December–February; spring: March–May), and by patient age and history of asthma/ reactive airway disease (asthma/RAD).

**Results:** We tested 3,897 inpatients with ARI; of whom, 954 were AEx-inpatients. Most AEx-inpatients (741/954 [78%]) reported an asthma/RAD history. Viruses were more frequently detected among AEx-inpatients <5 years (350/438 [76%]) than 5–17 years (365/496 [61%], P < 0.001); Most (615/655 [94%]) detections were of single viruses. The most frequent single virus detections were RV/EV (474/954 [50%]) and RSV (76/954 [8%]) but the frequency of each virus varied by season and age group (figure). Single RV/EVs were the most common virus detections in both seasons and all groups. Single RSV detections were prominent among <5 years olds in winter (40/185 [22%]). Among those with single RV/EV or RSV detections, 285/474 (60%) required supplemental oxygen, respectively (P = 0.676); median length of stay was 1 day (range: 0–45; IQR: 1–2) and 2 days (range: 0–6; IQR: 1–2.5), respectively (P < 0.001).

**Conclusion:** AEx-inpatients <5 years were more likely to have respiratory virus detections than those 5–17 years. Single RV/EVs formed the majority of virus detections throughout the surveillance period, regardless of age. RSV played a notable role in winter among patients <5 years. These findings could inform prevention or treatment strategies for virus-associated AEx.

### Virus detections among inpatients with asthma exacerbations (AEx-inpatients)

#### Surveillance period (Nov–Jun)

| Virus Type | No. of Detections |
|------------|------------------|
| Rhinovirus/Enterovirus | 500 |
| Respiratory syncytial virus | 400 |
| Human metapneumovirus | 300 |
| Influenza A | 200 |
| Parainfluenza virus 3 | 150 |
| Adenovirus | 100 |
| 2+ viruses detected | 50 |
| No virus detected | 0 |

December–February; spring: March–May), and by patient age and history of asthma/ reactive airway disease (asthma/RAD).

**Results:** We tested 3,897 inpatients with ARI; of whom, 954 were AEx-inpatients. Most AEx-inpatients (741/954 [78%]) reported an asthma/RAD history. Viruses were more frequently detected among AEx-inpatients <5 years (350/438 [76%]) than 5–17 years (365/496 [61%], P < 0.001); Most (615/655 [94%]) detections were of single viruses. The most frequent single virus detections were RV/EV (474/954 [50%]) and RSV (76/954 [8%]) but the frequency of each virus varied by season and age group (figure). Single RV/EVs were the most common virus detections in both seasons and all groups. Single RSV detections were prominent among <5 years olds in winter (40/185 [22%]). Among those with single RV/EV or RSV detections, 285/474 (60%) required supplemental oxygen, respectively (P = 0.676); median length of stay was 1 day (range: 0–45; IQR: 1–2) and 2 days (range: 0–6; IQR: 1–2.5), respectively (P < 0.001).

**Conclusion:** AEx-inpatients <5 years were more likely to have respiratory virus detections than those 5–17 years. Single RV/EVs formed the majority of virus detections throughout the surveillance period, regardless of age. RSV played a notable role in winter among patients <5 years. These findings could inform prevention or treatment strategies for virus-associated AEx.

#### Winter (Dec–Feb)

| Virus Type | No. of Detections |
|------------|------------------|
| Rhinovirus/Enterovirus | 250 |
| Respiratory syncytial virus | 200 |
| Human metapneumovirus | 150 |
| Influenza A | 100 |
| Parainfluenza virus 3 | 50 |
| Adenovirus | 25 |
| 2+ viruses detected | 10 |
| No virus detected | 0 |

#### Spring (Mar–May)

| Virus Type | No. of Detections |
|------------|------------------|
| Rhinovirus/Enterovirus | 100 |
| Respiratory syncytial virus | 50 |
| Human metapneumovirus | 25 |
| Influenza A | 10 |
| Parainfluenza virus 3 | 5 |
| Adenovirus | 2 |
| 2+ viruses detected | 1 |
| No virus detected | 0 |

#### Monthly Population Health Outcomes

| Month | Virus Detections |
|-------|-----------------|
| Jan   | 250             |
| Feb   | 200             |
| Mar   | 150             |
| Apr   | 100             |
| May   | 50              |
| Jun   | 0               |

#### Monthly Population Health Outcomes

| Month | Virus Detections |
|-------|-----------------|
| Jul   | 250             |
| Aug   | 200             |
| Sep   | 150             |
| Oct   | 100             |
| Nov   | 50              |
| Dec   | 0               |

### Disclosure.

#### 2019-2020 ILI season

**Results:** We tested 3,897 inpatients with ARI; of whom, 954 were AEx-inpatients. Most AEx-inpatients (741/954 [78%]) reported an asthma/RAD history. Viruses were more frequently detected among AEx-inpatients <5 years (350/438 [76%]) than 5–17 years (365/496 [61%], P < 0.001); Most (615/655 [94%]) detections were of single viruses. The most frequent single virus detections were RV/EV (474/954 [50%]) and RSV (76/954 [8%]) but the frequency of each virus varied by season and age group (figure). Single RV/EVs were the most common virus detections in both seasons and all groups. Single RSV detections were prominent among <5 years olds in winter (40/185 [22%]). Among those with single RV/EV or RSV detections, 285/474 (60%) required supplemental oxygen, respectively (P = 0.676); median length of stay was 1 day (range: 0–45; IQR: 1–2) and 2 days (range: 0–6; IQR: 1–2.5), respectively (P < 0.001).

**Conclusion:** AEx-inpatients <5 years were more likely to have respiratory virus detections than those 5–17 years. Single RV/EVs formed the majority of virus detections throughout the surveillance period, regardless of age. RSV played a notable role in winter among patients <5 years. These findings could inform prevention or treatment strategies for virus-associated AEx.
The median values of QOL and QALYs lost during a symptomatic period of ILI were 0.67 (interquartile range: 0.60–0.79) and 0.0055 (interquartile range: 0.0040–0.0072), respectively.

**Conclusion:** In Japan, most ILI patients visit healthcare facilities in the early phase of symptoms, and most physicians examine them using the RIDT. Most laboratory-diagnosed influenza cases are treated using antivirals. Future work should examine the relation between this early diagnosis and treatment practice, and the duration and severity of ILI symptoms.

**Disclosures.** All authors: No reported disclosures.

2642. Development of Human Intestinal Organoids as an Antiviral Evaluation Platform for Enteroviruses

Jasper Fuk-Woo Chan, MD; Jessica Tsang, BSc; Jie Zhou, PhD; Xiaoyu Zhao, MPhil; Kwok-Yung Yuen, MD; The University of Hong Kong, Hong Kong

**Session:** 272. Studies of Treatment and Prevention of Viral Disease
Saturday, October 5, 2019: 12:15 PM

**Background:** Enteroviruses are non-enveloped, single-stranded positive-sense RNA viruses belonging to the family Picornaviridae. Enterovirus A71 (EV-A71) has caused recurrent outbreaks of hand, foot, and mouth disease especially among children in Asia. Some patients develop severe complications, such as meningitis, encephalitis, myocarditis, and pulmonary edema. A major hurdle for the development of antivirals for EV-A71 infection is the lack of robust antiviral platforms that closely mimic the in vivo setting. Organoids are laboratory-adapted miniaturized organs with preserved three-dimensional micro-anatomical architecture. In recent years, organoid cultures have been increasingly used for studying the pathogenesis of and evaluating antiviral treatment options for viral infections. In this study, we developed human intestinal organoids as a robust platform for evaluating antiviral options for EV-A71.

**Methods:** An epidemic strain of EV-A71 isolated from a patient with laboratory-confirmed EV-A71 infection was used. We compared the performance of multiple antiviral evaluation assays (virus yield reduction, plaque reduction, and cell protection assays) between human intestinal organoids and Caco-2 cells, using itraconazole (an antifungal previously shown to exhibit potent anti-enteroviral effects) and DMSO as positive and negative controls, respectively.

**Results:** The antiviral effect of itraconazole was comparable between human intestinal organoids and Caco-2 cells in the virus yield reduction and plaque reduction assays. In the cell protection assay, Caco-2 cells failed to demonstrate significant differences between the itraconazole-treated and DMSO-treated groups. In contrast, cell protection effects were easily observed and quantified in human intestinal organoids. Moreover, the human intestinal organoids allowed the characterization of the different cell types affected in EV-A71 infection with or without itraconazole treatment.

**Conclusion:** Human intestinal organoids support the replication of EV-A71 and provides a robust platform for antiviral evaluation for EV-A71 infection.

**Disclosures.** All authors: No reported disclosures.

2643. Oral Nitazoxanide for Viral Gastroenteritis: A Single-Center Experience

FNU Shweta, MBBS; Omar Abu Saleh, MBBS; Mayo Clinic, Rochester, Minnesota

**Session:** 272. Studies of Treatment and Prevention of Viral Disease
Saturday, October 5, 2019: 12:15 PM

**Background:** Norovirus and serotypes (40/41) of adenoviruses are the leading cause of viral acute gastroenteritis in adults. The lack of therapeutic options can be devastating especially in the immunocompromised population. Nitazoxanide (NTZ), first designed as an antifolate anti-parasitic agent, is also known to have a broad-spectrum antiviral activity. Efficacy of NTZ in decreasing duration of symptomatic diarrhea in adults was first reported in a placebo controlled trial in 2006. Subsequent reports showed some promise as a possible therapeutic agent for viral gastroenteritis in the immunocompromised hosts.

**Methods:** Utilizing the inpatient pharmacy database we identified patients, who received NTZ for documented viral gastroenteritis, from January 1, 2008 to April 15, 2019. Chart review of cases was done to determine demographics, comorbidities, length of stay (LOS) in hospital, LOS in intensive care unit (ICU), duration of therapy, improvement in symptoms, and mortality.

**Results:** We identified 48 unique adult patients who were administered NTZ in the period under review. Of these 10 were prescribed NTZ specifically for viral gastroenteritis. 40% of the patients were females. The median age was 59 years (Interquartile Range [IR]: 47.75–69.25). Median LOS in hospital was 9.5 days (IR: 6.75–41.75). None of the patients required admission to the ICU. 4/10 patients had an active concomitant