

# Relationship Between Baseline Influenza-like Illness Rates And Healthcare Settings

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## Objective

To examine the baseline influenza-like illness (ILI) rates in the emergency departments (ED) of a large academic medical center (AMC), community hospital (CH), and neighboring adult and pediatric primary care clinics.

## Introduction

The primary goal of syndromic surveillance is early recognition of disease trends, in order to identify and control infectious disease outbreaks, such as influenza. For surveillance of influenza-like illness (ILI), public health departments receive data from multiple sources with varying degrees of patient acuity, including outpatient clinics and emergency departments. However, the lack of standardization of these data sources may lead to varying baseline levels of ILI activity within a local area.

## Methods

Geographic Utilization of Artificial Intelligence in Real-Time for Disease Identification and Alert Notification (GUARDIAN) – a syndromic surveillance program – was used to automate ILI detection using free text chief complaint/reason for visit fields and vital signs for a large AMC - ED, CH - ED, and neighboring outpatient clinics during the summer (June 15, 2016 to August 18, 2016) in order to create a baseline. The GUARDIAN system defined ILI as fever (temperature  $\geq 100^{\circ}\text{F}$ ) and cough and/or sore throat. Descriptive analysis of the observed ILI rates along with bivariate ANOVA with post hoc Bonferroni and t-test were utilized to examine the difference within the settings.

## Results

The average ILI rate for EDs is higher than the clinics by at least 0.39%. The CH- ED had 4.23% baseline ILI rate as compared to 1.35% for AMC-ED. While the AMC – Clinics have 0.96% baseline ILI rate as compared to 0.25% for CH – Clinics. The CH- ED and AMC – Clinics represented higher variations. Based on bivariate test, CH – ED was significantly different than AMC – ED, AMC - Clinics, and CH – Clinics ( $F = 10.58$ ,  $df = 1238$ ,  $p < 0.05$ ). For the AMC – Clinics, the average ILI rate for clinics providing services to adult patients was 0.66% (SD: 4.5%) as compared to 2.03% (SD: 10.81%) for pediatric clinics, which was not statistically significant.

## Conclusions

The CH - ED has higher baseline ILI rates compared to other settings, as well as the CDC Region 5's baseline (1.9% for 2015-2016). Based on previous studies<sup>1</sup>, this is likely due to providers' use of chief complaint free text fields. Thus, the CH – ED will have higher thresholds for widespread ILI activity. In addition, differences in baseline ILI rates between AMC - ED, AMC - Clinics, and CH - Clinics may result in different thresholds for widespread ILI activity (i.e., Average + 3 Standard Deviations). The CH – ED and AMC – Clinics had higher baseline standard deviations, indicating variations in underlying patient populations. In addition, pediatric clinics have higher baseline ILI activity but also higher variations, indicating the unique characteristics of pediatric patients. Thus, due to the above

findings, there is a need to closely monitor the ILI rates at various healthcare sites for both timing of onset, as well as the intensity of ILI activity.

Table 1. Baseline influenza-like illness (ILI) rates during summer 2016

Healthcare Setting	Total Encounters	Average ILI Rate	Standard Deviation
AMC - ED	12,840	1.35%	1.11%
CH - ED	6,428	4.23%	4.10%
AMC - Clinics	25,935	0.96%	6.45%
CH - Clinics	8,998	0.25%	0.90%
Overall	54,201	0.97%	5.31%

Note: AMC = Academic Medical Center and CH = Community Hospital. ANOVA with post hoc Bonferroni results CH - ED significantly different than AMC - ED, AMC Clinics, and CH - Clinics

## Keywords

GUARDIAN; Influenza-like illness; Baseline ILI rates

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## References

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