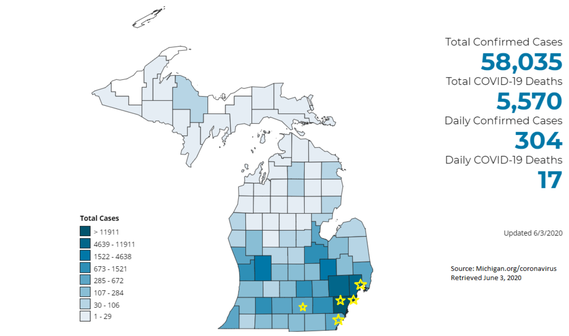
The Increase in Health Care Worker COVID-19 Positivity in Detroit: Driven by Job Category, High Case Volume, and Community Transmission

Amit T. Vahia MD MPH, Zohra Chaudhry MD, Allison Weinmann MBBS, Linoj Samuel PhD, Robert Tibbetts PhD George Alangaden MD, Geehan Suleyman MD
Henry Ford Health System, Detroit, MI

Background

- COVID-19 caused by the novel coronavirus SARS-CoV-2 has greatly impacted Michigan, with more than 132,000 confirmed cases reported in the state as of October 8, 2020.[1]
- Wayne county, which includes the city of Detroit, ranks 25th nationally in number of confirmed/presumptive cases and 6th nationally in the number of deaths.[2]
- Front-line healthcare workers (HCW) are particularly at risk of acquiring the infection, and the surge in COVID-19 patient volumes at Henry Ford Health System (HFHS) may have resulted in potential exposure to our staff
- However, rates of infection based on job category has not been described previously in the United States.3
- The surge in COVID-19 patient volumes at Henry Ford Health System (HFHS) resulted in potential exposure of healthcare workers (HCW).
- In this observational report we describe the epidemiology of COVID-19 positivity in HFHS HCW and examine how job title and increased patient volumes stand as markers for increased exposure among HCW.



Methods

Study Design: Descriptive period prevalence study of COVID-19 testing and positivity among Henry Ford Health System HCW, including front-line, clinical support, and non-clinical employees.

Study Period: March 10, 2020 through June 10, 2020 encompassing the first wave of COVID-19 admissions within HFHS.

Inclusion Criteria: All HCW entering HFHS facilities underwent daily health screening for symptoms of COVID-19. HCWs exhibiting symptoms consistent with COVID-19 infection were referred for SARS-CoV-2 testing. All symptomatic patients with Covid-19 symptoms who were tested were included.

Testing Platforms: Real-time reverse-transcriptase polymerase chain reaction (RT-PCR) for SARS-CoV-2 was done via nasopharyngeal swab at the Henry Ford Health System Microbiology laboratory

Outcome Measures: Rate of COVID-19 testing and positivity among healthcare employees by location of employment and by job category

Data Source: The HFHS COVID-19 Analytics Database. This internal hospital quality metric reporting analytics database recorded the daily number of HCW tested across the healthcare system, the number of positive SARS-CoV-2 tests, and HCW job descriptions

COVID-19 Incidence During Surge

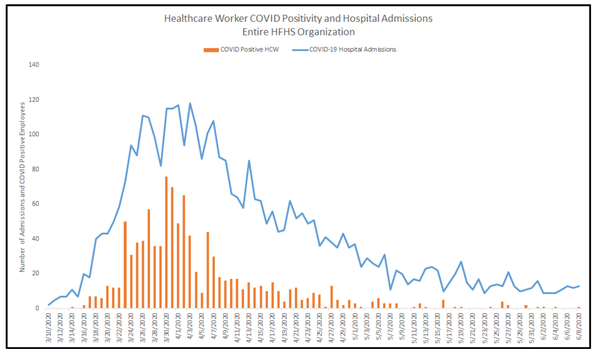


Figure 1: COVID-19 related hospital admissions and Employees Positive. 3/10/20 – 6/10/20

Employee Testing and Positivity By Hospital

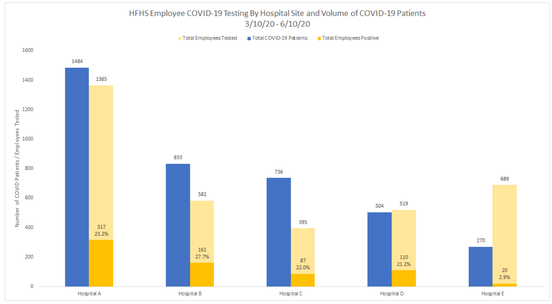


Figure 2: Total COVID-19 Admissions to Date and HCW Testing and Positivity by Hospital Site

Employee Testing By Job Description

Table 1: COVID-19 Testing by Job Category at Henry Ford Health System 3/10/20 - 6/10/20

Job Category	Employees Positive	Employees Tested	% Positive
Nursing	486	2069	23.49%
Allied Health [a]	127	748	16.98%
Physicians	57	526	10.84%
Clinical Support [b]	89	515	17.28%
Admin Support non Clinical	112	505	22.18%
Facilities/Security/Support [c]	81	390	20.77%
Unspecified	4	191	2.09%
Business non Clinical	29	176	16.48%
Leadership/Management	34	155	21.94%
Behavioral Health	17	77	22.08%
Total Symptomatic Employees	**1036**	**5352**	**19.36%**

[a] Allied Health includes Radiology, Pharmacy, Pathology, Rehabilitation, Advanced Practitioners, Dialysis Technicians, Surgical Techs, Social Work, Case mangement, Optometry

[b] Clinical Support includes Respiratory Therapy, Population Health personnell, Clerical staff of surgical departments, Transplant coordinators, Quality/utilization reviewers, and those self

[c] Facilities/Support includes Dietary/nutrition, Custodial staff, Security, Facilities engineers, Materials management/supply chain

Table 2: COVID Testing of Non Physician/Nurse Patient-Centered Employees 3/10/20 - 6/10/20

Job Function	Employees Positive	Empoloyees Negative	Empoloyees Tested	%Positive
Environmental Services	35	136	171	20.5%
Dietary	16	40	56	28.6%
Security	12	36	48	25.0%
Transportation	10	38	48	20.8%
Rehabilitation/Therapy	34	108	142	23.9%
Pharmacy	20	104	124	16.1%
Advanced Practitioners	8	42	50	16.0%
Dialysis	11	36	47	23.4%
Total Symptomatic Employees	**146**	**540**	**686**	**21.3%**

Results

- A total 5352 (16%) of 33538 employees were tested, of whom 1036 (19%) tested positive.
- The number of infected workers represents approximately 3.1 % of the workforce.
- The sharp increase of COVID-19 hospital admissions correlated with the rise in HCW COVID-19 testing and positivity rates (Figure 1).
- The number of HCW tested largely correlated with the disease burden at each hospital (Figure 2).
- Table 1 shows the total population of symptomatic HCW tested
  - The volume of testing and positivity were higher among HCW with close patient contact
  - Nurses, allied health professionals, and physicians are at highest risk among all HCW
- The positivity rates in specific clinical support staff are shown in Table 2
  - Notably, there were high rates of positivity among non-clinical business and management employees tested
  - This suggests that community transmission of COVID-19 played a part in the overall rate of COVID-19 positivity in our workforce.

Conclusions

- COVID-19 risk is highest among HCW in high volume settings with close patient contact.
- Community exposure may be an important factor that contributes to this risk.
- Strategies to minimize transmission in healthcare settings should be combined with HCW education emphasizing measures to avoid exposure within the community.
- Healthcare workers can be protected from COVID-19 transmission by doing the following:
  - Educating about transmission risk.
  - Providing and appropriately using personal protective equipment.
  - Adhering to hand hygiene and other basic infection control measures.
  - Screening HCW routinely
  - Testing and quarantining COVID-19 positive HCW promptly

References

1. Michigan Data. (n.d.). Retrieved October 09, 2020, from https://www.michigan.gov/coronavirus/0,9753,7-406-98163_98173---,00.html

2. COVID-19 United States Cases by County. (n.d.). Retrieved October 09, 2020, from https://coronavirus.jhu.edu/us-map

3. Characteristics of Health Care Personnel with COVID-19 - United States, February 12–April 9, 2020. (2020, April 16). Retrieved October 09, 2020, from https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e6.htm?s_cid=mm6915e6_w