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Costas T. Lambrew Research Retreat 2022

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4-25-2022

A Period Seroprevalence(SARS-CoV-2) Survey in MHCCN Cancer Healthcare Workers (HCWs) Providing Patient Care during the Height of the Outbreak: A Registry Study (Second Year Progress)

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Recommended Citation

Knight, Caroline; Prescott, Jill; Hobart, Jill; Saunders, Jamie; Caron, Kimberly; Neptune, Sandra; Brown, Patty; Sturtevant, Kyla; Eller, Sean; Lemire, Lisa; Breggia, Anne; Guerin-Staples, Susan L.; Lucas, Lee; Han, Paul; Kumar, Rachit; Liu, Johnson; Carlson, Robert; and Remick, Scot, "A Period Seroprevalence(SARS-CoV-2) Survey in MHCCN Cancer Healthcare Workers (HCWs) Providing Patient Care during the Height of the Outbreak: A Registry Study (Second Year Progress)" (2022). *Costas T. Lambrew Research Retreat 2022*. 37.

<https://knowledgeconnection.mainehealth.org/lambrew-retreat-2022/37>

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As the pandemic advances, Covid-19 antibody seroprevalence of 49% in MHCCN HCWs is consistent with Covid-19 infection and/or vaccination.

A Period Seroprevalence (SARS-CoV-2) Survey in MHCCN Cancer Healthcare Workers (HCWs) Providing Patient Care during the Height of the Outbreak: A Registry Study (Second Year Progress)

Authors: Jill Prescott, Caroline Knight, Erin Hobart, Jamie Saunders, Kimberly Caron, Sandra Neptune, Patty Brown, Kyla Sturtevant, Sean Eller, Lisa Lemire, Anne Breggia, Susan L. Guerin-Staples, Lee Lucas, Paul Han, Rachit Kumar, Johnson Liu, Robert Carlson, Scot Remick

Introduction

In December 2019, emergence of a new coronavirus in Wuhan, China heralded the onset of a global pandemic (aka Covid-19) that is well into its third year. At the outset, the initial first wave of the alpha variant in 2020 had less impact on our state and HCWs. In December 2020, Covid-19 vaccinations became available. By fall and winter 2021-2022, the delta and subsequent omicron variants nearly overwhelmed Maine healthcare systems and work force. In June 2020, we embarked on a period seroprevalence study in the MaineHealth Cancer Network (MHCCN) to document Covid-19 exposure in our rural cancer care workforce. Enrollment continues over two discrete periods during our study, essentially pre- and post-vaccination and with two discrete SARS-CoV-2 antibody-testing platforms as the pandemic evolved. This ongoing study provides additional insight into viral antibody (Ab) response across the settings of potential occupational exposure, rapid community spread, and vaccination.

Participants and Methods

We plan to enroll 600 HCWs with patient-facing duties between March 1 and May 31, 2020 and/or any time after December 1, 2020. Participants are required to have worn PPE during this time guided by level of PPE precaution: standard, droplet or airborne recommendation(s). HCWs (both in- and outpatient settings) are recruited based on analytic cancer case volume at our member institutions ensuring a representative sample across the MHCCN. All participants provided written informed consent and asked to complete 4 surveys. Initial antibody testing included sequential nucleocapsid Ab determinations (Roche & Abbott); succeeded by con-committant nucleocapsid and spike protein Ab determinations (Roche). The latter platform is more discriminating for both detection of antibody response to Covid-19 exposure and/or vaccination.

Results

Enrollment: To date, a total of 415 HCWs signed consent; 11 are censored (withdrew consent; failed to get Ab test; or lost to follow-up); leaving 404 HCWs [354 (88%) females; with the 3 top roles including: 155 (38%) RNs, 36 (9%) MDs, 29 (7%) receptionists] have been enrolled. The top 3 sites include: 165 (41%) at MMC; 119 (30%) at Maine General; 35 (9%) at PBMC; and 84 (20%) other MHCCN sites.

Vaccine: Of the 236 HCWs for which vaccination information has been reported, >95% have received at least one dose: 4% J&J (1 dose), 55% Moderna, 37% Pfizer, 3% Other and 1% unvaccinated (under exemption). Of the 225 vaccinated HCWs (*excluding those who received J&J and those who are unvaccinated*), 44% have received three doses of vaccine.

COVID-19 & Initial Test Results:

198 (49%) HCWs had a self-reported prior COVID diagnosis and/or positive initial serology (Roche nucleocapsid & Abbott nucleocapsid, and/or Roche spike protein)


- Of the 191 HCWs who had initial positive serology for Roche (spike protein target), results ranged from 8.72 to >2,500 U/mL with 81 HCWs having values over >2,500.

Of the 203 participants tested using the original NorDx Testing platform (used through April 2021 - Roche nucleocapsid, Abbott nucleocapsid):

- 7 HCWs self-reported a prior COVID-19 diagnosis → 3 HCWs had initial positive (both Roche & Abbott – nucleocapsid) serology

Of the 201 participants tested using the current NorDx testing platform:

- 12 HCWs self-reported COVID-19 diagnosis → of these, 11 HCWs had initial positive serology (positive results for both Roche nucleocapsid and Roche spike protein)



SCAN ME

Nucleocapsid Ab	Spike Protein Ab	Interpretation of Serology Tests using the Roche Nucleocapsid and Spike Protein Anti-Sars-Cov2 Antibody Tests:
Negative (-)	Negative (-) (<0.8 U/mL)	No detectable antibody response to SARS-CoV-2 or vaccine if applicable.
Positive (+)	Negative (-) (<0.8 U/mL)	Suggestive of antibody response to SARS-CoV-2. No detectable response to vaccine if applicable.
Negative (-)	Positive (+) (≥0.8 U/mL)	Suggestive of antibody response to SARS-CoV-2 and/or antibody response to vaccine if applicable.
Positive (+)	Positive (+) (≥0.8 U/mL)	Suggestive of antibody response to SARS-CoV-2 and antibody response to vaccine if applicable.

Preliminary Survey Results - Continued

- Cancer Care Correlation (N=198 HCWs self-reported prior COVID diagnosis and/or positive initial serology)**
 - Clinical Roles: 169 HCWs
 - Non-Clinical Roles: 23 HCWs
 - No Response: 6 HCWs
- Risk Exposure Level Correlation (N=198, self-reported prior COVID diagnosis and/or positive initial serology)**
 - High Exposure – 50 HCWs
 - Moderate Exposure – 31 HCWs
 - Low Exposure – 78 HCWs
 - No response – 39 HCWs
- Household Exposure Correlation (N=198, self-reported prior COVID diagnosis and/or positive initial serology)**
 - 178 HCWs live in households greater than 1
 - 27 HCWs had positive household exposure
- HCW and Household Health History (N=404)**
- 117 (29%) HCWs have at least one reportable health history at risk for Covid-19 and/or poorer outcome**
 - 23 HCWs with Auto-Immune Disease and Other
 - 3 HCWs with Auto-Immune and Cancer
 - 12 HCWs with Cancer
 - 3 HCW with Cancer and Hypertension
 - 35 HCWs with Hypertension
 - 8 HCWs with Diabetes
 - 32 HCWs with other conditions including but not limited to asthma, cardiac disease and Crohn's disease
 - 1 HCW with Cystic Fibrosis
- 53 (13%) HCWs have household members with at least one reportable health history**
 - 1 HCW with HH member with Auto-Immune Disease and Other
 - 24 HCW with HH member with Auto-Immune Disease
 - 1 HCW with HH member with Auto-Immune Disease and Cancer
 - 10 HCWs with HH member with Cancer
 - 3 HCWs with HH member with Cancer and Other
 - 1 HCW with HH member with organ transplant history
 - 1 HCW with HH member with Cystic Fibrosis
 - 12 HCW with HH member with other conditions including but not limited to asthma, epilepsy and heart disease

Discussion

- Over initial two-thirds (n=403) of our projected enrollment, 44.5% of HCWs have antibody seroprevalence, which is consistent with Covid-19 infection and/or Covid-19 vaccination.
- Community spread is likely the predominant driver of exposure to Covid-19 infection vs. occupational exposure.
- It is difficult reconcile false negative antibody responses in 4 HCWs with known Covid-19 infection. (Using the initial sequential Roche & Abbott nucleocapsid Ab determinations.
- 29% of HCWs have at least one reportable health history at risk for Covid-19 and/or poorer outcome.
- 13% of HCWs have household members with at least one reportable health history.
- A limitation of our study is that medical history and survey responses were self-reported; participants could omit answering any question they were not comfortable answering.

Conclusion: As the pandemic advances, Covid-19 antibody seroprevalence of 49% in MHCCN HCWs is consistent with Covid-19 infection and/or vaccination. Study accrual is ongoing and will be able to associate short time-course of Ab response to vaccine or illness as the study allows. We continue to track accrual.