411. Significance of a Known Epidemiological Link to a COVID-19 Index Case and Severity of COVID-19 Infection
Christopher Kandel, MD1; Allison McGeer, MD, FRCP(C)2; Joshua Friedland, MD3; Alynn Shigayevo, PhD1; Samira Mubareka, MD, FRCP(C)3; Sinai Health System, Toronto, Ontario, Canada; Sinai Health System, Toronto, Ontario, Canada; University of Toronto, Toronto, Ontario, Canada; Sinai Health, Toronto, Ontario, Canada; Sunnybrook Health Sciences Centre, Toronto, ON, Canada
Toronto Invasive Bacterial Diseases Network
Session: P-18. COVID-19 Impact of Social Distancing/Mitigation Measures
Background. Several factors have been associated with severity of COVID-19 disease, but there remains a paucity of data surrounding whether the nature of exposure is impactful. Evidence demonstrating the correlation between initial viral exposure dose and disease severity exists for many viral infections. Observational studies have suggested that the exposure context, which can be considered a proxy for magnitude of viral inoculum, may influence severity of COVID-19 infection. We aimed to assess whether having a known exposure, as a proxy for higher inoculum dose to COVID-19, was associated with more severe outcomes for individuals hospitalized with COVID-19.
Methods. We created a retrospective cohort of community-dwelling adults hospitalized for COVID-19 in south-central Ontario from April 1, 2020 - January 14, 2021. Individuals or next of kin were contacted to ascertain exposure history. The primary outcome was death, intensive care unit (ICU) admission, or mechanical ventilation (MV) within 30 days of admission. A multivariable logistic regression model was used to determine whether a known exposure was associated with worse outcomes.
Results. 1097 individuals with community acquired COVID-19 required hospitalization; of these, 942 (86%) had available exposure data. In this group, the median age was 65, 44% were women, 84% lived in a private residence. 59% had a frailty score (FS) of 1 – 3 while 40% had a FS of 4 – 9, and 28% had a known exposure. Overall, the primary outcome occurred in 368/942 (39%) patients. Having a known exposure was not associated with worse outcome (OR 7.14, 95% CI 0.84–1.54, p = 0.41). Male gender (OR 1.41, 95% CI 1.06–1.89; p = 0.018), age (OR 1.01/year, 95% CI 1.00–1.03, p = 0.03), frailty (OR 1.22/point, 95% CI 1.09–1.36, p = 0.001) and living with at least one other person (OR 1.57, 95% CI 1.09–2.28, p = 0.017) were all associated with death. ICU admission, or MV within 30 days of admission.
Conclusion. While having a known exposure to a person with COVID-19 was not associated with worse outcome, the identified increased severity of illness associated with cohabitation suggests context of exposure may have a role in disease severity. This data and future studies can be used to guide public health recommendations to not only minimize transmission, but severity of COVID-19 infection.
Disclosures. All Authors: No reported disclosures

412. Estimating the Impact of School Classroom Sizes on the Probability of Severe Acute Respiratory Syndrome Coronavirus-2 Infections or Exposure
Sanya J. Thomas, MD1; Rebecca R. Young, MS, M.S.2; Puskandrulova Akinboyo, MD3; Michael J. Smith, MD, M.S.C.E1; Tara Buckley, MPH, MBA1; Sarah S. Lewis, MD, MPH1; Nationwide Children’s Hospital/OSU, Columbus, Ohio; 2Duke University Medical Center, Durham, North Carolina; 3Duke University, Durham, North Carolina; Durham County Public Health Department, Durham, North Carolina
Session: P-18. COVID-19 Impact of Social Distancing/Mitigation Measures
Background. Despite schools reopening across the United States in communities with low and high Coronavirus disease 2019 (COVID-19) prevalence, data remain scarce about the effect of classroom size on the transmission of severe acute respiratory syndrome coronavirus-2 (SARS-COV-2) within schools. This study estimates the effect of classroom size on the risk of COVID-19 infection in a closed classroom cohort for varying age groups locally in Durham, North Carolina.
Methods. Total number of Coronavirus Disease 2019 (COVID-19) infections over a 28-day follow-up period for varying classroom reproduction number (R0) and varying classroom cohort sizes of 15 students, 30 students and 100 students in Durham County, North Carolina. Using publicly available population and COVID-19 case count data from Durham County, we calculated a weekly average number of new confirmed COVID-19 cases per week between May 3, 2020 and August 22, 2020 according to age categories: < 5 years, 5-9 years, 10-14 years, and 15-19 years. We collated average classroom cohort sizes and enrollment data for each age group by grade level of education for the first month of the 2019-2020 academic school year. Then, using a SEIR compartmental model, we calculated the number of susceptible (S), exposed (E), infectious (I) and recovered (R) students in a cohort size of 15, 30 and 100 students, modelling for classroom reproduction number (R0) of 0.5, 1.5 and 2.5 within a closed classroom cohort over a 14-day and 28-day follow-up period using age group-specific COVID-19 prevalence rates.
Results. The SEIR model estimated that the increase in cohort size resulted in up to 5 new COVID-19 infections per 10,000 students whereas the classroom R0 had a stronger effect, with up to 88 new infections per 10,000 students in a closed classroom cohort over time. When comparing different follow-up periods in a closed cohort with R0 of 0.5, we estimated 12 more infected students per 10,000 students over 28 days as compared to 14 days irrespective of cohort size. With a R0 of 2.5, there were 49 more infected students per 10,000 students over 28 days as compared to 14 days.
Conclusion. Classroom R0 had a stronger impact in reducing school-based COVID-19 transmission events as compared to cohort size. Additionally, earlier isolation of newly infected students in a closed cohort resulted in fewer new COVID-19 infections within that group. Mitigation strategies should target promoting safe practices within the school setting including early quarantine of newly identified contacts and minimizing COVID-19 community prevalence.
Disclosures. Michael J. Smith, MD, M.S.C.E, Merck (Grant/Research Support)/Pfizer (Grant/Research Support)

414. Observed Time Burden with Nursing Practices in an Emergency Room COVID-19 Isolation Zone at a University Affiliated Hospital in Korea
Imyoung Choi, Master’s Degree1; JIHYUN Kang, PhD, MPH2; Sook National University Hospital, Seoul, Republic of Korea; College of Infected Disease and Research Institute of Nursing Science, Seoul National University, Seoul, Seoul-t’ukpyolsi, Republic of Korea
Session: P-19. COVID-19 Infection Prevention
Background. The coronavirus disease 2019 (COVID-19) has caused great burdens on emergency room (ER) and front-line ER healthcare personnel faced with great challenges, including threats to their safety. This study aimed to provide a basis for additional workload of ER nurses who are charged with providing care for COVID-19 confirmed or suspicious cases.

Table 1. Summary of Frequency and Time Burden with Nursing Practices in an Emergency Room COVID-19 Isolation Zone. Note. IV, intravenous; IM, intramuscular; ID; intradermal; SC, subcutaneous; PPE, personal protective equipment; CPR, cardiopulmonary resuscitation
Methods. With institutional review board approval, we recruited ER nurses who were assigned to COVID-19 isolation zone with more than 6 months’ ER work experience. After their demographic information were collected through a questionnaire, their nursing practices and practice time during their 1 shift (day or evening) were recorded by one researcher using a stopwatch and an observation form. For each observation shift, unit-related information was collected, including the numbers of hospitalized patients, admission, discharge, and transfer of patients. For each nursing practice, frequency and total time spent were analyzed using descriptive statistics with SPSS 26.0 program.

Results. From January 4 to February 22, 2021, a total 18 nurses (27.4 years old on average with 25.2 months of ER experience) were observed from 20 different shifts. During the observation period, the average number of nurses’ working hours was 8.27 ± 0.39 hours. A total of 6,567 tasks were monitored with 337,703 seconds (93.81 hours) of the total time spent. Infection control practices were most frequent (33.88%) followed by nursing management (27.80%), assessment and observation (11.07%), medication (10.35%), pre and post examination care (4.86%), education (4.37%), communication (4.10%), safety care (1.10%), and others (0.03; Table 1). Nursing management (e.g., nursing recording) was most time-consuming (49.29%) followed by assessment and observation (15.03%), medication (12.94%), patient education (6.10%), infection control (5.30%), and safety care (1.64%).

Conclusion. This study showed that infection control practices were most frequent while time spent was relatively insignificant among ER nurses in charge of COVID-19 isolation zones. Further studies for more observations or with different study designs at other ER settings are necessary to understand nurse’s burdens with COVID-19 emergency care.

Disclosures. All Authors: No reported disclosures

415. A Whole Genome Sequencing Analysis of a Multi-unit Long-term Care Facility COVID-19 Outbreak
Ling Yuan Kong, MD, FRCP, DTM&H; Leilahanne Parkes, MD, FRCP; Yves Longtin, MD; Christina Greenaway, MD, MSc; J ferr Zakharatos, MD, FRCP; Vivian Loo, MD, MSc.; Noémie Savard, MD, FRCP; Rejean Dion, MD; Fournier Eric, n/a; Michel Roger, MD, Ph.D; Sandrine Moreira, MSc, Ph.D; SMBD Jewish General Hospital, Montreal, Quebec, Canada; SMBD Jewish General Hospital, Montreal, Quebec, Canada; McGill University, Montreal, QC, Canada; McGill University, Montreal, QC, Canada; McGill University, Montreal, Quebec, Canada.

Coronavirus Sequencing in Québec (CoVSeQ) Consortium

Session: P-19. COVID-19 Infection Prevention

Background. The coronavirus disease (COVID-19) pandemic has affected residents in long-term care facilities ( LTCF) significantly. Understanding transmission dynamics in this setting is crucial to control the spread of COVID-19 in this population. Using whole genome sequencing (WGS) of SARS-CoV-2, we aimed to delineate the points of introduction and transmission pathways in a large LTCF in Quebec.

Methods. Between 2020-10-28 and 2021-01-09, COVID-19 cases occurred in 102 residents and 111 HCW at a 387-bed LTCF; cases were distributed in 11 units on 6 floors. As part of outbreak analysis, SARS-CoV-2 isolates underwent WGS using the Oxford Nanopore Minion and the Artic V3 protocol. Lineage attribution and sequence types (ST, within 3 mutations) were assigned based on Pangolin classification on 6 floors. As part of outbreak analysis, SARS-CoV-2 isolates underwent WGS using the Oxford Nanopore Minion and the Artic V3 protocol. Lineage attribution and sequence types (ST, within 3 mutations) were assigned based on Pangolin classification on 6 floors.

Results. Of 170 isolates available from 100/102 residents and 70/111 HCW, 130 (76.4%) were successfully sequenced. Phylogenetic analysis revealed 7 separate introductions to the LTCF. Grouping of ST by units was observed, with temporal appearance of ST supporting HCW introduction in 7/11 units. Proportion of phone interview completions was low at 35% (26/70). Few HCW recalled high-risk exposures. Recalled exposures supported by genetic linkage revealed potential between-unit introductions from HCW-to-HCW transmission at work and outside the workplace (e.g. carpooling). On one unit, a wandering resident was identified as a likely source of transmission to other residents (Figure 1).

Conclusion. We demonstrate the complex genomic epidemiology of a multi-unit LTCF outbreak, putting into evidence the importance of a multi-faceted approach to limit transmission. This analysis highlights the utility of using WGS to uncover unsuspected transmission routes, such as HCW contact outside work, which can prompt new infection control measures.

Disclosures. All Authors: No reported disclosures

416. Diagnostic Yield of Serial COVID-19 Testing in Hospitalized Patients
Jeremy Li, MD; Charles Frentette, MD, FRCP; Vivian Loo, MD, MSc; McGill University, Montreal, Quebec, Canada; McGill University Health Centre, Montreal, Quebec, Canada.

Session: P-19. COVID-19 Infection Prevention

Background. Accurate and rapid diagnosis of SARS-CoV-2 infection is essential to prevent nosocomial transmission. Patients with negative COVID-19 tests at admission may still be in the incubation phase during hospitalisation. False negative results can occur when patients are tested too early. The incidence of COVID-19 infections in Montréal, Canada started to increase in December 2020. Because of this rise, on January 4, 2021, the Infection Control Service of the McGill University Health Centre (MUHC) recommended serial COVID-19 testing for all admitted patients on days 5 and 10 after admission. The aim of this study is to examine the diagnostic yield of serial COVID-19 testing.

Methods. We retrospectively analyzed SARS-CoV-2 test results for patients admitted to the MUHC between January 4, 2021, and April 30, 2021. Nasopharyngeal swabs were collected from patients for SARS-CoV-2 PCR testing. Multiple testing platforms were used (Roche Cobas 6800, Thermo Scientific King Fisher and Cepheid GeneXpert) because of the high volume of samples. Tests were classified as admission, day 5, and day 10 tests if they were done on days 0 to 3 to 7, and 8 to 12 respectively. Patients positive for SARS-CoV-2 on admission were excluded from the analyses. The diagnostic yield of serial testing for patients admitted during each month was calculated by dividing the number of patients testing positive on day 5 or day 10 by the total number of patients who underwent serial testing during that month.

Results. There were 2945 admissions of 5 days or more and 1777 admissions of 10 days or more. Of these, 1509 patients and 841 patients respectively were serially tested for SARS-CoV-2 as recommended for a compliance rate of 51% at day 5 and 47% at day 10. Ten (0.7%) and 12 (1.4%) patients tested positive on days 5 and 10 respectively. The diagnostic yield of serial testing was highest for patients admitted in January 2021 at 2.2%, when the average daily incidence of COVID-19 was highest in Montréal (see Figure).

Conclusion. The diagnostic yield of serial testing for each month, compared to the average daily COVID-19 incidence rate in Montréal, Quebec, Canada.

Disclosures. All Authors: No reported disclosures

417. COVID-19 Aerostudy: Evaluation of SARS-CoV-2 Virus in the Air of Patients Hospitalized with COVID-19
Hamza Ait Allal, MD, MPH; Margaret Seixena, PhD; Lorraine Conroy, PhD; Alfredo J. Mená Lora, MD; Eric Wenzler, PharmD; BCPS CBIDP AAHVPI; Scott Borgetto, MD; Benjamin Ladner, MD; Tracy Cable, MD; Ashley Dahlquist, n/a; Nahed Ismail, PhD MD; Steven Fisher, MD; Taha Ali, MD; Dagmar Sweeney, n/a; Susan C. Bleasdale, MD; UIC School of Public Health, Chicago, Illinois; University of Illinois at Chicago, Chicago, Illinois; University of Illinois Hospital, Chicago, Illinois; University of Illinois at Chicago, Chicago, Illinois; University of Illinois at Chicago, Chicago, Illinois.