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LB20. Valacyclovir to Prevent Vertical Transmission of Cytomegalovirus After Maternal Primary Infection During Pregnancy

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Background. Cytomegalovirus (CMV) is the most common cause of congenital infection in humans. The highest risk of fetal injury follows a maternal primary infection early in pregnancy. Despite the potential for severe fetal injury, to date there are no proven means to prevent viral transmission. Valacyclovir is an antiviral drug proven effective in decreasing the risk for CMV infection among transplant recipients. Valacyclovir is safe for use in pregnancy, and concentrates in the amniotic fluid without accumulating. A dose of 8 g/day creates therapeutic drug levels in the amniotic fluid and fetal blood.

Methods. This is a randomized, double-blind, placebo-controlled study comprising pregnant women with serologic evidence of primary CMV infection during the periconceptional period and first trimester. After informed consent, patients were randomly assigned to a treatment group (8 g/day of Valacyclovir) or control group (placebo). Treatment was initiated at the time of serological detection, and continued until amniocentesis. The primary endpoint was the rate of vertical transmission of CMV—determined by amniotic fluid CMV PCR. Secondary endpoints included evidence of symptomatic congenital CMV infection—in utero or postnatally.

Results. ***One hundred*** women were recruited, 90 were included in the data analysis; 45 patients received Valacyclovir and 45 placebo. There were 2 twin pregnancies, and therefore 92 amniocentesis. Amongst the Valacyclovir group, 5 (11.1%) amniocentesis were positive for CMV, compared with 14 (29.8%) in the placebo group (P GLMM = 0.03), corresponding with an odds ratio of 0.29 (95% CI: 0.09–0.90) for vertical CMV transmission. Amongst patients infected during the first trimester, a positive amniocentesis for CMV was significantly ($P = 0.02$) less likely in the Valacyclovir arm (2/19) compared with placebo (11/23). No significant differences ($P = 0.91$) in CMV-positive amniocentesis were observed between study arms amongst patients infected periconceptionally.

Conclusion. Valacyclovir at a dose of 8 g/day is effective in reducing the rate of fetal CMV infection following early maternal primary infection during pregnancy. The drug reduces the rate of fetal infection by 71%.

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LB21. The Seattle Flu Study: A Community-Based Study of Influenza

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Background. Influenza epidemics and pandemics cause significant morbidity and mortality. An effective response to a potential pandemic requires the infrastructure to rapidly detect and contain new and emerging flu strains at a population level. The objective of this study was to use data gathered simultaneously from community and hospital sites to develop a model of how flu enters and spreads in a population.

Methods. In the 2018–2019 season, we enrolled individuals with respiratory illness from community sites throughout the Seattle area, including homeless shelters, childcare facilities, Seattle-Tacoma International Airport, workplaces, college campuses, clinics, and at home (Figure 1). We collected data and nasal swabs from individuals with at least two respiratory symptoms. Additionally, we collected residual nasal swabs and data from individuals who sought care at four regional hospitals. Home-based self-testing for influenza and prediction models for influenza were piloted. Swabs were tested with a multiplex molecular assay, and influenza whole-genome sequencing was performed. Geospatial mapping and computational modeling platforms were developed to characterize regional spread of respiratory pathogens.

Results. A total of 18,847 samples were collected in the 2018–2019 season. Of those tested to date, 291/3,653 (8%) community and 2,393/11,273 (21%) hospital samples have influenza detected. Of the community enrollments, 39% had influenza-like illness. Community enrollees were in age groups not well-represented from hospitals. Influenza A/H3N2 activity peaked on college campuses and homeless shelters 2 weeks before the peak in hospitals. We observed multiple independent introductions of influenza strains into the city and evidence of sustained transmission chains within the city (Figures 2 and 3).

Conclusion. Utilizing the city-wide infrastructure we developed, we observed the introduction of influenza A/H3N2 into the community before the hospital and evidence of transmissions of unique strains into and within the Seattle area. These data provide the blueprint for implementing city-wide, community-based surveillance systems for rapid detection, real-time assessment of transmission patterns, and interruption of spread of seasonal or pandemic strains.

Figure 1. Targeted community enrollment sites in the Seattle region. The size of the circle represents the total number of enrollments at each site.

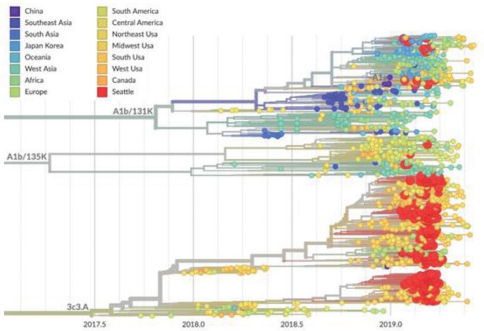

Figure 2. Phylogenetic tree of influenza A/H3N2, including 280 Seattle Flu samples (red dots) compared to strains observed globally.

Fig 3. Transmission chains of influenza A/H3N2 within Seattle, as well as introductions of strains that do not show signals of sustained transmission.

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