

Characteristics of COVID-19 Workplace Clusters in Rhode Island

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ABSTRACT

The COVID-19 pandemic has impacted certain workplace settings disproportionately, putting some industries at a higher risk for workplace transmission than others. This study examines workplace clusters in Rhode Island between March 2020 and May 2021. There were 14,580 cases associated with 2784 clusters during this period, with the largest number of workplace clusters occurring in manufacturing, food services, and retail. A better understanding of most impacted industries can inform sector-specific COVID-19 guidance and policy changes.

KEYWORDS: COVID-19, workplace, cluster, industry

INTRODUCTION

Coronavirus Disease 2019 (COVID-19) has had devastating impacts on the economy, causing increased unemployment rates across most industries and age groups.¹ While research has focused on worker exposure risk to COVID-19 in health-care and congregate settings, few studies have examined risk among other workplace settings outside of these.²⁻⁴ Many factors play a role in the impact of risk of COVID-19 workplace transmission, including ability to physical distance, mask-wearing, ventilation, area of workplace, carpooling to work, and workplace structure.^{5,6} Efforts to mitigate workplace transmission have included masking guidelines, distancing measures, remote work, workforce testing and quarantine guidelines.⁷ Regular active screening for COVID-19 symptoms among employees has shown to be critical in prevention efforts as well.⁸

Following mitigation efforts in some workplace settings can be challenging. Manufacturing settings, for example, cannot work remotely and may not be able to operate at a six-foot distance.⁶ Workplaces such as these may be at an increased risk for COVID-19 transmission and workplace clusters.⁹ A comprehensive understanding of the distribution of workplace COVID-19 outbreaks by industry sector can help direct future public health action.

The Rhode Island Department of Health (RIDOH) investigates all COVID-19 cases to collect demographics, work history, medical history, and symptom information. RIDOH monitors clusters of cases within a workplace to confirm transmission, and then provides workplace-specific public

health guidance. RIDOH's COVID-19 Epidemiologic Operations unit (Epi-Ops) analyzed industry trends among RI workplace cases from March 2020 through May 2021 to determine which workplace settings are experiencing higher COVID-19 transmission.

METHODS

All laboratory-confirmed PCR cases of COVID-19 are reported to RIDOH along with self-reported rapid antigen tests. Factors analyzed included demographic information, such as gender, age, primary language spoken, race/ethnicity, and whether the case lived in a High-Density Community (HDC), defined as an area of higher population density than average, determined by zip code of the case's residence. Case investigation data was used to determine if workplace cases worked while infectious or symptomatic. A case is classified as working infectious if the person was physically in the workplace two days prior to symptom onset date or, for asymptomatic cases, specimen collection date. A cluster is defined as two or more laboratory-confirmed cases of COVID-19 among individuals associated with a setting within a 14-day period.

A workplace-associated case is defined as a person who was present in the workplace during the 14 days prior to COVID-19 diagnosis. In this analysis, health care, education, and congregate living settings are excluded. Each case is classified by industry using the North American Industry Classification System (NAICS).¹⁰ Frequencies were calculated using Microsoft Excel (Microsoft Office 365, Version 2008).

RESULTS

There were 30,696 workplace-associated cases from March 1, 2020–May 31, 2021. Of these, 14,953 (48.7%) were associated with a workplace cluster. Cases attributed to a workplace cluster were more often male (57.4%), aged 26 to 35 (26.0%) (Table 1). Most cluster-associated cases were symptomatic (86.1%). English was the primary language spoken at home (84.5%), followed by Spanish (9.6%). Additionally, most cases were White (62.0%) and Non-Hispanic (77.0%). There was no difference in case counts based on HDC status.

There were 2,784 clusters identified during this period. Clusters were seen across all industries, with manufacturing

Table 1. Employer Cluster-Associated COVID-19 Case Demographics, March 2020–May 2021.

Demographics	Count (n=14580)	Percent
Gender		
Male	8371	57.4%
Female	6187	42.4%
Other/Declined	22	0.2%
Age Group		
16–25	2778	19.1%
26–35	3784	26.0%
36–45	2850	19.5%
46–55	2897	19.9%
56–64	2035	14.0%
65+	236	1.6%
Symptom Status		
Asymptomatic	1873	12.8%
Symptomatic	12554	86.1%
Unknown	153	1.0%
High Density Community		
Yes	7312	50.2%
No	6998	48.0%
Unknown	270	1.9%
Primary Language in Home		
English	12314	84.5%
Haitian Creole	8	0.1%
Portuguese	63	0.4%
Spanish	1390	9.5%
No Info	765	5.2%
Other	40	0.3%
Race/Ethnicity		
Hispanic or Latino (any race)	3350	23.0%
Non-Hispanic	11230	77.0%
American Indian or Alaska Native	52	0.4%
Asian	396	2.7%
Black or African American	983	6.7%
White	9046	62.0%
Multiple Races	131	0.9%
Declined Race	306	2.1%
Unknown	316	2.2%

(27.4%), food services and drinking places (18.5%), and retail (10.9%) having the highest percentage (Table 2). Among all industries, the average number of cases in a cluster was 3.7(±1.3). Industries with the highest average number of cases in a cluster were financial activities (6.3 cases) and government (6.3 cases). Industries with a higher percent of employees working while infectious were accommodation

Table 2. Workplace Cluster Characteristics by Industry, March 2020–May 2021.

Industry	Total Employee Cases	Average Number of Cases in Cluster	Total Clusters n (%)	Working Infectious n (%)	Working Symptomatic n (%)
Accommodation	180	2.4	26 (0.9%)	24 (52.2%)	20 (43.5%)
Arts, Entertainment, and Recreation	786	3.4	83 (2.8%)	116 (64.1%)	60 (33.1%)
Construction	1226	3.5	176 (6.0%)	264 (74.2%)	156 (43.8%)
Delivery	705	5.5	43 (1.5%)	197 (51.4%)	186 (45.3%)
Financial Activities	2203	6.3	175 (6.0%)	470 (34.9%)	296 (22.0%)
Food Services and Drinking Places	4040	4.7	540 (18.5%)	1012 (62.8%)	547 (33.9%)
Government	2001	6.3	144 (4.9%)	738 (63.7%)	431 (37.2%)
Landscaping	264	3.0	37 (1.3%)	50 (73.5%)	31 (45.6%)
Manufacturing	6661	5.2	801 (27.%)	2624 (75.3%)	1707 (44.%)
Personal and Laundry Services	573	2.9	50 (1.7%)	95 (72.0%)	54 (40.9%)
Professional, Scientific, and Technical Services	2494	2.9	167 (5.7%)	320 (65.8%)	192 (39.5%)
Religious Services	139	2.4	14 (0.5%)	20 (69.0%)	11 (37.9%)
Rentals and Real Estate	378	3.3	32 (1.1%)	56 (58.3%)	39 (40.6%)
Repair and Maintenance	1016	2.7	115 (3.9%)	216 (76.6%)	123 (44.7%)
Retail	5836	3.3	318 (10.9%)	1339 (70.3%)	806 (42.3%)
Staffing	139	3.3	10 (0.3%)	35 (66.0%)	25 (43.1%)
Transportation	749	5.0	23 (0.8%)	178 (74.8%)	101 (42.4%)
Utilities	461	2.4	17 (0.6%)	102 (65.0%)	60 (38.2%)
Veterinary	86	2.6	13 (0.4%)	22 (73.3%)	12 (40.0%)
Total/Average	29937	3.7	3.7 (5.0%)	7878 (65.4%)	4857 (39.9%)

(81.0%), repair and maintenance (76.6%), and manufacturing (75.3%). Similar associations were seen among cluster-associated cases working while symptomatic, with accommodation (71.4%), landscaping (45.6%), and manufacturing (44.4%) having the highest proportion of cases. Among clusters in all industries, an average of 67.0% cases worked while infectious and 41.4% worked while symptomatic.

DISCUSSION

Certain industry settings have a higher risk for COVID-19 transmission than others.¹¹ Similar to previous studies, industries where workers are in proximity, like manufacturing, or more closely interact with the public, such as retail and food service, experienced more clusters of cases among employees.^{11,12} The high number of workplace clusters in the manufacturing industry illustrates the challenges in implementing mitigation strategies in this setting. In meat and poultry plants, existing workflows utilizing assembly lines demand proximity. Balancing the need for refrigeration to reduce spoilage while simultaneously maintaining optimal ventilation can also be difficult.¹³ A study by the Utah Department of Health found a disproportionate burden of COVID-19 within the manufacturing industry, particularly among meat processing facilities, like this analysis.⁹ Conversely, the high number of clusters seen in government and financial activities are typically office-based settings. As jobs in these fields are viewed as lower risk than other work settings, it is probable that mitigation strategies such as mask wearing and physical distancing may be used less strictly than in perceived higher-risk occupations, such as public-facing jobs.

Of cases working while symptomatic, manufacturing and repair and maintenance had some of the largest percentages, consistent with previous research that essential workers are more likely to work with symptoms than non-essential workers.^{14,15} However, there is no literature looking at working symptomatic among non-essential industries. This analysis showed delivery (45.3%) and staffing (43.1%) also had high proportions of employees working symptomatic. Information on motivators for working while symptomatic is not systematically collected during case interviews. However, factors may include financial, lack of paid sick leave, unawareness of mild or subtle COVID-19 symptoms, and fear of overburdening co-workers. In the delivery industry, employees are likely to work alone, isolated from others for most of the day, leading them to think they may not be able to transmit COVID-19 during the brief interactions that they have with others. Many staffing employees work for large manufacturers or retailers, where they are temporary employees and may not be familiar with the organization's screening or symptom-monitoring requirements.¹⁵

Numerous factors contribute to the risk of COVID-19 workplace transmission that are influenced by workplace setting. Understanding the distribution of workplace clusters across industries can help target where intervention may be needed in a COVID-19 surge or other infectious diseases. In addressing immediate goals to reduce workplace COVID-19 transmission, broader systemic challenges have been uncovered that impact worker health and safety. Disparities in policies regarding paid sick leave, unemployment benefits, and childcare payment support may be leaving some workers more vulnerable to COVID-19 infection.¹⁴ RIDOH

engagement with employers has highlighted the prevalence of disparities in RI workplaces. Further research is needed on how these disparities contribute to workplace transmission and how policy changes might effectively address this.

LIMITATIONS

Executive orders directing closure of certain “non-essential” services throughout the pandemic impacted industry sectors differently. Attendance at work was likely different based on industry. In addition, these findings may not be generalizable to states where the pandemic response differed from RI. Another limitation is self-reported symptom onset data. Cases may have mis-reported their symptom onset due to either recall bias or fear of symptom status while at work being disclosed to their employer. Finally, workplace transmission cannot be confirmed in all clusters. Household and community transmission may have contributed to workplace clusters in the analysis.

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