the many challenges in consistently collecting this data. Cross-agency collaboration and advocacy for occupational research, especially in the early stages of a public health emergency, is critical.

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Appendices

Appendix A – Detailed case-identification criteria

Administrative orders

Standardized letters sent to claimants indicating that a claim has been allowed for COVID-19 exposure only or for COVID-19 contraction.

ICD-10 Codes

ICD-10 codes are found in billing data submitted to L&I or internally associated with the claim to expedite medical coverage. Since the surveillance system was built before the adoption of COVID-19 specific codes, we also identified potential cases using codes for COVID-19 symptoms (must have two or more) or a potentially related respiratory condition. Claims for infectious diseases other than COVID-19 are relatively rare.

Table 8. ICD-10 codes used to identify potential COVID-19 cases

Category	ICD-10 Code	ICD-10 code descriptor
<i>Standard COVID-19 codes</i>	U07.1	2019-ncov emergency code
	Z20.822	Contact With And (Suspected) Exposure To Covid-19
	Z86.16	Personal History Of Covid-19
	Z11.52	Encounter For Screening For Covid-19
<i>Symptoms for COVID-19 (Must have 2 or more)</i>	R05	Cough
	R06.00	Dyspnea unspecified
	R06.02	Shortness of breath
	R06.09	Other forms of dyspnea
	R50.9	Fever, unspecified
<i>Respiratory illness potentially related to COVID-19 infection</i>	B34.2	Coronavirus infection, unspecified
	B97.21	SARS-associated coronavirus as the cause of diseases classified elsewhere
	B97.29	Other coronavirus as the cause of disease classified elsewhere
	J09.X2	Influenza due to identified novel influenza A virus with other respiratory manif.
	J10.1	Influenza due to other identified influenza virus with other respiratory manif.
	J11.1	Influenza due to unidentified influenza virus with other respiratory manif.
	J12.81	Pneumonia due to SARS-associated coronavirus
	J12.89	Other viral pneumonia
	J12.9	Viral pneumonia, unspecified
	J16.8	Pneumonia due to other specified infectious organisms
	J18.8	Other pneumonia, unspecified organism
	J18.9	Pneumonia, unspecified organism
	J20.8	Acute bronchitis due to other specified organisms
	J22	Unspecified acute lower respiratory infection
	J40	Bronchitis, not specified as acute or chronic
J80	Acute respiratory distress syndrome	
J98.8	Other specified respiratory disorders	

Keywords

Keywords are found in descriptions of the injury submitted by workers, employers, and/or physicians. Regular

expressions include misspellings and colloquial variations of these terms. We expected that the earliest cases of COVID-19 may be evaluated for influenza instead, therefore claims with influenza keywords.

Table 9. Regular expressions for COVID-19 keywords in injury narratives

Regular expression	Targeted keywords
/CO.{0,1}V.{0,2}D/i	Exact letter sequence <i>COVID</i>
^bNCOV/i	Exact letter sequence <i>NCOV</i>
/COV.{0,10}{19 VIR}/i	Exact letter sequence <i>COV</i> with <i>-19</i> or <i>virus</i>
/[C K][O A]R[O A]NA[^RY L]/i	Variations on spelling of <i>corona</i> , excluding <i>coronary</i> and <i>coronal</i> .
/Q.{0,2}(REN RAN).{0,4}T.{0,4}N/i	Variations on spelling of <i>quarantine</i>
/ISOLAT[E ION]/i	Variations on <i>isolation</i>
/FLU.{0,3}LIKE.{0,3}SYM/i	Variations on <i>flu-like symptoms</i>
^b(FLU[^ SHOT] INFLUENZA)\b/i	Exact word <i>flu</i> or <i>influenza</i> , excluding <i>flu shot</i>
^b[P N].{0,3}[E I U]MO.{0,3}A\b/i	Variations on spelling of <i>pneumonia</i>

OIICS Codes

Occupational Injury and Illness Classification System (OIICS v1.01) codes are internally assigned to claims. There are no COVID-19 specific OIICS codes, however there are conventions. We used OIICS codes primarily to exclude claims for injuries other than viral infections.

Table 10. OIICS codes used as inclusion or exclusion case-identification criteria

Category	Code Type	OIICS Code	OIICS Code Descriptor
include	Source	533	Viruses
	Event	2299	Other diseases due to viruses & Chlamydiae, n.e.c.
Exclude	Event	1; 4; 5; 6	Falls; Transportation Accidents; Fires & Explosions; Assaults & Violent Acts
	Body part	3; 4	Upper Extremities; Lower Extremities
	Nature	0	Traumatic Injuries & Disorders
	Source	1; 3; 6; 7; 8	Containers; Parts & Materials; Structures & Surfaces; Tools, Instruments, & Equipment; Vehicles
	Source	22; 23	Overexertion; Repetitive motion

Appendix B - Accuracy of case-identification methods

In the absence of administrative orders, the positive-predictive value was 54% for ICD-10 codes, 49% for keywords, and 11% for OIICS codes.

Table 11. Positive predictive values of case identification methods

Case-Identification Criteria	# Potential Cases	# Cases	% Potential were cases
<i>Administrative orders</i>	24,556	23,941	97%*
<i>Claim information</i>	6,958	2,436	35%
Keywords only	2,530	986	39%
OIICS only	1,707	26	2%
Keywords, ICD-10 Codes, and OIICS	1,262	738	58%
Keywords and ICD-10 Codes	722	471	65%
Keywords and OIICS	417	193	46%
ICD-10 codes only	283	13	5%
ICD-10 codes and OIICS	37	9	24%
Total Potential Cases	31,514	26,377	84%

* As of February 2022, new claims with administrative orders were presumed to be cases without case review.

Appendix C - Detailed Industry Statistics

Industry Classification System (NAICS 2007).

Statistics are compiled by 2-digit, 4-digit, and 6-

Cases (cases per week) = number of claims that met our case-definition for occupational COVID-19, adjusted for the duration of the period.

Accepted = number of cases that were accepted for claim coverage by L&I

Positive = number of cases that were confirmed to be COVID-19 positive by any PCR, at-home, or antigen test

Cases per 1k FTE (Total 1k FTE) = number of cases per 1,000 full-time equivalents, equal to 2,000 hours per year.

Industry Code 2-digit industry sector * 4-digit industry group ** 6-digit NAICS code	Total				pre-HELSA				HELSA				post-HELSA			
	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)
11 : Agriculture, Forestry, Fishing and Hunting	229 (1)	135	187	3 (88)	115 (2)	56	77	1 (88)	114 (1)	79	110	1 (88)	0 (0)	0	0	0 (89)
*13 : Fruit and Tree Nut Farming	48 (0.2)	30	45	2 (28)	10 (0.2)	5	9	0.3 (29)	38 (0.4)	25	36	1 (27)	0 (0)	0	0	- (-)
**31 : Apple Orchards	31 (0.1)	17	29	2 (15)	5 (0.08)	2	5	- (-)	26 (0.3)	15	24	2 (15)	0 (0)	0	0	- (-)
*14 : Greenhouse, Nursery, and Floriculture Production	27 (0.1)	1	5	4 (6)	25 (0.4)	0	3	4 (7)	2 (0.02)	1	2	- (-)	0 (0)	0	0	- (-)
*51 : Support Activities for Crop Production	129 (0.6)	92	116	5 (27)	72 (1)	49	60	3 (26)	57 (0.6)	43	56	2 (27)	0 (0)	0	0	- (-)
**14 : Postharvest Crop Activities (except Cotton Ginnin	67 (0.3)	43	61	5 (14)	30 (0.5)	15	24	2 (14)	37 (0.4)	28	37	3 (14)	0 (0)	0	0	- (-)
**15 : Farm Labor Contractors and Crew Leaders	48 (0.2)	38	44	6 (8)	36 (0.6)	30	32	5 (7)	12 (0.1)	8	12	1 (8)	0 (0)	0	0	- (-)
21 : Mining, Quarrying, and Oil and Gas Extraction	0 (0)	0	0	0 (2)	0 (0)	0	0	0 (2)	0 (0)	0	0	0 (2)	0 (0)	0	0	0 (2)
22 : Utilities	9 (0.04)	7	7	0.6 (14)	2 (0.03)	2	1	0.1 (14)	6 (0.06)	4	5	0.4 (14)	1 (0.02)	1	1	0.07 (15)
23 : Construction	155 (0.7)	23	93	0.8 (187)	86 (1)	11	32	0.5 (176)	67 (0.7)	12	59	0.3 (192)	2 (0.03)	0	2	0.01 (192)
*61 : Residential Building Construction	23 (0.1)	6	15	0.8 (30)	15 (0.2)	4	8	0.6 (27)	7 (0.07)	2	6	0.2 (32)	1 (0.02)	0	1	- (-)
*62 : Nonresidential Building Construction	29 (0.1)	1	9	2 (18)	22 (0.4)	0	4	1 (18)	7 (0.07)	1	5	0.4 (18)	0 (0)	0	0	- (-)
**20 : Commercial and Institutional Building Constructio	27 (0.1)	1	9	2 (16)	20 (0.3)	0	4	1 (16)	7 (0.07)	1	5	0.4 (16)	0 (0)	0	0	- (-)
*82 : Building Equipment Contractors	49 (0.2)	7	32	1 (51)	25 (0.4)	4	10	0.5 (47)	24 (0.2)	3	22	0.5 (52)	0 (0)	0	0	- (-)
**10 : Electrical Contractors and Other Wiring Installatio	23 (0.1)	4	16	1 (22)	12 (0.2)	1	6	0.6 (20)	11 (0.1)	3	10	0.5 (22)	0 (0)	0	0	- (-)
**20 : Plumbing, Heating, and Air-Conditioning Contract	24 (0.1)	2	14	0.9 (27)	12 (0.2)	2	3	0.5 (25)	12 (0.1)	0	11	0.4 (27)	0 (0)	0	0	- (-)
*83 : Building Finishing Contractors	24 (0.1)	4	15	1 (22)	13 (0.2)	3	4	0.6 (21)	10 (0.1)	1	10	0.4 (23)	1 (0.02)	0	1	- (-)
31-33 : Manufacturing	407 (2)	52	327	2 (234)	105 (2)	13	45	0.5 (227)	268 (3)	39	252	1 (234)	34 (0.6)	0	30	0.1 (244)
*21 : Beverage Manufacturing	25 (0.1)	8	11	3 (9)	16 (0.3)	0	2	2 (8)	9 (0.09)	8	9	1 (9)	0 (0)	0	0	- (-)
**30 : Wineries	23 (0.1)	6	9	6 (4)	16 (0.3)	0	2	5 (3)	7 (0.07)	6	7	2 (4)	0 (0)	0	0	- (-)
*64 : Aerospace Product and Parts Manufacturing	242 (1)	9	225	3 (70)	19 (0.3)	3	17	0.3 (69)	194 (2)	6	183	3 (67)	29 (0.5)	0	25	0.4 (78)
**11 : Aircraft Manufacturing	238 (1)	8	222	4 (64)	18 (0.3)	3	17	0.3 (62)	191 (2)	5	180	3 (62)	29 (0.5)	0	25	0.4 (72)
42 : Wholesale Trade	123 (0.5)	40	78	0.9 (130)	55 (0.9)	4	12	0.4 (125)	66 (0.7)	35	64	0.5 (132)	2 (0.03)	1	2	0.01 (134)
*44 : Grocery and Related Product Merchant Wholesale	64 (0.3)	20	30	3 (22)	37 (0.6)	2	4	2 (22)	26 (0.3)	17	25	1 (22)	1 (0.02)	1	1	- (-)

Industry Code 2-digit industry sector * 4-digit industry group ** 6-digit NAICS code	Total				pre-HELSEA				HELSEA				post-HELSEA			
	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)
**10 : General Line Grocery Merchant Wholesalers	31 (0.1)	2	3	6 (6)	28 (0.4)	2	1	5 (5)	3 (0.03)	0	2	- (-)	0 (0)	0	0	- (-)
**80 : Fresh Fruit and Vegetable Merchant Wholesalers	29 (0.1)	16	23	4 (8)	8 (0.1)	0	2	1 (8)	20 (0.2)	15	20	2 (8)	1 (0.02)	1	1	- (-)
44-45 : Retail Trade	425 (2)	241	331	1 (294)	128 (2)	34	73	0.5 (279)	283 (3)	201	246	0.9 (301)	14 (0.2)	6	12	0.05 (299)
*11 : Automobile Dealers	38 (0.2)	20	32	2 (23)	13 (0.2)	1	7	0.6 (22)	25 (0.3)	19	25	1 (23)	0 (0)	0	0	- (-)
**10 : New Car Dealers	35 (0.2)	18	29	2 (19)	13 (0.2)	1	7	0.7 (18)	22 (0.2)	17	22	1 (19)	0 (0)	0	0	- (-)
*41 : Building Material and Supplies Dealers	22 (0.1)	8	15	0.8 (28)	11 (0.2)	0	4	0.4 (28)	11 (0.1)	8	11	0.4 (28)	0 (0)	0	0	- (-)
*51 : Grocery Stores	126 (0.6)	88	90	3 (50)	24 (0.4)	8	20	0.5 (46)	99 (1)	78	67	2 (51)	3 (0.05)	2	3	- (-)
**10 : Supermarkets and Other Grocery (except Conven	121 (0.5)	85	87	3 (40)	22 (0.4)	8	20	0.6 (40)	96 (1)	75	64	2 (40)	3 (0.05)	2	3	- (-)
*61 : Health and Personal Care Stores	67 (0.3)	56	55	5 (14)	15 (0.2)	11	5	1 (13)	45 (0.5)	42	44	3 (14)	7 (0.1)	3	6	0.5 (13)
**10 : Pharmacies and Drug Stores	56 (0.2)	49	46	6 (9)	12 (0.2)	10	3	1 (9)	38 (0.4)	36	38	4 (10)	6 (0.1)	3	5	0.7 (9)
*81 : Clothing Stores	38 (0.2)	23	37	2 (17)	8 (0.1)	1	8	0.5 (16)	29 (0.3)	21	29	2 (18)	1 (0.02)	1	0	- (-)
**40 : Family Clothing Stores	30 (0.1)	20	30	2 (12)	6 (0.1)	1	6	0.5 (12)	24 (0.2)	19	24	2 (12)	0 (0)	0	0	- (-)
48-49 : Transportation and Warehousing	253 (1)	133	173	3 (94)	87 (1)	26	31	1 (81)	156 (2)	105	132	2 (97)	10 (0.2)	2	10	0.1 (101)
*11 : Scheduled Air Transportation	35 (0.2)	4	21	3 (12)	22 (0.4)	3	9	2 (9)	11 (0.1)	1	10	0.9 (12)	2 (0.03)	0	2	- (-)
**11 : Scheduled Passenger Air Transportation	35 (0.2)	4	21	3 (12)	22 (0.4)	3	9	2 (9)	11 (0.1)	1	10	0.9 (12)	2 (0.03)	0	2	- (-)
*41 : General Freight Trucking	32 (0.1)	8	19	3 (13)	18 (0.3)	1	5	1 (13)	14 (0.1)	7	14	1 (13)	0 (0)	0	0	- (-)
*51 : Urban Transit Systems	32 (0.1)	28	23	10 (3)	7 (0.1)	7	0	2 (3)	23 (0.2)	21	21	7 (3)	2 (0.03)	0	2	- (-)
**13 : Bus and Other Motor Vehicle Transit Systems	30 (0.1)	26	22	16 (2)	6 (0.1)	6	0	3 (2)	22 (0.2)	20	20	12 (2)	2 (0.03)	0	2	- (-)
*52 : Interurban and Rural Bus Transportation	38 (0.2)	33	24	55 (0.7)	1 (0.02)	1	0	- (-)	34 (0.3)	31	21	50 (0.7)	3 (0.05)	1	3	- (-)
**10 : Interurban and Rural Bus Transportation	38 (0.2)	33	24	55 (0.7)	1 (0.02)	1	0	- (-)	34 (0.3)	31	21	50 (0.7)	3 (0.05)	1	3	- (-)
*55 : Charter Bus Industry	21 (0.09)	16	13	12 (2)	9 (0.1)	6	1	5 (2)	11 (0.1)	10	11	6 (2)	1 (0.02)	0	1	- (-)
**10 : Charter Bus Industry	21 (0.09)	16	13	12 (2)	9 (0.1)	6	1	5 (2)	11 (0.1)	10	11	6 (2)	1 (0.02)	0	1	- (-)
51 : Information	49 (0.2)	40	44	0.4 (119)	6 (0.1)	2	3	0.05 (121)	42 (0.4)	38	40	0.3 (131)	1 (0.02)	0	1	0.01 (96)
*72 : Wireless Telecommunications Carriers (except Sa	38 (0.2)	34	35	5 (8)	1 (0.02)	0	0	- (-)	36 (0.4)	34	34	5 (8)	1 (0.02)	0	1	- (-)
**10 : Wireless Telecommunications Carriers (except S	38 (0.2)	34	35	72 (0.5)	1 (0.02)	0	0	- (-)	36 (0.4)	34	34	62 (0.6)	1 (0.02)	0	1	- (-)
52 : Finance and Insurance	17 (0.08)	2	12	0.2 (79)	8 (0.1)	0	3	0.1 (79)	8 (0.08)	2	8	0.1 (79)	1 (0.02)	0	1	0.01 (78)
53 : Real Estate and Rental and Leasing	50 (0.2)	23	33	0.8 (65)	19 (0.3)	5	5	0.3 (61)	29 (0.3)	18	26	0.4 (66)	2 (0.03)	0	2	0.03 (66)
*11 : Lessors of Real Estate	26 (0.1)	11	17	2 (14)	10 (0.2)	4	4	0.7 (14)	14 (0.1)	7	11	1 (14)	2 (0.03)	0	2	- (-)
**10 : Lessors of Residential Buildings and Dwellings	23 (0.1)	10	14	2 (9)	8 (0.1)	3	2	0.8 (10)	13 (0.1)	7	10	1 (9)	2 (0.03)	0	2	- (-)

Industry Code 2-digit industry sector * 4-digit industry group ** 6-digit NAICS code	Total				pre-HELSEA				HELSEA				post-HELSEA			
	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)
54 : Professional, Scientific, and Technical Services	176 (0.8)	109	141	0.8 (233)	41 (0.7)	13	18	0.2 (212)	121 (1)	89	109	0.5 (240)	14 (0.2)	7	14	0.06 (247)
*12 : Accounting, Tax Preparation, Bookkeeping, and P	31 (0.1)	29	31	13 (2)	0 (0)	0	0	- (-)	31 (0.3)	29	31	12 (3)	0 (0)	0	0	- (-)
**14 : Payroll Services	24 (0.1)	7	19	0.3 (88)	11 (0.2)	3	8	0.1 (78)	13 (0.1)	4	11	0.1 (92)	0 (0)	0	0	- (-)
*15 : Computer Systems Design and Related Services	20 (0.09)	6	16	11 (2)	10 (0.2)	3	8	6 (2)	10 (0.1)	3	8	5 (2)	0 (0)	0	0	- (-)
**19 : Other Computer Related Services	44 (0.2)	36	39	1 (32)	6 (0.1)	2	3	0.2 (29)	37 (0.4)	33	35	1 (33)	1 (0.02)	1	1	- (-)
*16 : Management, Scientific, and Technical Consulting	32 (0.1)	30	30	2 (13)	2 (0.03)	2	2	- (-)	29 (0.3)	27	27	2 (14)	1 (0.02)	1	1	- (-)
**11 : Administrative Management and General Manage	37 (0.2)	22	20	3 (13)	12 (0.2)	3	2	1 (12)	25 (0.3)	19	18	2 (13)	0 (0)	0	0	- (-)
*19 : Other Professional, Scientific, and Technical Servi	28 (0.1)	16	15	3 (9)	7 (0.1)	1	1	0.8 (9)	21 (0.2)	15	14	2 (9)	0 (0)	0	0	- (-)
**40 : Veterinary Services	4 (0.02)	1	4	1 (3)	1 (0.02)	1	1	0.4 (3)	3 (0.03)	0	3	1 (3)	0 (0)	0	0	0 (3)
55 : Management of Companies and Enterprises	990 (4)	813	798	5 (204)	269 (4)	220	187	1 (194)	669 (7)	579	562	3 (210)	52 (0.9)	14	49	0.3 (206)
56 : Administrative and Support and Waste Managemen	153 (0.7)	129	135	2 (77)	48 (0.8)	45	32	0.6 (76)	97 (1)	81	95	1 (79)	8 (0.1)	3	8	0.1 (77)
*11 : Office Administrative Services	153 (0.7)	129	135	2 (77)	48 (0.8)	45	32	0.6 (76)	97 (1)	81	95	1 (79)	8 (0.1)	3	8	0.1 (77)
**10 : Office Administrative Services	23 (0.1)	20	19	10 (2)	14 (0.2)	13	11	5 (3)	9 (0.09)	7	8	4 (2)	0 (0)	0	0	- (-)
*12 : Facilities Support Services	23 (0.1)	20	19	10 (2)	14 (0.2)	13	11	5 (3)	9 (0.09)	7	8	4 (2)	0 (0)	0	0	- (-)
**10 : Facilities Support Services	532 (2)	451	473	11 (48)	145 (2)	132	109	3 (43)	345 (3)	309	325	7 (51)	42 (0.7)	10	39	0.9 (46)
*13 : Employment Services	504 (2)	430	461	12 (41)	131 (2)	121	106	3 (38)	332 (3)	299	317	7 (45)	41 (0.7)	10	38	1 (39)
**20 : Temporary Help Services	30 (0.1)	10	19	2 (16)	14 (0.2)	3	4	0.9 (15)	16 (0.2)	7	15	1 (16)	0 (0)	0	0	- (-)
*16 : Investigation and Security Services	28 (0.1)	10	17	2 (13)	13 (0.2)	3	3	1 (12)	15 (0.2)	7	14	1 (13)	0 (0)	0	0	- (-)
**12 : Security Guards and Patrol Services	45 (0.2)	13	28	1 (30)	24 (0.4)	5	8	0.8 (28)	19 (0.2)	7	18	0.6 (31)	2 (0.03)	1	2	- (-)
*17 : Services to Buildings and Dwellings	24 (0.1)	10	20	2 (13)	8 (0.1)	3	4	0.7 (12)	15 (0.2)	6	15	1 (13)	1 (0.02)	1	1	- (-)
**20 : Janitorial Services	172 (0.8)	167	93	66 (3)	4 (0.06)	4	4	- (-)	168 (2)	163	89	65 (3)	0 (0)	0	0	- (-)
*22 : Waste Treatment and Disposal	171 (0.8)	167	92	95 (2)	4 (0.06)	4	4	- (-)	167 (2)	163	88	91 (2)	0 (0)	0	0	- (-)
**12 : Solid Waste Landfill	23 (0.1)	19	21	4 (5)	20 (0.3)	18	19	4 (5)	3 (0.03)	1	2	- (-)	0 (0)	0	0	- (-)
*29 : Remediation and Other Waste Management Servi	21 (0.09)	19	20	7 (3)	19 (0.3)	18	18	7 (3)	2 (0.02)	1	2	- (-)	0 (0)	0	0	- (-)
**10 : Remediation Services	2407 (11)	2129	2235	15 (160)	397 (6)	380	320	3 (153)	1908 (19)	1708	1817	12 (161)	102 (2)	41	98	0.6 (168)
61 : Educational Services	1126 (5)	894	1054	10 (117)	13 (0.2)	2	3	0.1 (112)	1069 (11)	876	1010	9 (118)	44 (0.7)	16	41	0.4 (123)
*11 : Elementary and Secondary Schools	1126 (5)	894	1054	10 (117)	13 (0.2)	2	3	0.1 (112)	1069 (11)	876	1010	9 (118)	44 (0.7)	16	41	0.4 (123)
**10 : Elementary and Secondary Schools	1272 (6)	1230	1173	60 (21)	384 (6)	378	317	18 (21)	832 (8)	828	801	40 (21)	56 (0.9)	24	55	3 (22)
*13 : Colleges, Universities, and Professional Schools	1272 (6)	1230	1173	60 (21)	384 (6)	378	317	18 (21)	832 (8)	828	801	40 (21)	56 (0.9)	24	55	3 (22)
**10 : Colleges, Universities, and Professional Schools	15012 (66)	13736	12638	39 (388)	5240 (84)	5029	3415	14 (372)	8483 (85)	8020	8016	22 (389)	1289 (22)	687	1207	3 (405)

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	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)	Cases (cases per week)	Accepted	Positive	Cases per 1k FTE (Total 1k FTE)
62 : Health Care and Social Assistance	1506 (7)	1404	1143	41 (37)	526 (8)	503	217	14 (37)	898 (9)	854	845	23 (39)	82 (1)	47	81	2 (35)
**11 : Offices of Physicians (except Mental Health Spec	1267 (6)	1184	926	42 (30)	471 (8)	456	175	16 (30)	725 (7)	688	681	23 (31)	71 (1)	40	70	2 (29)
**12 : Offices of Physicians, Mental Health Specialists	239 (1)	220	217	25 (10)	55 (0.9)	47	42	6 (10)	173 (2)	166	164	18 (10)	11 (0.2)	7	11	1 (10)
*12 : Offices of Dentists	69 (0.3)	62	51	4 (20)	26 (0.4)	25	11	1 (18)	39 (0.4)	36	36	2 (20)	4 (0.07)	1	4	- (-)
**10 : Offices of Dentists	69 (0.3)	62	51	4 (20)	26 (0.4)	25	11	1 (18)	39 (0.4)	36	36	2 (20)	4 (0.07)	1	4	- (-)
*13 : Offices of Other Health Practitioners	169 (0.7)	154	148	8 (22)	52 (0.8)	50	36	3 (20)	104 (1)	95	100	5 (23)	13 (0.2)	9	12	0.6 (24)
**30 : Offices of Mental Health Practitioners (except Phy	21 (0.09)	16	15	6 (3)	8 (0.1)	7	3	3 (3)	11 (0.1)	8	11	3 (3)	2 (0.03)	1	1	- (-)
**40 : Offices of Physical, Occupational and Speech Th	97 (0.4)	91	86	16 (6)	39 (0.6)	39	31	7 (5)	47 (0.5)	44	44	8 (6)	11 (0.2)	8	11	2 (6)
**99 : Offices of All Other Miscellaneous Health Practitio	24 (0.1)	23	22	5 (4)	2 (0.03)	1	1	- (-)	22 (0.2)	22	21	5 (5)	0 (0)	0	0	- (-)
*14 : Outpatient Care Centers	217 (1)	208	133	4 (56)	109 (2)	109	40	2 (52)	104 (1)	97	89	2 (55)	4 (0.07)	2	4	- (-)
**20 : Outpatient Mental Health and Substance Abuse C	49 (0.2)	45	41	10 (5)	18 (0.3)	18	11	4 (5)	28 (0.3)	26	27	6 (5)	3 (0.05)	1	3	- (-)
**91 : HMO Medical Centers	83 (0.4)	79	22	33 (3)	55 (0.9)	55	7	25 (2)	28 (0.3)	24	15	12 (2)	0 (0)	0	0	- (-)
**93 : Freestanding Ambulatory Surgical and Emergenc	27 (0.1)	27	26	26 (1)	5 (0.08)	5	4	- (-)	21 (0.2)	21	21	19 (1)	1 (0.02)	1	1	- (-)
**98 : All Other Outpatient Care Centers	41 (0.2)	41	32	0.9 (43)	21 (0.3)	21	13	0.5 (40)	20 (0.2)	20	19	0.5 (43)	0 (0)	0	0	- (-)
*15 : Medical and Diagnostic Laboratories	40 (0.2)	40	18	7 (6)	31 (0.5)	31	9	6 (5)	9 (0.09)	9	9	2 (6)	0 (0)	0	0	- (-)
**11 : Medical Laboratories	29 (0.1)	29	8	7 (4)	23 (0.4)	23	2	6 (4)	6 (0.06)	6	6	1 (4)	0 (0)	0	0	- (-)
*16 : Home Health Care Services	147 (0.7)	140	117	7 (21)	84 (1)	82	58	2 (35)	58 (0.6)	54	54	3 (21)	5 (0.08)	4	5	- (-)
**10 : Home Health Care Services	147 (0.7)	140	117	7 (21)	84 (1)	82	58	2 (35)	58 (0.6)	54	54	3 (21)	5 (0.08)	4	5	- (-)
*19 : Other Ambulatory Health Care Services	473 (2)	429	386	100 (5)	138 (2)	134	68	31 (4)	297 (3)	280	286	62 (5)	38 (0.6)	15	32	8 (5)
**10 : Ambulance Services	385 (2)	361	306	149 (3)	133 (2)	130	65	54 (2)	243 (2)	228	233	93 (3)	9 (0.2)	3	8	3 (3)
**99 : All Other Miscellaneous Ambulatory Health Care	85 (0.4)	65	78	268 (0.3)	3 (0.05)	2	2	- (-)	53 (0.5)	51	52	151 (0.4)	29 (0.5)	12	24	83 (0.4)
*21 : General Medical and Surgical Hospitals	6027 (27)	5428	4942	66 (92)	1867 (30)	1776	1077	21 (90)	3592 (36)	3359	3343	39 (92)	568 (10)	293	522	6 (94)
**10 : General Medical and Surgical Hospitals	6027 (27)	5428	4942	66 (92)	1867 (30)	1776	1077	21 (90)	3592 (36)	3359	3343	39 (92)	568 (10)	293	522	6 (94)
*22 : Psychiatric and Substance Abuse Hospitals	650 (3)	595	620	130 (5)	48 (0.8)	46	35	9 (5)	499 (5)	491	484	103 (5)	103 (2)	58	101	21 (5)
**10 : Psychiatric and Substance Abuse Hospitals	650 (3)	595	620	130 (5)	48 (0.8)	46	35	9 (5)	499 (5)	491	484	103 (5)	103 (2)	58	101	21 (5)
*23 : Specialty (except Psychiatric and Substance Abus	51 (0.2)	49	49	130 (0.4)	31 (0.5)	31	29	69 (0.5)	16 (0.2)	16	16	41 (0.4)	4 (0.07)	2	4	- (-)
**10 : Specialty (except Psychiatric and Substance Abu	51 (0.2)	49	49	130 (0.4)	31 (0.5)	31	29	69 (0.5)	16 (0.2)	16	16	41 (0.4)	4 (0.07)	2	4	- (-)
*31 : Nursing Care Facilities	2806 (12)	2606	2494	206 (14)	1273 (20)	1250	1031	91 (14)	1307 (13)	1240	1251	104 (13)	226 (4)	116	212	15 (15)
**10 : Nursing Care Facilities	2806 (12)	2606	2494	206 (14)	1273 (20)	1250	1031	91 (14)	1307 (13)	1240	1251	104 (13)	226 (4)	116	212	15 (15)
*32 : Residential Mental Retardation, Mental Health and	402 (2)	370	362	90 (4)	61 (1)	57	26	13 (5)	228 (2)	224	225	53 (4)	113 (2)	89	111	26 (4)

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**10 : Residential Mental Retardation Facilities	342 (2)	316	332	137 (3)	13 (0.2)	11	7	5 (3)	217 (2)	216	215	91 (2)	112 (2)	89	110	47 (2)
**20 : Residential Mental Health and Substance Abuse	60 (0.3)	54	30	31 (2)	48 (0.8)	46	19	24 (2)	11 (0.1)	8	10	6 (2)	1 (0.02)	0	1	- (-)
*33 : Community Care Facilities for the Elderly	1914 (8)	1828	1766	73 (26)	814 (13)	798	693	31 (26)	1017 (10)	992	994	39 (26)	83 (1)	38	79	3 (27)
**11 : Continuing Care Retirement Communities	828 (4)	784	751	82 (10)	318 (5)	308	259	33 (10)	473 (5)	458	458	47 (10)	37 (0.6)	18	34	4 (11)
**12 : Homes for the Elderly	1086 (5)	1044	1015	72 (15)	496 (8)	490	434	33 (15)	544 (5)	534	536	36 (15)	46 (0.8)	20	45	3 (16)
*39 : Other Residential Care Facilities	47 (0.2)	42	44	13 (4)	11 (0.2)	11	9	3 (4)	32 (0.3)	29	32	9 (4)	4 (.07)	2	3	- (-)
**90 : Other Residential Care Facilities	47 (0.2)	42	44	13 (4)	11 (0.2)	11	9	3 (4)	32 (0.3)	29	32	9 (4)	4 (.07)	2	3	- (-)
*41 : Individual and Family Services	296 (1)	268	223	7 (44)	110 (2)	107	53	4 (26)	170 (2)	158	157	4 (44)	16 (0.3)	3	13	0.2 (64)
**10 : Child and Youth Services	40 (0.2)	37	39	21 (2)	1 (.02)	1	0	- (-)	36 (0.4)	36	36	18 (2)	3 (.05)	0	3	- (-)
**20 : Services for the Elderly and Persons with Disabilit	173 (0.8)	157	117	6 (30)	86 (1)	84	42	7 (12)	78 (0.8)	71	69	3 (30)	9 (0.2)	2	6	0.2 (48)
**90 : Other Individual and Family Services	83 (0.4)	74	67	7 (12)	23 (0.4)	22	11	2 (11)	56 (0.6)	51	52	5 (12)	4 (.07)	1	4	- (-)
*42 : Community Food and Housing, and Emergency an	32 (0.1)	18	22	7 (5)	11 (0.2)	5	2	3 (4)	12 (0.1)	10	12	3 (5)	9 (0.2)	3	8	2 (5)
*43 : Vocational Rehabilitation Services	28 (0.1)	17	22	6 (5)	11 (0.2)	6	7	2 (4)	14 (0.1)	10	12	3 (5)	3 (.05)	1	3	- (-)
**10 : Vocational Rehabilitation Services	28 (0.1)	17	22	6 (5)	11 (0.2)	6	7	2 (4)	14 (0.1)	10	12	3 (5)	3 (.05)	1	3	- (-)
*44 : Child Day Care Services	138 (0.6)	78	98	9 (15)	37 (0.6)	8	14	3 (13)	87 (0.9)	66	71	6 (15)	14 (0.2)	4	13	0.8 (17)
**10 : Child Day Care Services	138 (0.6)	78	98	9 (15)	37 (0.6)	8	14	3 (13)	87 (0.9)	66	71	6 (15)	14 (0.2)	4	13	0.8 (17)
71 : Arts, Entertainment, and Recreation	24 (0.1)	7	22	1 (22)	7 (0.1)	2	7	0.4 (16)	17 (0.2)	5	15	0.7 (24)	0 (0)	0	0	0 (26)
72 : Accommodation and Food Services	259 (1)	128	162	2 (148)	117 (2)	31	29	1 (117)	137 (1)	95	128	0.9 (156)	5 (.08)	2	5	.03 (166)
*11 : Traveler Accommodation	34 (0.2)	22	26	2 (17)	8 (0.1)	1	2	0.6 (13)	25 (0.3)	21	23	1 (18)	1 (.02)	0	1	- (-)
**10 : Hotels (except Casino Hotels) and Motels	34 (0.2)	22	26	2 (16)	8 (0.1)	1	2	0.7 (12)	25 (0.3)	21	23	1 (17)	1 (.02)	0	1	- (-)
*13 : Rooming and Boarding Houses	48 (0.2)	46	35	18 (3)	24 (0.4)	23	12	9 (3)	21 (0.2)	21	20	8 (3)	3 (.05)	2	3	- (-)
**10 : Rooming and Boarding Houses	48 (0.2)	46	35	18 (3)	24 (0.4)	23	12	9 (3)	21 (0.2)	21	20	8 (3)	3 (.05)	2	3	- (-)
*21 : Full-Service Restaurants	65 (0.3)	28	46	1 (59)	27 (0.4)	4	9	0.6 (42)	37 (0.4)	24	36	0.6 (65)	1 (.02)	0	1	- (-)
**10 : Full-Service Restaurants	65 (0.3)	28	46	1 (59)	27 (0.4)	4	9	0.6 (42)	37 (0.4)	24	36	0.6 (65)	1 (.02)	0	1	- (-)
*22 : Limited-Service Eating Places	98 (0.4)	25	45	2 (57)	54 (0.9)	2	6	1 (52)	44 (0.4)	23	39	0.8 (58)	0 (0)	0	0	- (-)
**11 : Limited-Service Restaurants	79 (0.3)	25	38	2 (45)	43 (0.7)	2	4	1 (42)	36 (0.4)	23	34	0.8 (46)	0 (0)	0	0	- (-)
81 : Other Services (except Public Administration)	289 (1)	240	214	3 (90)	106 (2)	86	39	1 (81)	165 (2)	146	158	2 (91)	18 (0.3)	8	17	0.2 (97)
*31 : Religious Organizations	181 (0.8)	160	143	12 (15)	55 (0.9)	45	23	4 (15)	114 (1)	111	109	7 (15)	12 (0.2)	4	11	0.8 (16)
**10 : Religious Organizations	181 (0.8)	160	143	12 (15)	55 (0.9)	45	23	4 (15)	114 (1)	111	109	7 (15)	12 (0.2)	4	11	0.8 (16)
*39 : Business, Professional, Labor, Political, and Simila	52 (0.2)	49	25	5 (10)	37 (0.6)	37	10	4 (9)	15 (0.2)	12	15	2 (10)	0 (0)	0	0	- (-)

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**20 : Professional Organizations	41 (0.2)	40	14	14 (3)	37 (0.6)	37	10	12 (3)	4 (.04)	3	4	- (-)	0 (0)	0	0	- (-)
92 : Public Administration	5406 (24)	5184	4399	67 (81)	1133 (18)	1056	461	15 (78)	4069 (41)	3969	3742	51 (80)	204 (3)	159	196	2 (87)
*11 : Executive, Legislative, and Other General Govern	2864 (13)	2743	2220	118 (24)	679 (11)	621	262	30 (23)	2092 (21)	2039	1866	87 (24)	93 (2)	83	92	4 (26)
**10 : Executive Offices	794 (4)	770	599	282 (3)	192 (3)	182	74	72 (3)	560 (6)	549	483	201 (3)	42 (0.7)	39	42	14 (3)
**20 : Legislative Bodies	339 (2)	323	225	201 (2)	87 (1)	77	13	55 (2)	245 (2)	239	205	148 (2)	7 (0.1)	7	7	4 (2)
**40 : Executive and Legislative Offices, Combined	406 (2)	388	296	43 (9)	155 (2)	141	57	17 (9)	247 (2)	245	236	27 (9)	4 (0.07)	2	3	- (-)
**90 : Other General Government Support	1323 (6)	1262	1098	38 (35)	245 (4)	221	118	7 (34)	1038 (10)	1006	940	30 (34)	40 (0.7)	35	40	1 (36)
*21 : Justice, Public Order, and Safety Activities	2451 (11)	2381	2113	117 (21)	426 (7)	417	192	21 (21)	1923 (19)	1891	1826	93 (21)	102 (2)	73	95	5 (22)
**20 : Police Protection	156 (0.7)	148	98	74 (2)	54 (0.9)	52	11	24 (2)	100 (1)	94	85	50 (2)	2 (0.03)	2	2	- (-)
**40 : Correctional Institutions	1246 (6)	1212	1198	137 (9)	112 (2)	111	102	12 (9)	1104 (11)	1088	1067	125 (9)	30 (0.5)	13	29	3 (10)
**60 : Fire Protection	1034 (5)	1007	806	146 (7)	259 (4)	253	78	39 (7)	705 (7)	696	664	101 (7)	70 (1)	58	64	9 (8)
*31 : Administration of Human Resource Programs	39 (0.2)	27	29	2 (18)	9 (0.1)	8	1	0.5 (17)	26 (0.3)	19	24	1 (18)	4 (0.07)	0	4	- (-)
**30 : Administration of Human Resource Programs (ex	32 (0.1)	23	27	2 (14)	5 (0.08)	4	1	- (-)	24 (0.2)	19	23	2 (13)	3 (0.05)	0	3	- (-)
*61 : Administration of Economic Program	38 (0.2)	24	26	4 (9)	16 (0.3)	10	5	2 (9)	18 (0.2)	11	17	2 (9)	4 (0.07)	3	4	- (-)
**30 : Regulation and Administration of Communication	21 (0.09)	14	10	24 (0.9)	15 (0.2)	10	4	17 (0.9)	6 (0.06)	4	6	7 (0.9)	0 (0)	0	0	- (-)
99 : Unknown/Non-Classifiable	93 (0.4)	10	78	11 (9)	1 (0.02)	0	0	0.1 (8)	88 (0.9)	10	74	10 (9)	4 (0.07)	0	4	0.4 (10)
Total	26377 (117)	23053	21976	10 (2763)	7923 (126)	6971	4759	3 (2593)	6699 (167)	15154	15566	6 (2812)	1755 (30)	928	1651	0.6 (2879)

Appendix D - Detailed Occupation Statistics

Occupation is coded using Standard Occupational Classification (SOC 2000). Statistics were compiled for every 2-digit, 3-digit, and 6-digit SOC codes, and by the HELSA period in which the claim was established. Codes with fewer than 20 total valid cases were omitted from the table.

Cases (cases per week) = number of claims that met our case-definition for occupational COVID-19, adjusted for the duration of the period.

Accepted = number of cases that were accepted for claim coverage by L&I

Positive = number of cases that were confirmed to be COVID-19 positive by any PCR, at-home, or antigen test

Occupation Code 2-digit major occupational group * 3-digit minor occupational group ** 6-digit occupation code	Total			pre-HELSEA			HELSEA			post-HELSEA		
	Cases (cases per week)	Accepted	Positive	Cases (cases per week)	Accepted	Positive	Valid (cases per week)	Accepted	Positive	Valid (cases per week)	Accepted	Positive
11 : Management Occupations	498 (2)	424	430	138 (2)	103	84	334 (3)	305	320	26 (0.4)	16	26
*1 : Top Executives	30 (0.1)	21	24	9 (0.1)	4	4	19 (0.2)	17	18	2 (0.03)	-	2
**021 : General and Operations Managers	20 (0.09)	12	14	7 (0.1)	2	2	12 (0.1)	10	11	1 (0.02)	-	1
*2 : Advertising, Marketing, Promotions, Public Relations, and Sales Managers	34 (0.2)	24	31	12 (0.2)	8	10	22 (0.2)	16	21	-	-	-
**022 : Sales Managers	27 (0.1)	19	25	10 (0.2)	7	9	17 (0.2)	12	16	-	-	-
*3 : Operations Specialties Managers	56 (0.2)	49	52	18 (0.3)	14	14	38 (0.4)	35	38	-	-	-
**011 : Administrative Services Managers	27 (0.1)	25	25	10 (0.2)	9	8	17 (0.2)	16	17	-	-	-
*9 : Other Management Occupations	378 (2)	330	323	99 (2)	77	56	255 (3)	237	243	24 (0.4)	16	24
**051 : Food Service Managers	37 (0.2)	31	30	6 (0.1)	4	2	31 (0.3)	27	28	-	-	-
**111 : Medical and Health Services Managers	196 (0.9)	186	175	51 (0.8)	46	35	130 (1)	127	125	15 (0.3)	13	15
**151 : Social and Community Service Managers	27 (0.1)	21	19	12 (0.2)	10	4	9 (0.09)	9	9	6 (0.1)	2	6
**199 : Managers, All Other	67 (0.3)	56	59	17 (0.3)	12	9	48 (0.5)	43	48	2 (0.03)	1	2
13 : Business and Financial Operations Occupations	111 (0.5)	91	104	19 (0.3)	12	15	85 (0.9)	73	82	7 (0.1)	6	7
*1 : Business Operations Specialists	71 (0.3)	60	67	7 (0.1)	3	5	58 (0.6)	52	56	6 (0.1)	5	6
*2 : Financial Specialists	40 (0.2)	31	37	12 (0.2)	9	10	27 (0.3)	21	26	1 (0.02)	1	1
**011 : Accountants and Auditors	20 (0.09)	16	19	7 (0.1)	6	6	13 (0.1)	10	13	-	-	-
15 : Computer and Mathematical Occupations	31 (0.1)	26	27	5 (0.08)	3	2	21 (0.2)	19	20	5 (0.08)	4	5
*1 : Computer Specialists	30 (0.1)	25	26	5 (0.08)	3	2	20 (0.2)	18	19	5 (0.08)	4	5
17 : Architecture and Engineering Occupations	37 (0.2)	27	30	8 (0.1)	4	2	27 (0.3)	22	26	2 (0.03)	1	2
*2 : Engineers	29 (0.1)	20	23	7 (0.1)	4	2	20 (0.2)	15	19	2 (0.03)	1	2
19 : Life, Physical, and Social Science Occupations	94 (0.4)	85	83	17 (0.3)	14	8	70 (0.7)	68	69	7 (0.1)	3	6
*1 : Life Scientists	22 (0.1)	19	19	5 (0.08)	3	2	15 (0.2)	15	15	2 (0.03)	1	2
*3 : Social Scientists and Related Workers	25 (0.1)	22	23	1 (0.02)	1	1	20 (0.2)	20	19	4 (0.07)	1	3
*4 : Life, Physical, and Social Science Technicians	46 (0.2)	43	40	11 (0.2)	10	5	34 (0.3)	32	34	1 (0.02)	1	1
**099 : Life, Physical, and Social Science Technicians, All Other	39 (0.2)	36	33	10 (0.2)	9	4	29 (0.3)	27	29	-	-	-

Occupation Code 2-digit major occupational group * 3-digit minor occupational group ** 6-digit occupation code	Total			pre-HELSA			HELSA			post-HELSA		
	(cases per week) Valid	Accepted	Positive	(cases per week) Cases	Accepted	Positive	(cases per week) Valid	Accepted	Positive	(cases per week) Valid	Accepted	Positive
21 : Community and Social Services Occupations	524 (2)	486	467	102 (2)	93	63	387 (4)	371	371	35 (0.6)	22	33
*1 : Counselors, Social Workers, and Other Community and Social Service Sp	520 (2)	482	464	100 (2)	91	62	385 (4)	369	369	35 (0.6)	22	33
**011 : Substance Abuse and Behavioral Disorder Counselors	75 (0.3)	70	62	27 (0.4)	26	16	46 (0.5)	43	44	2 (0.03)	1	2
**012 : Educational, Vocational, and School Counselors	27 (0.1)	26	26	1 (0.02)	1	-	24 (0.2)	24	24	2 (0.03)	1	2
**014 : Mental Health Counselors	64 (0.3)	59	59	6 (0.1)	5	4	47 (0.5)	47	45	11 (0.2)	7	10
**019 : Counselors, All Other	215 (1)	202	193	48 (0.8)	44	32	166 (2)	157	160	1 (0.02)	1	1
**021 : Child, Family, and School Social Workers	22 (0.1)	19	19	2 (0.03)	-	-	19 (0.2)	19	18	1 (0.02)	-	1
**022 : Medical and Public Health Social Workers	32 (0.1)	30	29	3 (0.05)	3	3	21 (0.2)	21	19	8 (0.1)	6	7
**029 : Social Workers, All Other	26 (0.1)	23	25	4 (0.06)	4	3	22 (0.2)	19	22	-	-	-
23 : Legal Occupations	15 (0.07)	11	12	4 (0.06)	-	1	11 (0.1)	11	11	-	-	-
25 : Education, Training, and Library Occupations	760 (3)	694	697	32 (0.5)	9	10	704 (7)	669	664	24 (0.4)	16	23
*2 : Primary, Secondary, and Special Education School Teachers	306 (1)	268	269	20 (0.3)	2	5	275 (3)	260	254	11 (0.2)	6	10
**011 : Preschool Teachers, Except Special Education	74 (0.3)	44	51	19 (0.3)	2	4	49 (0.5)	41	42	6 (0.1)	1	5
**012 : Kindergarten Teachers, Except Special Education	21 (0.09)	19	17	-	-	-	21 (0.2)	19	17	-	-	-
**021 : Elementary School Teachers, Except Special Education	122 (0.5)	117	118	1 (0.02)	-	1	117 (1)	113	113	4 (0.07)	4	4
**022 : Middle School Teachers, Except Special and Vocational Education	35 (0.2)	35	33	-	-	-	34 (0.3)	34	32	1 (0.02)	1	1
**031 : Secondary School Teachers, Except Special and Vocational Education	41 (0.2)	40	38	-	-	-	41 (0.4)	40	38	-	-	-
*3 : Other Teachers and Instructors	242 (1)	233	232	2 (0.03)	1	1	236 (2)	229	227	4 (0.07)	3	4
**099 : Teachers and Instructors, All Other	228 (1)	220	218	2 (0.03)	1	1	225 (2)	218	216	1 (0.02)	1	1
*9 : Other Education, Training, and Library Occupations	194 (0.9)	176	178	10 (0.2)	6	4	176 (2)	163	166	8 (0.1)	7	8
**041 : Teacher Assistants	179 (0.8)	162	163	9 (0.1)	5	3	162 (2)	150	152	8 (0.1)	7	8
27 : Arts, Design, Entertainment, Sports, and Media Occupations	38 (0.2)	27	32	9 (0.1)	8	4	26 (0.3)	18	25	3 (0.05)	1	3
29 : Healthcare Practitioners and Technical Occupations	7830 (35)	7466	6514	2766 (44)	2700	1694	4614 (46)	4440	4380	450 (8)	326	440
*1 : Health Diagnosing and Treating Practitioners	5824 (26)	5565	4740	2320 (37)	2273	1414	3210 (32)	3072	3039	294 (5)	220	287
**031 : Dietitians and Nutritionists	32 (0.1)	30	30	9 (0.1)	8	8	19 (0.2)	19	18	4 (0.07)	3	4
**051 : Pharmacists	104 (0.5)	101	83	34 (0.5)	33	15	66 (0.7)	64	64	4 (0.07)	4	4
**069 : Physicians and Surgeons, All Other	165 (0.7)	158	108	82 (1)	78	28	70 (0.7)	68	67	13 (0.2)	12	13
**071 : Physician Assistants	71 (0.3)	70	59	22 (0.4)	22	11	44 (0.4)	44	43	5 (0.08)	4	5
**111 : Registered Nurses	4960 (22)	4734	4028	2002 (32)	1966	1234	2726 (27)	2600	2569	232 (4)	168	225
**122 : Occupational Therapists	67 (0.3)	64	65	22 (0.4)	22	20	35 (0.4)	35	35	10 (0.2)	7	10
**123 : Physical Therapists	189 (0.8)	184	159	81 (1)	81	56	97 (1)	94	92	11 (0.2)	9	11

Occupation Code 2-digit major occupational group * 3-digit minor occupational group ** 6-digit occupation code	Total			pre-HELSA			HELSA			post-HELSA		
	(cases per week) Valid	Accepted	Positive	(cases per week) Cases	Accepted	Positive	(cases per week) Valid	Accepted	Positive	(cases per week) Valid	Accepted	Positive
**126 : Respiratory Therapists	106 (0.5)	101	98	24 (0.4)	21	16	77 (0.8)	75	77	5 (0.08)	5	5
**127 : Speech-Language Pathologists	50 (0.2)	48	45	18 (0.3)	18	14	25 (0.3)	25	24	7 (0.1)	5	7
*2 : Health Technologists and Technicians	1979 (9)	1879	1750	443 (7)	426	278	1383 (14)	1348	1322	153 (3)	105	150
**011 : Medical and Clinical Laboratory Technologists	29 (0.1)	28	21	7 (0.1)	7	1	16 (0.2)	16	15	6 (0.1)	5	5
**012 : Medical and Clinical Laboratory Technicians	73 (0.3)	72	63	11 (0.2)	11	5	55 (0.6)	55	51	7 (0.1)	6	7
**021 : Dental Hygienists	21 (0.09)	21	14	7 (0.1)	7	1	14 (0.1)	14	13	-	-	-
**031 : Cardiovascular Technologists and Technicians	24 (0.1)	24	22	3 (0.05)	3	3	19 (0.2)	19	17	2 (0.03)	2	2
**032 : Diagnostic Medical Sonographers	101 (0.4)	95	89	21 (0.3)	21	15	77 (0.8)	74	71	3 (0.05)	-	3
**034 : Radiologic Technologists and Technicians	116 (0.5)	113	109	11 (0.2)	10	8	95 (1)	95	91	10 (0.2)	8	10
**041 : Emergency Medical Technicians and Paramedics	519 (2)	490	418	143 (2)	138	61	334 (3)	316	316	42 (0.7)	36	41
**051 : Dietetic Technicians	44 (0.2)	42	37	13 (0.2)	13	8	29 (0.3)	29	27	2 (0.03)	-	2
**052 : Pharmacy Technicians	64 (0.3)	61	58	7 (0.1)	7	3	51 (0.5)	51	49	6 (0.1)	3	6
**053 : Psychiatric Technicians	126 (0.6)	122	120	14 (0.2)	14	9	106 (1)	103	105	6 (0.1)	5	6
**055 : Surgical Technologists	85 (0.4)	81	76	10 (0.2)	10	8	72 (0.7)	69	65	3 (0.05)	2	3
**061 : Licensed Practical and Licensed Vocational Nurses	504 (2)	479	474	168 (3)	164	145	293 (3)	291	287	43 (0.7)	24	42
**071 : Medical Records and Health Information Technicians	22 (0.1)	21	20	3 (0.05)	3	2	16 (0.2)	16	15	3 (0.05)	2	3
**099 : Health Technologists and Technicians, All Other	230 (1)	215	213	18 (0.3)	13	6	192 (2)	190	187	20 (0.3)	12	20
*9 : Other Healthcare Practitioners and Technical Occupations	27 (0.1)	22	24	3 (0.05)	1	2	21 (0.2)	20	19	3 (0.05)	1	3
31 : Healthcare Support Occupations	4313 (19)	4119	3793	1567 (25)	1525	1154	2476 (25)	2409	2376	270 (5)	185	263
*1 : Nursing, Psychiatric, and Home Health Aides	2895 (13)	2769	2565	1285 (20)	1260	1011	1460 (15)	1415	1408	150 (3)	94	146
**011 : Home Health Aides	81 (0.4)	77	69	22 (0.4)	20	12	55 (0.6)	53	53	4 (0.07)	4	4
**012 : Nursing Aides, Orderlies, and Attendants	2804 (12)	2687	2487	1263 (20)	1240	999	1402 (14)	1359	1352	139 (2)	88	136
*2 : Occupational and Physical Therapist Assistants and Aides	160 (0.7)	149	136	64 (1)	61	43	82 (0.8)	81	79	14 (0.2)	7	14
**011 : Occupational Therapist Assistants	102 (0.5)	97	84	41 (0.7)	38	25	57 (0.6)	56	55	4 (0.07)	3	4
**021 : Physical Therapist Assistants	43 (0.2)	41	38	22 (0.4)	22	17	18 (0.2)	18	18	3 (0.05)	1	3
*9 : Other Healthcare Support Occupations	1258 (6)	1201	1092	218 (3)	204	100	934 (9)	913	889	106 (2)	84	103
**091 : Dental Assistants	70 (0.3)	65	47	34 (0.5)	32	12	32 (0.3)	31	31	4 (0.07)	2	4
**092 : Medical Assistants	695 (3)	668	626	73 (1)	69	31	560 (6)	547	535	62 (1)	52	60
**093 : Medical Equipment Preparers	36 (0.2)	34	33	6 (0.1)	5	4	28 (0.3)	27	27	2 (0.03)	2	2
**095 : Pharmacy Aides	25 (0.1)	25	22	5 (0.08)	5	2	18 (0.2)	18	18	2 (0.03)	2	2
**099 : Healthcare Support Workers, All Other	407 (2)	388	349	95 (2)	89	49	277 (3)	273	266	35 (0.6)	26	34

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	(cases per week) Valid	Accepted	Positive	(cases per week) Cases	Accepted	Positive	(cases per week) Valid	Accepted	Positive	(cases per week) Valid	Accepted	Positive
33 : Protective Service Occupations	4852 (21)	4740	3931	980 (16)	950	406	3738 (37)	3682	3397	134 (2)	108	128
*1 : First-Line Supervisors/Managers, Protective Service Workers	548 (2)	540	466	75 (1)	73	28	449 (4)	445	416	24 (0.4)	22	22
**011 : First-Line Supervisors/Managers of Correctional Officers	106 (0.5)	105	99	1 (0.02)	1	1	102 (1)	102	95	3 (0.05)	2	3
**012 : First-Line Supervisors/Managers of Police and Detectives	80 (0.4)	77	65	10 (0.2)	9	4	70 (0.7)	68	61	-	-	-
**021 : First-Line Supervisors/Managers of Fire Fighting and Prevention Work	355 (2)	352	296	64 (1)	63	23	271 (3)	270	255	20 (0.3)	19	18
*2 : Fire Fighting and Prevention Workers	1642 (7)	1611	1251	497 (8)	488	169	1079 (11)	1069	1020	66 (1)	54	62
**011 : Fire Fighters	1632 (7)	1601	1243	494 (8)	485	168	1073 (11)	1063	1014	65 (1)	53	61
*3 : Law Enforcement Workers	2462 (11)	2417	2037	375 (6)	368	192	2053 (21)	2023	1811	34 (0.6)	26	34
**012 : Correctional Officers and Jailers	1554 (7)	1532	1429	141 (2)	139	122	1389 (14)	1377	1283	24 (0.4)	16	24
**021 : Detectives and Criminal Investigators	55 (0.2)	51	37	18 (0.3)	18	6	37 (0.4)	33	31	-	-	-
**051 : Police and Sheriff's Patrol Officers	851 (4)	832	569	216 (3)	211	64	625 (6)	611	495	10 (0.2)	10	10
*9 : Other Protective Service Workers	200 (0.9)	172	177	33 (0.5)	21	17	157 (2)	145	150	10 (0.2)	6	10
**032 : Security Guards	189 (0.8)	163	168	31 (0.5)	20	17	148 (1)	137	141	10 (0.2)	6	10
35 : Food Preparation and Serving Related Occupations	617 (3)	478	502	217 (3)	138	129	377 (4)	328	351	23 (0.4)	12	22
*1 : Supervisors, Food Preparation and Serving Workers	69 (0.3)	47	53	29 (0.5)	17	16	37 (0.4)	29	35	3 (0.05)	1	2
**012 : First-Line Supervisors/Managers of Food Preparation and Serving Wor	51 (0.2)	33	41	18 (0.3)	9	10	30 (0.3)	23	29	3 (0.05)	1	2
*2 : Cooks and Food Preparation Workers	234 (1)	209	210	64 (1)	57	50	157 (2)	143	147	13 (0.2)	9	13
**012 : Cooks, Institution and Cafeteria	114 (0.5)	109	107	40 (0.6)	39	34	66 (0.7)	65	65	8 (0.1)	5	8
**014 : Cooks, Restaurant	74 (0.3)	59	62	20 (0.3)	15	13	54 (0.5)	44	49	-	-	-
**021 : Food Preparation Workers	40 (0.2)	36	37	2 (0.03)	1	2	33 (0.3)	31	30	5 (0.08)	4	5
*3 : Food and Beverage Serving Workers	260 (1)	175	192	107 (2)	52	51	146 (1)	121	134	7 (0.1)	2	7
**021 : Combined Food Preparation and Serving Workers, Including Fast Foo	106 (0.5)	60	64	51 (0.8)	18	17	55 (0.6)	42	47	-	-	-
**031 : Waiters and Waitresses	58 (0.3)	43	50	24 (0.4)	17	17	33 (0.3)	26	32	1 (0.02)	-	1
**041 : Food Servers, Nonrestaurant	70 (0.3)	63	65	18 (0.3)	17	15	46 (0.5)	44	44	6 (0.1)	2	6
*9 : Other Food Preparation and Serving Related Workers	54 (0.2)	47	47	17 (0.3)	12	12	37 (0.4)	35	35	-	-	-
**021 : Dishwashers	29 (0.1)	27	25	7 (0.1)	6	4	22 (0.2)	21	21	-	-	-
37 : Building and Grounds Cleaning and Maintenance Occupations	600 (3)	524	533	209 (3)	167	157	359 (4)	337	345	32 (0.5)	20	31
*1 : Supervisors, Building and Grounds Cleaning and Maintenance Workers	42 (0.2)	41	38	16 (0.3)	15	13	25 (0.3)	25	24	1 (0.02)	1	1
**011 : First-Line Supervisors/Managers of Housekeeping and Janitorial Work	36 (0.2)	35	33	12 (0.2)	11	10	23 (0.2)	23	22	1 (0.02)	1	1
*2 : Building Cleaning and Pest Control Workers	530 (2)	471	479	178 (3)	151	139	323 (3)	302	312	29 (0.5)	18	28
**011 : Janitors and Cleaners, Except Maids and Housekeeping Cleaners	220 (1)	187	192	66 (1)	49	46	143 (1)	129	135	11 (0.2)	9	11

Occupation Code 2-digit major occupational group * 3-digit minor occupational group ** 6-digit occupation code	Total			pre-HELSA			HELSA			post-HELSA		
	(cases per week) Valid	Accepted	Positive	(cases per week) Cases	Accepted	Positive	(cases per week) Valid	Accepted	Positive	(cases per week) Valid	Accepted	Positive
**012 : Maids and Housekeeping Cleaners	307 (1)	283	286	110 (2)	102	93	179 (2)	172	176	18 (0.3)	9	17
*3 : Grounds Maintenance Workers	28 (0.1)	12	16	15 (0.2)	1	5	11 (0.1)	10	9	2 (0.03)	1	2
**011 : Landscaping and Groundskeeping Workers	24 (0.1)	8	13	15 (0.2)	1	5	8 (0.08)	7	7	1 (0.02)	-	1
39 : Personal Care and Service Occupations	1372 (6)	1246	1177	557 (9)	524	417	666 (7)	625	616	149 (3)	97	144
*6 : Transportation, Tourism, and Lodging Attendants	31 (0.1)	15	20	18 (0.3)	6	7	12 (0.1)	9	12	1 (0.02)	-	1
*9 : Other Personal Care and Service Workers	1311 (6)	1212	1134	526 (8)	512	401	637 (6)	603	590	148 (2)	97	143
**011 : Child Care Workers	34 (0.2)	22	26	6 (0.1)	2	3	22 (0.2)	16	17	6 (0.1)	4	6
**021 : Personal and Home Care Aides	1145 (5)	1069	986	477 (8)	468	361	542 (5)	516	503	126 (2)	85	122
**032 : Recreation Workers	123 (0.5)	113	114	38 (0.6)	38	33	69 (0.7)	67	66	16 (0.3)	8	15
41 : Sales and Related Occupations	185 (0.8)	98	147	53 (0.8)	12	31	130 (1)	86	114	2 (0.03)	-	2
*1 : Supervisors, Sales Workers	29 (0.1)	17	25	7 (0.1)	1	4	21 (0.2)	16	20	1 (0.02)	-	1
**011 : First-Line Supervisors/Managers of Retail Sales Workers	29 (0.1)	17	25	7 (0.1)	1	4	21 (0.2)	16	20	1 (0.02)	-	1
*2 : Retail Sales Workers	140 (0.6)	75	110	42 (0.7)	10	25	98 (1)	65	85	-	-	-
**011 : Cashiers	45 (0.2)	23	37	15 (0.2)	3	8	30 (0.3)	20	29	-	-	-
**031 : Retail Salespersons	91 (0.4)	50	70	26 (0.4)	7	17	65 (0.7)	43	53	-	-	-
43 : Office and Administrative Support Occupations	1388 (6)	1243	1166	372 (6)	313	203	952 (10)	884	901	64 (1)	46	62
*1 : Supervisors, Office and Administrative Support Workers	58 (0.3)	52	48	19 (0.3)	15	9	36 (0.4)	35	36	3 (0.05)	2	3
**011 : First-Line Supervisors/Managers of Office and Administrative Support	58 (0.3)	52	48	19 (0.3)	15	9	36 (0.4)	35	36	3 (0.05)	2	3
*3 : Financial Clerks	56 (0.2)	45	48	10 (0.2)	4	4	45 (0.5)	40	43	1 (0.02)	1	1
*4 : Information and Record Clerks	361 (2)	319	299	99 (2)	80	50	241 (2)	222	228	21 (0.4)	17	21
**031 : Court, Municipal, and License Clerks	31 (0.1)	26	25	1 (0.02)	-	1	26 (0.3)	23	20	4 (0.07)	3	4
**051 : Customer Service Representatives	111 (0.5)	89	84	54 (0.9)	43	27	53 (0.5)	44	53	4 (0.07)	2	4
**111 : Interviewers, Except Eligibility and Loan	29 (0.1)	29	28	-	-	-	21 (0.2)	21	20	8 (0.1)	8	8
**171 : Receptionists and Information Clerks	151 (0.7)	139	129	36 (0.6)	30	19	110 (1)	105	105	5 (0.08)	4	5
*5 : Material Recording, Scheduling, Dispatching, and Distributing Workers	133 (0.6)	98	109	34 (0.5)	16	13	97 (1)	81	95	2 (0.03)	1	1
**031 : Police, Fire, and Ambulance Dispatchers	47 (0.2)	43	44	5 (0.08)	5	3	41 (0.4)	38	40	1 (0.02)	-	1
**081 : Stock Clerks and Order Fillers	36 (0.2)	20	26	13 (0.2)	3	4	23 (0.2)	17	22	-	-	-
*6 : Secretaries and Administrative Assistants	621 (3)	587	527	187 (3)	178	117	410 (4)	395	387	24 (0.4)	14	23
**011 : Executive Secretaries and Administrative Assistants	28 (0.1)	24	26	2 (0.03)	1	1	22 (0.2)	22	21	4 (0.07)	1	4
**013 : Medical Secretaries	473 (2)	455	404	145 (2)	141	90	310 (3)	302	297	18 (0.3)	12	17
**014 : Secretaries, Except Legal, Medical, and Executive	118 (0.5)	107	96	40 (0.6)	36	26	76 (0.8)	70	68	2 (0.03)	1	2

Occupation Code 2-digit major occupational group * 3-digit minor occupational group ** 6-digit occupation code	Total			pre-HELSA			HELSA			post-HELSA		
	(cases per week) Valid	Accepted	Positive	(cases per week) Cases	Accepted	Positive	(cases per week) Valid	Accepted	Positive	(cases per week) Valid	Accepted	Positive
*9 : Other Office and Administrative Support Workers	156 (0.7)	140	134	22 (0.4)	19	10	122 (1)	110	112	12 (0.2)	11	12
**061 : Office Clerks, General	82 (0.4)	68	65	21 (0.3)	18	10	56 (0.6)	46	50	5 (0.08)	4	5
**199 : Office and Administrative Support Workers, All Other	70 (0.3)	69	65	1 (0.02)	1	-	62 (0.6)	61	58	7 (0.1)	7	7
45 : Farming, Fishing, and Forestry Occupations	190 (0.8)	120	155	90 (1)	45	55	99 (1)	74	99	1 (0.02)	1	1
*2 : Agricultural Workers	178 (0.8)	115	146	84 (1)	44	52	93 (0.9)	70	93	1 (0.02)	1	1
**092 : Farmworkers and Laborers, Crop, Nursery, and Greenhouse	156 (0.7)	101	129	72 (1)	38	45	83 (0.8)	62	83	1 (0.02)	1	1
47 : Construction and Extraction Occupations	157 (0.7)	64	108	69 (1)	12	28	85 (0.9)	51	77	3 (0.05)	1	3
*1 : Supervisors, Construction and Extraction Workers	21 (0.09)	9	11	10 (0.2)	1	2	11 (0.1)	8	9	-	-	-
**011 : First-Line Supervisors/Managers of Construction Trades and Extractio	21 (0.09)	9	11	10 (0.2)	1	2	11 (0.1)	8	9	-	-	-
*2 : Construction Trades Workers	115 (0.5)	36	80	54 (0.9)	8	23	58 (0.6)	27	54	3 (0.05)	1	3
**061 : Construction Laborers	24 (0.1)	6	14	15 (0.2)	1	6	9 (0.09)	5	8	-	-	-
**111 : Electricians	27 (0.1)	11	23	10 (0.2)	2	7	16 (0.2)	9	15	1 (0.02)	-	1
*4 : Other Construction and Related Workers	20 (0.09)	18	16	5 (0.08)	3	3	15 (0.2)	15	13	-	-	-
49 : Installation, Maintenance, and Repair Occupations	318 (1)	227	281	89 (1)	52	64	213 (2)	169	201	16 (0.3)	6	16
*1 : Supervisors of Installation, Maintenance, and Repair Workers	64 (0.3)	56	59	22 (0.4)	21	19	37 (0.4)	34	35	5 (0.08)	1	5
**011 : First-Line Supervisors/Managers of Mechanics, Installers, and Repaire	64 (0.3)	56	59	22 (0.4)	21	19	37 (0.4)	34	35	5 (0.08)	1	5
*3 : Vehicle and Mobile Equipment Mechanics, Installers, and Repairers	51 (0.2)	27	47	19 (0.3)	6	16	31 (0.3)	20	30	1 (0.02)	1	1
**031 : Bus and Truck Mechanics and Diesel Engine Specialists	20 (0.09)	13	20	5 (0.08)	3	5	15 (0.2)	10	15	-	-	-
*9 : Other Installation, Maintenance, and Repair Occupations	201 (0.9)	144	174	47 (0.7)	25	29	144 (1)	115	135	10 (0.2)	4	10
**042 : Maintenance and Repair Workers, General	94 (0.4)	76	81	24 (0.4)	16	16	66 (0.7)	56	61	4 (0.07)	4	4
**099 : Installation, Maintenance, and Repair Workers, All Other	47 (0.2)	28	39	8 (0.1)	3	4	35 (0.4)	25	31	4 (0.07)	-	4
51 : Production Occupations	239 (1)	130	176	122 (2)	57	68	111 (1)	69	102	6 (0.1)	4	6
*1 : Supervisors, Production Workers	23 (0.1)	12	16	10 (0.2)	2	5	13 (0.1)	10	11	-	-	-
**011 : First-Line Supervisors/Managers of Production and Operating Workers	23 (0.1)	12	16	10 (0.2)	2	5	13 (0.1)	10	11	-	-	-
*3 : Food Processing Workers	23 (0.1)	13	19	9 (0.1)	5	6	14 (0.1)	8	13	-	-	-
*6 : Textile, Apparel, and Furnishings Workers	67 (0.3)	60	56	35 (0.6)	29	25	28 (0.3)	27	27	4 (0.07)	4	4
**011 : Laundry and Dry-Cleaning Workers	60 (0.3)	59	53	29 (0.5)	28	23	27 (0.3)	27	26	4 (0.07)	4	4
*9 : Other Production Occupations	82 (0.4)	31	53	48 (0.8)	17	23	32 (0.3)	14	28	2 (0.03)	-	2
**199 : Production Workers, All Other	49 (0.2)	19	30	30 (0.5)	11	15	19 (0.2)	8	15	-	-	-
53 : Transportation and Material Moving Occupations	464 (2)	308	356	133 (2)	67	56	316 (3)	235	285	15 (0.3)	6	15
*3 : Motor Vehicle Operators	272 (1)	208	198	71 (1)	45	19	194 (2)	160	172	7 (0.1)	3	7

Occupation Code 2-digit major occupational group * 3-digit minor occupational group ** 6-digit occupation code	Total			pre-HELSA			HELSA			post-HELSA		
	(cases per week) Valid	Accepted	Positive	(cases per week) Cases	Accepted	Positive	(cases per week) Valid	Accepted	Positive	(cases per week) Valid	Accepted	Positive
**021 : Bus Drivers, Transit and Intercity	115 (0.5)	106	83	27 (0.4)	26	7	84 (0.8)	78	72	4 (0.07)	2	4
**022 : Bus Drivers, School	45 (0.2)	41	43	-	-	-	45 (0.5)	41	43	-	-	-
**032 : Truck Drivers, Heavy and Tractor-Trailer	38 (0.2)	12	21	17 (0.3)	3	4	21 (0.2)	9	17	-	-	-
**033 : Truck Drivers, Light or Delivery Services	39 (0.2)	22	29	16 (0.3)	8	7	23 (0.2)	14	22	-	-	-
*6 : Other Transportation Workers	25 (0.1)	17	16	8 (0.1)	2	2	14 (0.1)	12	11	3 (0.05)	3	3
*7 : Material Moving Workers	144 (0.6)	67	124	45 (0.7)	14	31	95 (1)	53	89	4 (0.07)	-	4
**062 : Laborers and Freight, Stock, and Material Movers, Hand	84 (0.4)	45	70	21 (0.3)	6	13	60 (0.6)	39	54	3 (0.05)	-	3
**064 : Packers and Packagers, Hand	34 (0.2)	17	30	19 (0.3)	8	15	15 (0.2)	9	15	-	-	-
99 : Unknown/Non-Classifiable	1744 (8)	419	1255	365 (6)	163	108	898 (9)	209	734	481 (8)	47	413
TOTAL : Total	26377 (117)	23053	21976	7923 (126)	6971	4759	16699 (167)	15154	15566	1755 (30)	928	1651