

# An Exploration of the H1N1 Outbreak in Champaign and Urbana Elementary Schools

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## Objective

The goal of this project is to examine the patterns of school absenteeism during the H1N1 pandemic of 2009 comparing two contiguous school districts with very different enrollment policies.

## Introduction

Champaign and Urbana, Illinois are considered twin cities that share the University of Illinois. Due to different geographic recruitment procedures, Champaign and Urbana public elementary schools offer a particularly novel opportunity to examine the H1N1 outbreak among students. Urbana schools recruit from specific geographic areas (neighborhoods) designated by the school district whereas Champaign schools are non-selective in their composition where students residing in Champaign can attend any school within the city.

## Methods

Daily absence data from elementary schools in Champaign and Urbana school districts were obtained through the NCSA INDICATOR<sup>1</sup> database. School population data were obtained from the Illinois State Board of Education annual school report cards<sup>2</sup>. Data were examined as a proportion of students within a school considered absent and mapped utilizing ArcMap 10.1 showing a time course of the percentage of students absent at each school for the period between September 8 and December 18 2009. Correlation analysis was used to examine relationships between specific demographics and absence patterns.

## Results

In early October, both school districts showed an increase in overall absences with Urbana schools showing a quicker and more substantial increase in the beginning of the month then leveling off with a slight increase in later October. Champaign had a more gradual but substantial increase over the month of October peaking near the middle of the month and remained elevated for about two weeks. Both districts showed a drop in absences until late November when the Champaign schools saw another jump to nearly 8%. This was again followed by a decrease to pre-October absence percentages throughout the remainder of the semester. On an individual school level correlations between schools range from 0.692 to -.113 with a mean of 0.292 in Urbana indicating significant differences in the absence patterns. 9 of the 15 pairwise comparisons were significant at  $p < 0.05$ . In Champaign the range was from to .817 to -.092 with a mean of 0.497. 51 of the 55 pairwise comparisons were significant at  $p < 0.05$ .

Correlation analyses were used to determine trends among the variables. The only significant trends noted were among the student composition and the percentage of low income students. There were no significant correlations between the composition, number of students, or percent of low-income students and maximum or average absence proportion among the schools.

## Conclusions

There is clear evidence from this small comparison that there is a difference in the pattern of disease spread depending on the geographic composition of the schools catchment area. In Urbana which uses traditional neighborhood schools only 60% of the pairwise epidemiological curves were significantly similar compared to 92.7% of the pairwise curves in Champaign. This shows that when students from the city are intermingled through a school district a disease epidemic spreads through the schools in a similar timeframe, whereas there is a greater temporal separation with neighborhood schools. The practical implication of this is that once an outbreak has been detected in a neighborhood school there may be time to prevent it spreading to other schools in the district, whereas with geographically mixed school an outbreak essentially hits all of the schools simultaneously.

## Keywords

School absenteeism; H1N1 surveillance; Geographic analysis

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## References

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