**BACKGROUND**

School-aged children (aged 5—18 years) have the highest rates of influenza diagnosis among people seeking medical care for acute respiratory infections (ARI) [1]. Accordingly, surveillance systems that focus on children may provide an early warning for seasonal and pandemic influenza.

A relationship between school absenteeism and an influenza epidemic was first reported in the medical literature by Harboe and Juul in 1958 [2]. This is not surprising for a pathogen that can have very high attack rates, nearing 40%, among school-aged children [2]. Accordingly, multiple efforts have been undertaken to assess the utility of monitoring absenteeism of children as an indicator of influenza in the community [3-10]. A study from the 2009 pandemic demonstrated poor predictive value (R2 = 0.01) and a high IDU correlation between confirmed influenza from hospitalized cases and all school absences, influenza-like illness (ILI) health outlet visits, and ILI-related absenteeism, respectively, in a school district [10].

In this study, we compare all-cause absenteeism (a-TOT), absenteeism due to illness (a-I) and absenteeism due to influenza-like illness (a-ILI) with laboratory-confirmed influenza (SI).

From January to June, 2015, 646 a-ILI days were recorded and 129 home visits were conducted. Influenza was recovered from 31 (24%) swabs collected from children during home visits, of which 21 were from a-ILI cases. A replacement round of home visits was performed after influenza season 2015-09 through 2015-18, but with a disappearance following spring break (figure 2).

**RESULTS**

### Study Period

The following data were compiled for the year 2014-2015:

- Total school days: 651,488
- 100% 8.9% 1.9% 0.22%

### Student Absenteeism

- a-TOT: 56,477 (8.9%)
- a-I: 129,682 (19.9%)
- a-ILI: 688 (0.22%)

**Correlation Table**

### Component

<table>
<thead>
<tr>
<th>Component</th>
<th>Student Absenteeism</th>
<th>Total (n-TOT)</th>
<th>a-TOT</th>
<th>a-I</th>
<th>a-ILI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILI</td>
<td>0.218</td>
<td>(p&lt;0.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ILI</td>
<td>0.590</td>
<td>(p&lt;0.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ILI</td>
<td>0.718</td>
<td>(p&lt;0.001)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Total Absenteeism

- a-ILI was highly correlated to medically-attended influenza (MAI) in the community and a-I was moderately correlated; low correlation existed between a-TOT and MAI (Table 2; figure 2).

**DISCUSSION**

**ORCHARDS** is the first study to evaluate total absenteeism (a-TOT), illness-related absenteeism (a-I) and a-ILI-related absenteeism (a-ILI) within an entire school district and compare the temporal patterns with medically-attended influenza (MAI) within the same community during a period from fall 2014 to spring 2015. a-I and a-ILI showed very high validity and moderate to very low correlation to MAI, respectively. This study also directly compares a-ILI, confirmed influenza in absent children and community MAI and demonstrates very high correlations among these. Accordingly, ORCHARDS provides a direct linkage between children with laboratory-confirmed influenza, children absent with ILI, and medically-attended influenza in the community. This linkage strongly supports the utility of a-ILI absenteeism as a tool to monitor influenza outbreaks.

We also demonstrate the feasibility of using educational information systems to report absenteeism data efficiently to流行eoue learners using simple, automated processes. This study is limited in that it assesses a single school district during a single influenza season. The winter season was characterized by predominance of influenza A(H1N1) for which there was a low estimated vaccine efficacy due to vaccine mismatch. In addition, preliminary data presented collected from specimens from absent children prior to and during peak circulation of influenza A.

ORCHARDS will continue to monitor absenteeism and conduct home visits over the next two influenza seasons, through June 2017.

**CONCLUSIONS**

Absenteeism due to influenza-like illness, although representing only a small fraction of total absenteeism, is a strong indicator of influenza within the population of school children and in the broader communities in which the children live.

Utilization of absenteeism information, reported anonymously by automated processes within educational information systems, may provide a valuable, timely, and adaptable method for influenza monitoring. In addition, assessment of populations of school children may provide early warning of outbreaks of seasonal and pandemic influenza.

**REFERENCES**


**ACKNOWLEDGEMENTS**

We would like to acknowledge the efforts of Oregon School District, Oregon, Wisconsin State Laboratory of Hygiene, Wisconsin Division of Public Health, UW Department of Family Medicine and Community Health, and the financial support of CDC/NCZEID and Quidel Inc.