Validation of a definition for K-12 student absenteeism due to influenza-like illness (ILI) for school-based influenza activity monitoring in Oregon School District, Wisconsin

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BACKGROUND

- Syndrome-based student absenteeism monitoring is proposed as a simple and generalizable approach for early identification of influenza outbreaks in K-12 schools and surrounding communities, utilizing routinely collected attendance data.
- Although many school districts routinely capture reasons for absenteeism, most categories are relatively general (e.g., illness, family vacation).
- The creation of a more specific category to capture influenza-like illness-related absenteeism (a-ILI) for influenza monitoring, requires three components:
  a) Prompting parents to report simple, easily recognized symptoms on a telephone-based absentee call-in line.
  b) Allowing attendance staff to easily identify a-ILI from a background of other reasons for absenteeism.
  c) Providing a valid representation of influenza infection in absentee children.

METHODS

Data Collection and Laboratory
- To evaluate a-ILI against laboratory-confirmed influenza, we conducted a prospective study in children aged 4-19 years, between January 5, 2015 and July 31, 2017, which enrolled students with acute respiratory illness (ARI). Absentee call line.
- Via home visits, the study team assessed participating students for ARI symptoms (fever, cough, sore throat, nasal congestion, runny nose), collected nasal swabs for virus testing using the CDC Human Influenza Virus Real-time RT-PCR Diagnostic Panel and the LumineX NxTag® Respiratory Pathogen Panel, and ascertained school absence status.
- For analysis, ILI was defined as the presence of fever and a respiratory tract symptom (cough, sore throat, nasal congestion, or runny nose).

Data Analysis
- We used multivariate binary logistic regression to assess the relationships between pathogens, absence status, and illness category.

RESULTS

Home visit were made to 700 children
mean age = 10.0 ± 3.5 years; median = 10; range = 4-18
665 home visits occurred while school was in session
These children were included in analysis of absenteeism
mean age = 10.0 ± 3.5 years; median = 10; range = 4-18
439 (80.9%) were absent from school due to illness
405 (60.9%) met the ILI criteria
377 (56.7%) were absent with ILI (a-ILI)

Influenza RT-PCR and Multiplex RPP results were available for all students (n=665) and respiratory viruses were identified in 387/665 (58.1%)

Mean time from symptom onset to specimen collection was 55.3 ± 32.3 hr.

Influenza was identified in 104 students (15.6%)
Influenza A was identified in 53 students (8.0%)
Influenza B was identified in 51 students (7.7%)

<table>
<thead>
<tr>
<th>Syndrome or Absenteeism Category</th>
<th>Influenza Detection Odds Ratio 95% CI (p-value)</th>
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<tbody>
<tr>
<td>ILI or ARI (ILI)</td>
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<tr>
<td>- Influenza A</td>
<td>2.26 (95% CI: 1.24, 4.13; p&lt;0.001)</td>
</tr>
<tr>
<td>- Influenza B</td>
<td>5.13 (95% CI: 2.88, 9.01; p&lt;0.001)</td>
</tr>
<tr>
<td>- Influenza A or B</td>
<td>7.80 (95% CI: 4.50, 13.51; p&lt;0.001)</td>
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DISCUSSION

- In a community cohort of school-aged children—extending across three influenza seasons—we demonstrated that laboratory-confirmed influenza is associated with ILI status, absenteeism, and absenteeism due to ILI (a-ILI).
- Influenza A was associated with ILI status; influenza B was more associated with absenteeism.
- Compared to other respiratory viruses, influenza is a strong predictor of absenteeism (OR = 5.50) and absenteeism due to ILI (OR = 4.43).
- ORCHARDS engaged ill children in community not medically-attended settings, and thus, provides a better measure of influenza’s effect on absenteeism.
- A simple and operational definition for ILI (fever plus a respiratory symptom) was validated and performed well for school aged children in a community setting.

CONCLUSION

a-ILI serves as a reasonable proxy for influenza-specific absenteeism, thus facilitating school-based, cause-specific absenteeism monitoring for influenza outbreaks.

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1. UW School of Medicine and Public Health
2. Centers for Disease Control and Prevention