

Influenza Surveillance of Families in an Observational Household Study 2019-2021



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Background

- Families with children may be at higher risk for influenza virus infection.
- The burden of influenza disease may be underestimated without community surveillance.

Methods

- Households with school-aged children were enrolled, mailed home specimen collection kits, and asked to self-assess for weekly acute respiratory illness (ARI).
- Participants with cough or ≥ 2 ARI pre-determined symptoms were prompted to complete serial illness surveys with parental or self-collected mid-turbinate nasal swabs.
- Samples were sent to a University of Washington study laboratory for RT-PCR influenza testing.
- Whole genomic sequencing was attempted on samples with Ct $<$ 30 and phylogenetic trees created using publicly available influenza sequences in WA state.
- Secondary attack rates (SAR) were calculated

Table 1	Total participants	Influenza	
Characteristics	n=1861 (%)	A n=41 (%)	B n=41 (%)
Sex			
Female, n (%)	951 (51)	20 (49)	22 (53)
Hispanic/Latinx	110 (6)	1 (2)	6 (14)
Race*			
White	1668 (89)	38 (92)	35 (85)
Black	27 (1)	1(2)	2 (5)
Asian	244 (13)	12 (29)	9 (22)
Other	55 (3)	0	3 (7)
Prefer not to say	42 (2)	0	2 (5)
Age (years)			
<5	196 (11)	5 (12)	3(7)
5-17	673 (36)	23 (56)	28 (68)
18-64	967 (52)	13 (32)	10 (24)
>64	25 (1)	0	0
Seasonal Flu Vaccine 2018-2019	1152/1379 (83)	34/41 (83)	38/41 (93)
Seasonal Flu Vaccine 2019-2020	1525/1806 (84)	36/38 (95)	38/41 (93)

*multiple answers were included

Figure 1. Influenza A and B cases from 2019-2021

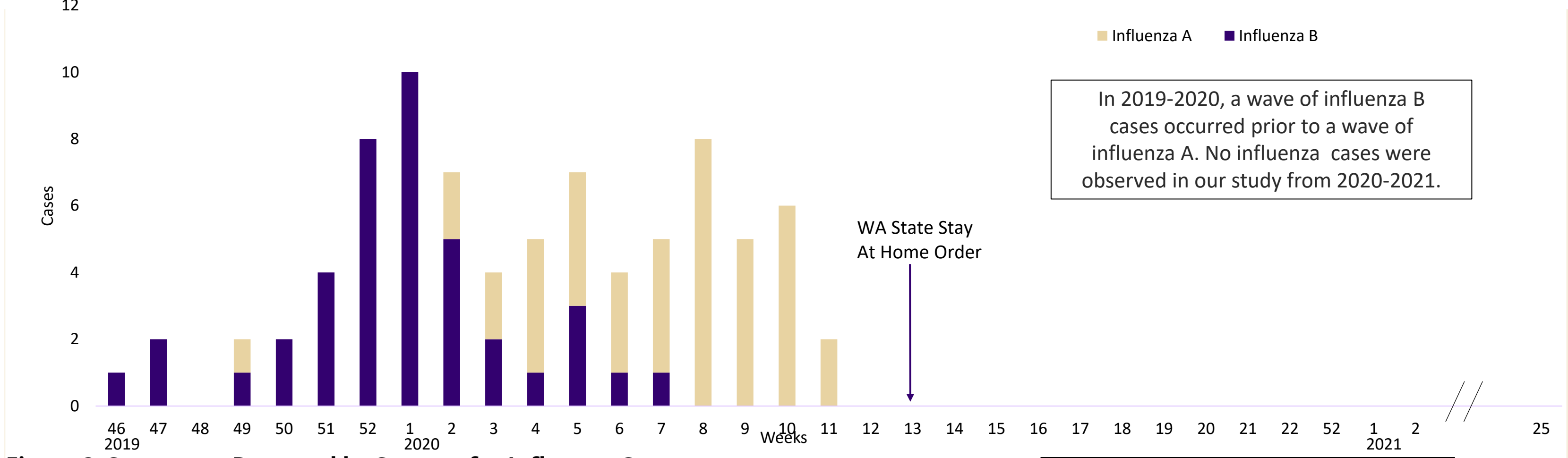


Figure 2. Symptoms Reported by Surveys for Influenza Cases at Day 0 (D0) of reported symptoms and Day 7 (D7)

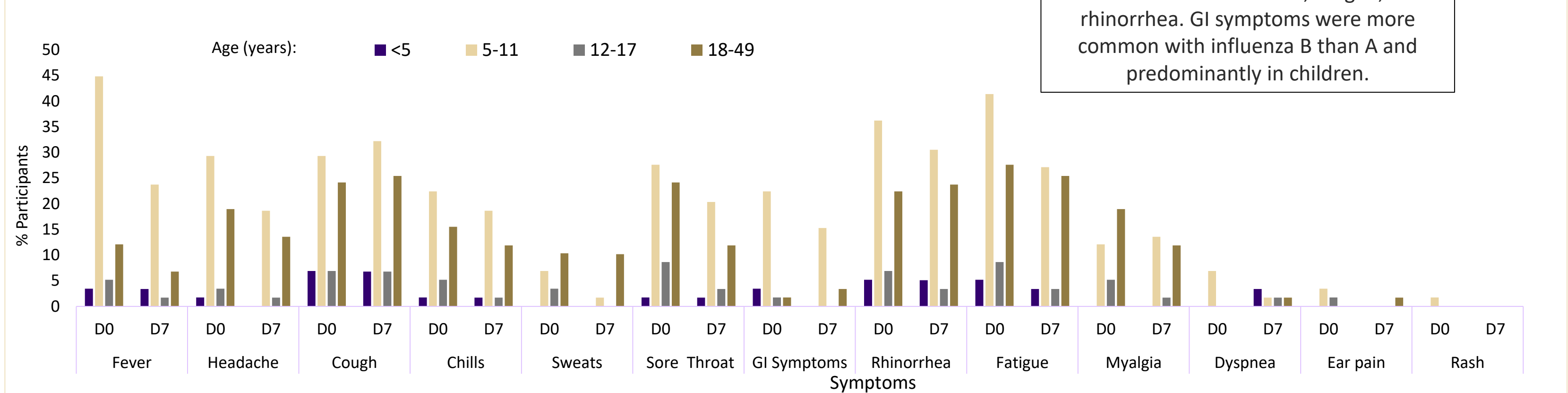
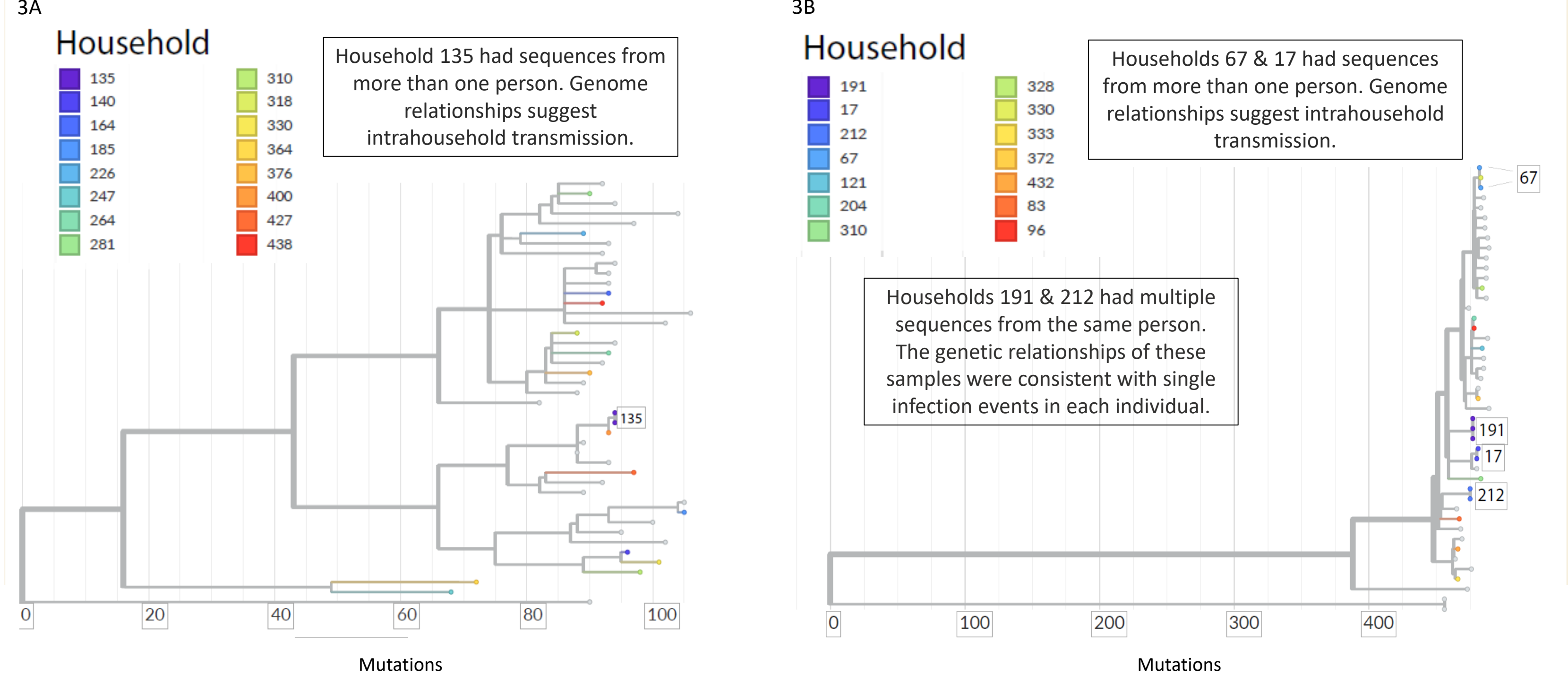


Figure 3. Phylogenetic tree of Households 3A. Influenza A 3B. Influenza B



Results

- Enrollment, surveillance, and sampling were all successfully performed remotely. Household compliance of at least 1 weekly survey completion:
 - Year 1: 98%
 - Year 2: 100%
- A total of 1157 ARI events were reported among 992 adults and 869 children in 470 households. 41 influenza A and 41 influenza B cases were detected.
- The study participant median age (IQR) was 32 years (8-43), 11 years (6-36) for influenza A, and 11 years (7- 17) for influenza B cases.
- Overall, 13% of households had an influenza case, of which 14 (22%) reported >1 case.
- The SAR for both symptomatic influenza A and B cases was 33%.
- There were no influenza cases in participants >49 years.

Conclusions

- Most cases were in children and adolescents who had received at least one dose of current season of influenza vaccine.
- Sequenced study samples were reflective of the diversity of Influenza A and B viruses circulating in Washington at the time as represented by influenza genomes deposited in GISAID.
- Influenza incidence in our cohort declined to zero with the rise of SARS-CoV-2 cases and widespread mitigation efforts.
- Symptoms were widely distributed and similar between influenza A and B.

Acknowledgments

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