Abstract # 1058082

Descriptive Analysis of SARS-CoV-2 Infections Among Health System and University Employees

Jessica.seidelman@duke.edu
315 Trent Drive
Room 156 Hanes House
Durham, NC 27710
Phone: (919) 681-5098

Jessica Seidelman[1,2], Ibukunoluwa Kalu[1,2], Kristen Said[3], Carol Epling[3], Maya Rinehart[4], Matthew Stiegel[4], Sarah S. Lewis[1,2], Becky A. Smith[1,2]

1- Division of Infectious Diseases, Department of Medicine, Duke University, Durham, North Carolina.; 2- Duke Center for Antimicrobial Stewardship and Infection Prevention, Duke University Medical Center, Durham, North Carolina; 3- Division of Occupational and Environmental Medicine, Department of Community and Family Medicine, Duke University Medical Center, Durham, North Carolina; 4-Occupational and Environmental Safety Office, Duke University and Health System, Durham, North Carolina

Abstract

Background We aimed to describe SARS-CoV-2 (COVID-19) infections among employees in a large, academic institution.

Methods We prospectively tracked and traced COVID-19 infections among employees across our health system and university. Each employee with a confirmed positive test and 3 presumed positive cases were interviewed with a standard contact tracing template that included descriptive variables such as high-risk behaviors and contacts, dates worked while infectious, and initial symptoms. Using this information, the most likely location of infection acquisition was adjudicated (Table 1). We compared behavior frequency between community and unknown, likely community and community and unknown cases using descriptive statistics.

Results From 3/2020 to 4/2021 we identified 3,140 COVID-19 infections in 3,119 employees out of a total of 44,956 employees (6.9%) (Figure 1). Of those 3,119 employees 1,685 (54.0%) were clinical employees working in the health system, 916 (29.4%) were non-clinical employees working in the health system, and 518 (16.6%) were university employees. Descriptive characteristics for the COVID-19 infections and adjudications are outlined in Table 2. Severe disease among employees was significantly less frequent compared to patients in the health system (2.2% vs 15.3%, p< 0.01). The frequency of travel within 14 days, masked gatherings and unmasked gatherings/activities was not significantly different between the community and unknown, likely community groups or the community and unknown groups (Table 3).

Conclusion The majority of COVID-19 infections were linked to acquisition in the community, and few were attributed to workplace exposures. Employees with unknown sources of COVID-19 participated in higher-risk activities at approximately the same frequency as employees with community sources of COVID-19. The most frequently reported initial symptoms were mild and non-specific and rarely included fever. Despite a comprehensive testing and generous paid leave, a large proportion of COVID-positive employees worked with symptoms, highlighting ongoing challenges with presenteeism in healthcare.

Background

- Healthcare workers (HCWs) are at risk of acquiring COVID-19 in the workplace
- Descriptive analysis of COVID-19 infections among HCWs in the United States is limited.

Methods

- We prospectively tracked COVID-19 infections among employees across our health system and university and recorded exposures and demographics.
- We defined infection acquisition location (Table 1) and compared behavior frequencies among these categories.
- We assessed cases for activities that would increase risk for community acquisition including travel within 14 days before infection, participation in unmasked activities, as well as participation in large gatherings (masked or unmasked)

Table 1: COVID-19 Attribution Definitions

Attribution Classification	Definition
Healthcare/workplace-acquired	
Healthcare worker or Co- worker	Exposure to a COVID-infected healthcare worker or co-worker during their infectious window
Patient	Exposure to a COVID-infected patient while without adequate personal protective equipment (pre-isolation) or breach in personal protective equipment
Visitor	Exposure to a COVID-infected visitor while not wearing adequate personal protective equipment
Community-acquired	Exposure to a COVID-infected person in the community (or a co-worker outside the workplace) including non-work environments during infectious window. OR The employee and person who they have spent time with outside of work developed symptoms at the same time (and confirmed positive) making a community point source the most likely explanation
Unknown, likely community-acquired	Close contact with a person who has symptoms consistent with COVID (but has not been tested for COVID infection) during their infectious window; the contact occurred in the community including non-Duke work environments OR the employee case and their significant other/housemate/family member developed symptoms at the same time (but did not get tested for COVID) making a community point source a likely explanation
Unknown	No known contact with a COVID-infected person in the community, no known contact with a COVID-infected co-worker or visitor in the healthcare environment during their infectious window, and no breach in PPE during care of a COVID-infected patient. Alternatively, known contact with a COVID-infected person in the community AND a COVID-infected co-workers or visitor in the healthcare environment during their infectious window.

Results

- We identified 3,140 COVID-19 infections in 3,119 employees out of 44956 total employees (6.9%) (Figure 1). Descriptive characteristics are outlined in Table 2
- The most frequent adjudication of acquisition was community (52.4%) (Table 2). Of the 308 infections with suspected workplace source, 222 were felt to be related to COVID-positive coworkers
- The frequency of travel within 14 days, masked gatherings and unmasked gatherings/activities was not significantly different between the community and unknown, likely community groups or the community and unknown groups (Table 3).

Figure 1. Number of SARS-CoV-2 cases among employees between 3/2020 and 4/2021 by month and stratified according to clinical employee working in the healthcare system, non-clinical employee employed by the healthcare system, and university employee

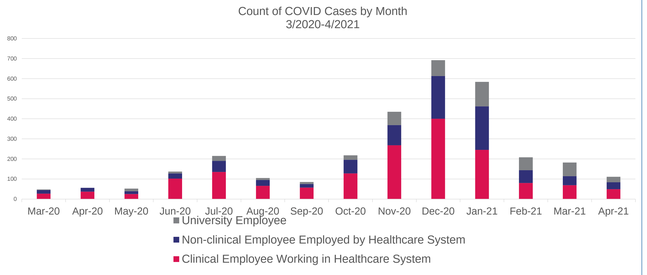

Table 3. Risk Factors for Community, Likely Community, and Unknown Cases

Risk Factor	Community N=1646	Unknown, Likely Community N=129	Unknown N=1057
Travel within 14 days	385 (23.4)	36 (27.9)	213 (20.2)
Masked gatherings (eg, church)	937 (56.9)	73 (56.6)	543 (51.4)
Unmasked gatherings/activities	745 (45.3)	61 (37.4)	395 (37.4)

Conclusions

- The majority of COVID-19 infections were adjudicated to community acquisition and few were from the workplace. Specifically, most workplace infections were acquired from coworkers, as opposed to patients or visitors.
- The most frequently reported initial symptoms were mild, non-specific, and rarely included fever
- Cases adjudicated as unknown/unknown, likely community as source for COVID participated in higher risk activities at the same frequency as those cases adjudicated as community-acquired supporting that these case were more likely to be community-acquired as opposed to workplace acquisitions.
- A large proportion of COVID-positive employees worked with symptoms, highlighting the challenges with presenteeism in healthcare

Table 2. Description of 3,140 COVID 19 infections in employees from 3/2020 to 4/2021

Variable	N (%)
Age	
18-25	405 (13.0)
26-35	1054 (33.8)
36-45	625 (20.0)
46-55	579 (18.6)
56-65	397 (12.7)
65+	59 (1.9)
Initial Symptoms*	
Congestion or Runny Nose	810 (25.8)
Headache	709 (22.6)
Cough	654 (20.8)
Muscle or Body Aches	533 (17.0)
Sore Throat	441 (14.0)
Fatigue	378 (12.0)
Fever or Chills	289 (9.2)
Other**	149 (4.7)
New Loss of Taste or Smell	139 (4.4)
Nausea or Vomiting	97(3.1)
Shortness of Breath or Difficulty Breathing	74 (2.4)
Diarrhea	57 (1.8)
Asymptomatic	269 (8.6)
Worked during infectious window	2538 (80.8)
Worked during pre-symptomatic window***	1397 (44.5)
Worked with symptoms	1141 (36.3)
Quarantined prior to symptom onset	219 (7.0)
Tested negative followed by a positive test	63 (2.0)
Severe disease	70 (2.2)
Reinfection	21 (0.7)
Attribution	
Community	1646 (52.4)
Unknown, likely community	129 (4.1)
Unknown	1057 (33.7)
Workplace	308 (9.8)
Workplace-patient	81 (2.6)
Workplace-employee	222 (7.1)
Workplace-visitor	5 (0.2)

*Initial symptoms included all symptoms the employee reported on the first day of symptom onset, therefore making the denominator greater than 3,140 symptoms.
**Examples of "Other" symptoms include loss of appetite, night sweats, abdominal pain, dizziness
***Defined as 2 calendar days prior to the onset of symptoms