

# Use of an Influenza-like Illness School Absenteeism Monitoring System to Identify Seasonal Influenza Outbreaks in the Community

ORCHARDS (ORegon CHild Absenteeism due to Respiratory Disease Study)

Wisconsin, September 2014—June 2017



**ORCHARDS**

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## BACKGROUND

Schools are purported to be primary venues of influenza transmission and amplification with secondary spread to communities.<sup>1,2</sup> Due to reduced social distancing and a greater volume of respiratory secretion in children, school environments are optimal settings for influenza transmission.<sup>3-5</sup> Accordingly, monitoring for influenza within schools may provide early warning for influenza in adjoining communities.

We evaluated K—12 student absenteeism monitoring at the Oregon School District (OSD), Oregon, WI, as a means for early detection of influenza activity in the community.

## METHODS

- 3-year, prospective observational study of all-cause (a-TOT), illness-associated (a-I), and influenza-like illness-associated (a-ILI) absenteeism within the OSD.
- Absenteeism reporting was facilitated by automated processes within OSD's electronic student information system.
- Students were screened for ILI, and, if eligible, visited at home, where pharyngeal specimens were collected for influenza RT-PCR (IVD CDC Human Influenza Virus RT-PCR Diagnostic Panel) and multipathogen testing (Luminex NxTAG RPP).
- Surveillance of medically attended laboratory-confirmed influenza (MAI) occurred in five primary care clinics in and adjoining OSD as part of the Wisconsin Influenza Incidence Surveillance Project.
- Poisson general additive log linear regression models of daily counts of absenteeism and MAI were compared using correlation analysis.

## RESULTS

- Influenza A was detected in 54 of 700 visited students; and influenza B in 51 of the visited students between January 2015 and June 2017 (Absenteeism counts, school influenza cases, and MAI pictured in Figure 1).
- Influenza infection (A or B) was significantly associated with meeting a-ILI status (OR = 4.74; 95%CI: 2.78—8.18; P<0.001).
- Of MAI patients, 371 had influenza A and 143 had influenza B.
- a-ILI was significantly correlated with MAI in the community (Figure 2 and 3:  $r = 0.480$ ; P<0.001) with a 1-day lead time.
- a-I was significantly correlated with MAI in the community (Figure 2:  $r = 0.472$ ; P<0.001) with a 15-day lead time
- a-TOT performed poorly, and followed MAI by 9 days (Figure 2:  $r = 0.278$ ; P<0.001).

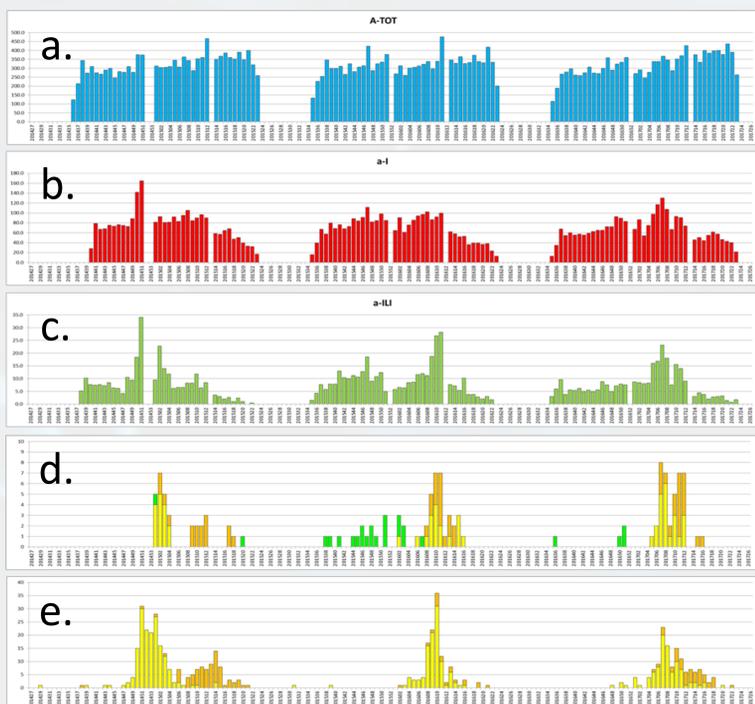


Figure 1. Weekly summaries of absenteeism counts (a-c), influenza cases in school children (d), and medically-attend influenza in the community (e). Absenteeism is shown as: a-TOT (blue); a-I (red); a-ILI (green). Laboratory-confirmed cases of influenza A (yellow), influenza B (orange) and adenovirus (bright green) are shown for school children (d) and for medically-attended patients (e).

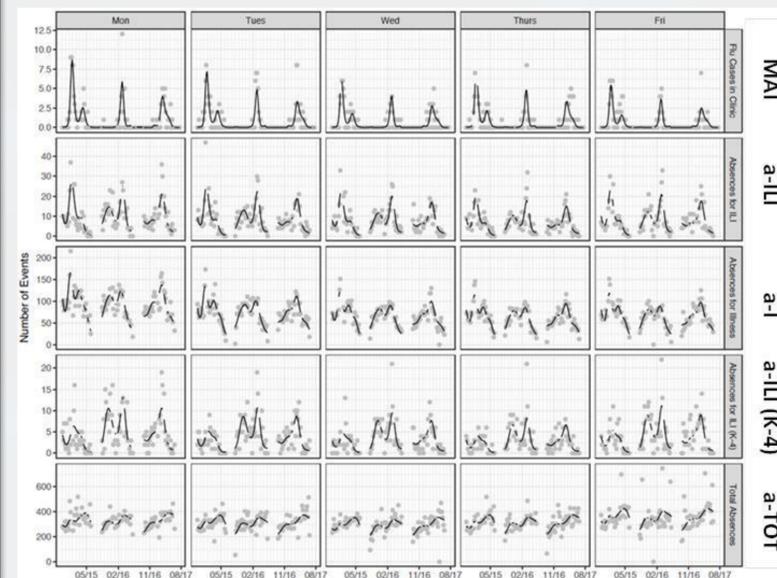


Figure 2. Poisson general additive log linear regression models of daily counts of medically attended influenza in the community (MAI: top row), absenteeism due to influenza-like illness (a-ILI: 2nd row), absenteeism due to illness (a-I: 3rd row), a-ILI in kindergarten through 4th grade (a-ILI K-4: 4th row), and total absenteeism (a-TOT: bottom row). Daily school absenteeism within the Oregon School District, Oregon, WI, from September 2014 through June 2017.

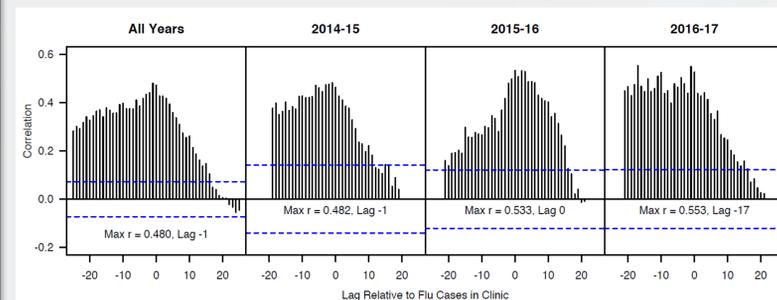


Figure 3. Example showing correlations between a-ILI and MAI cases for varying lags, for the entire series (All Years) and for each school year. The correlations are Pearson (ordinary) correlations of the square-root-transformed counts. The dashed lines represent the critical values for a test of zero correlation.

## DISCUSSION

Cause-specific school absenteeism accurately identified influenza outbreaks in the surrounding community over a three-year period with four discrete influenza outbreaks. Comparison between the absenteeism monitoring system and MAI was enhanced through ongoing clinical surveillance within and adjoining the school district used for monitoring. Increases in illness absenteeism (a-I) preceded MAI by 15 days whereas increases in ILI-associated absenteeism (a-ILI) occurred one day ahead of MAI. Systems capturing cause-specific absenteeism may therefore be considered as an alternative for monitoring outbreaks of seasonal and pandemic influenza in wider communities.

## CONCLUSIONS

Surveillance using cause-specific absenteeism was feasible to implement in OSD, and performed well over a 3-year period marked by diverse presentations of seasonal influenza. Monitoring of a-I and a-ILI in schools can effectively detect influenza outbreaks in the community, providing an early warning and allowing for community mitigation efforts for seasonal and pandemic influenza.

## REFERENCES

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