Methods & Materials: We conducted a retrospective cohort investigation amongst 2 253 attendees. A cluster was defined as the identification/presence of ≥two laboratory confirmed COVID-19 cases amongst individuals who attended the Rage between 27 November to 4 December 2020. COVID-19 confirmed cases were identified using the organizers ticket purchaser and crew record list and the national COVID-19 laboratory confirmed cases line-list. A standardized questionnaire was circulated to 1814 attendees using Google Forms. A case was defined as any person within the cohort with SARS-CoV-2 RT-PCR positive results.

Results: Of the 2 253 attendees, 848 (37.6%) cases were identified, of which 846 (99.8%) were revelers and two were crew members (0.2%). Age ranged from 16 to 58 years (Median: 18, IQR: 18-18). The 15-19-year-old age group accounted for 802 (94.6%) of the cases, while 53.0% (425/802) were males. Most cases were from Gauteng (66.2%,561/848), followed by KwaZulu-Natal (30.0%, 254/848). Two of the attendees had positive SARS-CoV-2 results approximately 7-10 days before the festival. The questionnaire response rate was 1.0% (19/1814). Revelers attended other large events and private parties and mask wearing and social distancing was not always practiced.

Conclusion: Although organizers observed COVID-19 precautions and protocols; social distancing and mask wearing were compromised. Factors such as mass gathering without using appropriate personal protective equipment, crowded spaces, poor hygiene and ventilation may have produced a conducive environment for SARS-CoV-2 transmission. The study limitations included delayed questionnaire circulation, lack of contact tracing data to determine secondary attack rate, and lack of clinical information amongst cases. Non-pharmaceutical interventions are effective recommended prevention and control measures.

https://doi.org/10.1016/j.ijid.2021.12.054

OP04.02 (797)

Excess Deaths during COVID-19 pandemic in Alberta, Canada

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Purpose: To determine if there was excess mortality in Alberta, Canada during the pandemic. We sought to confirm if excess mortality affected all age groups equally and determine what proportion of excess deaths is directly related to COVID-19.

Methods & Materials: Excess mortality was calculated by comparing observed to expected number of deaths. Monthly Crude death rates (CDR) for 2015 to 2019 was calculated by dividing monthly deaths by the mid-year population. Expected deaths was calculated by multiplying mean monthly CDR by the mid-year population in 2020 and the projected mid-year population in 2021 to calculate expected deaths. Age-adjusted monthly mortality rates for January 2020 to March 2021 was compared to the previous 5 years.

Results: From January 2020 to May 2021 there was a 11% excess mortality corresponding to an average of 248 monthly excess deaths with a minimum of 49 deaths in January 2020 (no COVID-19-related deaths) and a maximum of 781 excess deaths in December 2020. COVID-19 related deaths (n=2266) account for 53.8 % of the total excess deaths (n=4214) that occurred in the 17 months.

Increase in all cause -excess deaths was proportionately higher, and in significantly greater numbers, in the younger age groups. Deaths directly linked to COVID-19 were: 8 (20-29 years), 12 (30-39 years), 32 (40-49 years), 74 (50-59 years), 225 (60-69 years), 409 (70-79 years), and 1274 (>80 years)

Statistically significant increases in monthly drug poisoning deaths from March 2020 to April 2021 with a total of 1819 deaths. Excess 731 drug poisoning deaths representing 18.2 % of total all-cause excess mortality affected mostly those age 25-60. 53.9 % of all excess deaths is directly related to COVID-19 and 18.2% are drug poisoning related excess deaths. The remaining 27.9 % of excess deaths are likely due other factors such as limited access to urgent medical care.

Conclusion: There was statistically significant increase in all-cause mortality. Although older adults are more likely to die of COVID-19, there was massive increase in non-COVID-19 related mortality among the youth. These should be factored in public policy decisions on epidemic/pandemic management.

https://doi.org/10.1016/j.ijid.2021.12.055

OP04.03 (153)

Implementing a SARS-CoV-2 Early Warning System in Valencia (Spain) and its Correlation with Epidemiological Indicators

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Purpose: To implement a SARS-CoV-2 wastewater surveillance system in Valencia and study the correlation between SARS-CoV-2 concentration levels and epidemiological indicators.

Methods & Materials: The working strategy developed in the municipality of Valencia consisted of monitoring wastewater effluents collected by 790,000 people. The city was divided into 24 different hydraulic sectors. 3,023 samples of untreated wastewater were collected and analysed between May 2020 and May 2021. RNA extraction from sewage material was carried out using the NucleoSpin RNA virus Kit. SARS-CoV-2 RNA detection was performed by RT-qPCR using One-Step PrimeScript[TM] RT-PCR Kit (Perfect Real Time), targeting the nucleoprotein (N), N1 and N2 fragments, and envelope protein (E) gene. Mengovirus RNA recovery rates were used as quality assurance parameters according to ISO 15216-1:2017.

Results: A total of 2,169 samples were positive for SARS-CoV-2 RNA material. SARS-CoV-2 variations were detected throughout the entire study evidencing trends during the first, second and third wave. As the National State of Emergency ended (June 2020), SARS-CoV-2 values began to increase reaching the first and most significant concentration spike of the study (20th-26th of July 2020), with a weekly average aggregate concentration of 34,5M GC/L (an increase of 2 units in the log scale). This translated in the worsening of epidemiological indicators (number of cases, hospitalizations, deaths and cumulative incidence (CI)), which maintained a stable increase until a second spike was detected during an important bank holiday in October (9th-12th), where the concentration changed from 28M GC/L to 345M GC/L in a 3-day period while the city was registering 1,100 new weekly cases and a CI of 200 cases/100,000 residents. Finally, a third wave placed Valencia with the worst historical epidemiological data (6,545 new cases; 1,000 new hospitalizations; CI= 1,318,04 cases/100,000 in-