

Experience Using Syndromic Surveillance Systems  
During the Novel H1N1 Influenza Outbreak,  
Connecticut, 2009

**Katy Purviance, MPH**

Infectious Disease Section  
Connecticut Department of Public Health



## Objective

- To evaluate the performance of the Connecticut hospital emergency department and hospital admissions syndromic surveillance systems during the novel H1N1 influenza outbreak in 2009 (wave 1 and 2)

## Background

- Two syndromic surveillance systems to detect and monitor public health threats
  - Hospital emergency department syndromic surveillance (HEDSS)
  - Hospital admissions syndromic surveillance (HASS)
- Previous analysis of seasonal influenza has shown both systems are useful for predicting influenza activity
  - HASS useful during seasons where the total number of influenza-related hospitalizations is high
  - HEDSS also performs well during milder seasons with fewer hospitalizations

## HEDSS:

### *Hospital Emergency Department Syndromic Surveillance*

- Developed in 2004
- 19/33 (58%) EDs participate
- Electronically report de-identified chief complaint data daily to DPH
- DPH categorizes chief complaints into 8 syndrome categories
- “Fever/flu” syndrome has been the best indicator of influenza activity

## **HASS:**

### ***Hospital Admissions Syndromic Surveillance***

- Developed in 2001
- All 32 acute care hospitals participate
- Hospitals review unscheduled admissions from the previous 24 hours and manually categorize them into 11 syndromes
- Aggregate counts are reported daily to DPH
- “Pneumonia” syndrome has been a good indicator of influenza activity, particularly for severe disease due to influenza

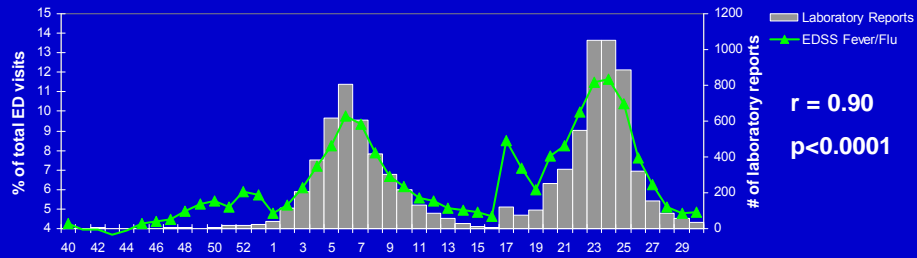
## **Methods**

- Correlation analysis to compare syndromes to laboratory reports of influenza
  - HEDSS: weekly percentage of “fever/flu” visits
  - HASS: weekly counts of “pneumonia” admissions
- HEDSS “fever/flu” visits were examined by:
  - Geographical region (defined by hospital location)
  - Age group ( <5; 5-17; 18-49; 50-64; ≥65)
- Cumulative excess visits/hospitalizations were calculated
  - Baseline: average weekly count for 3 weeks prior to beginning of seasonal flu season (9/7/2008 – 9/27/2008)

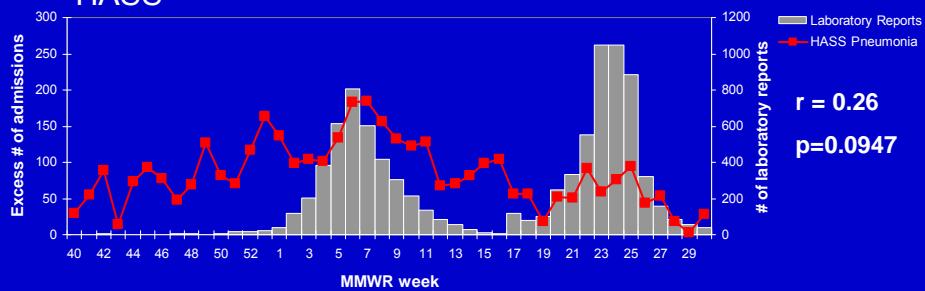
# Results

## 2008/2009 Total Influenza Season MMWR weeks 40 - 30

### HEDSS

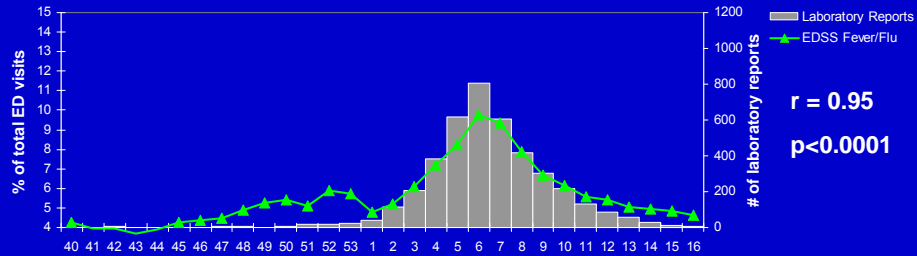


### HASS

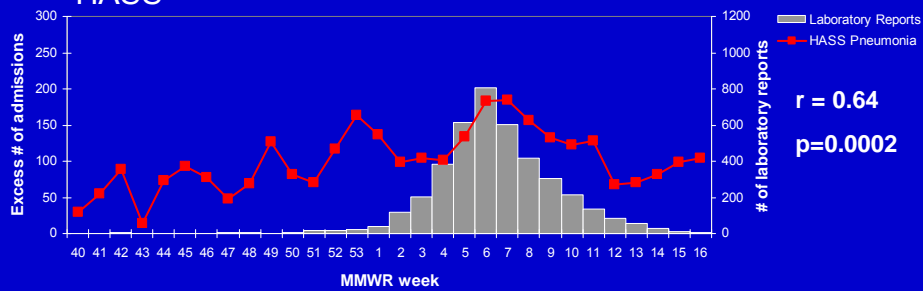


## 2008/2009 Seasonal Influenza MMWR weeks 40 - 16

### HEDSS

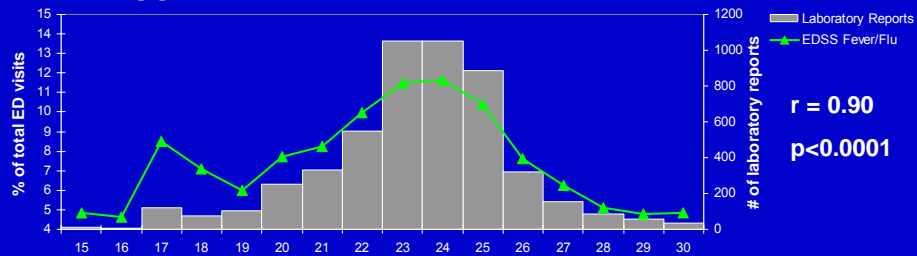


### HASS

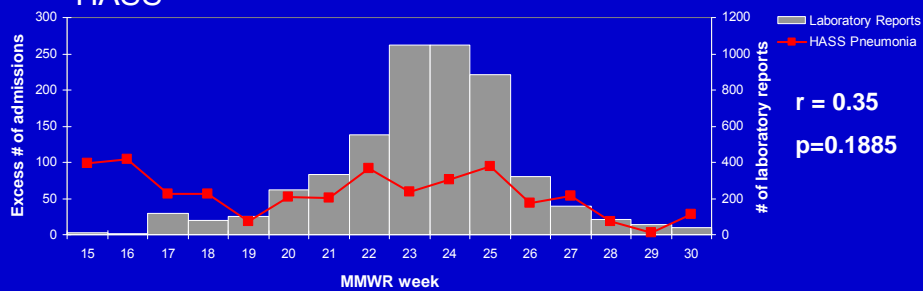


## 2008/2009 H1N1 Wave 1 MMWR weeks 15 - 30

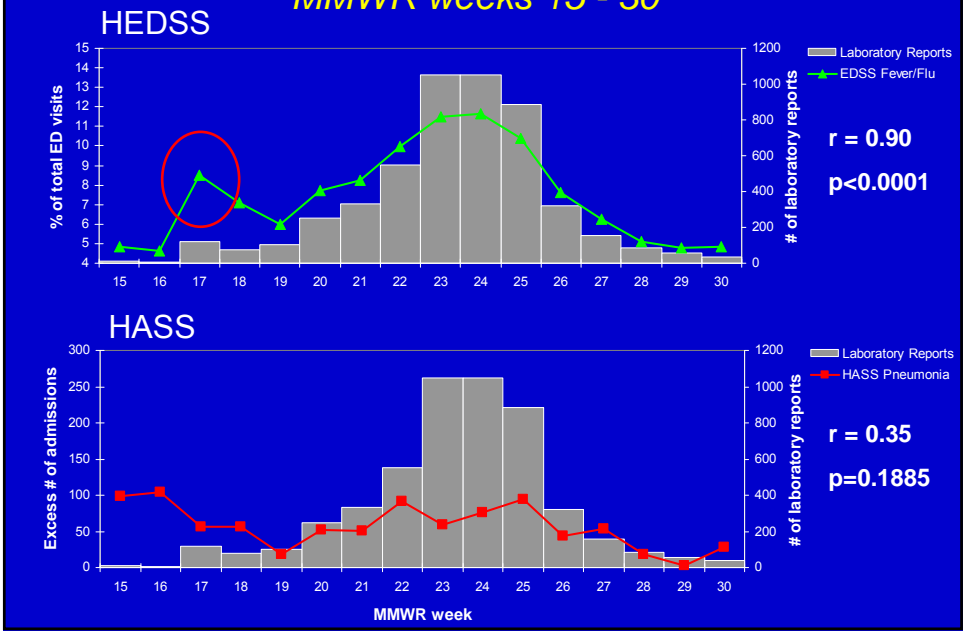
### HEDSS



### HASS



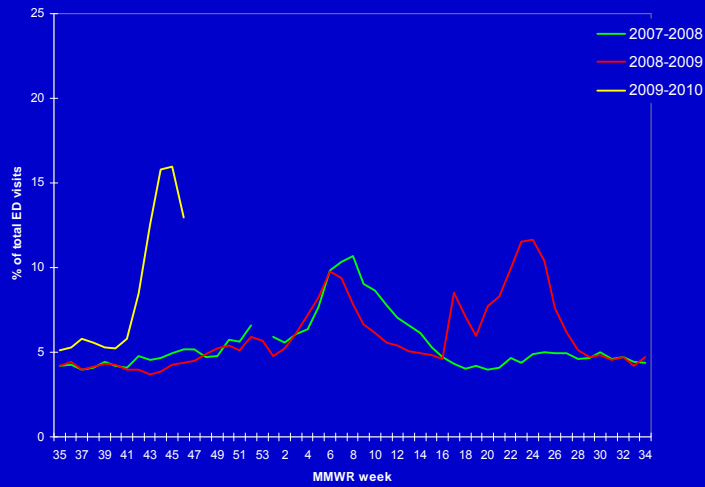
## 2008/2009 H1N1 Wave 1 MMWR weeks 15 - 30



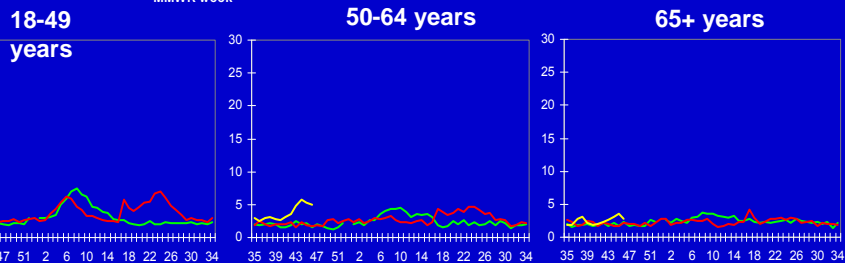
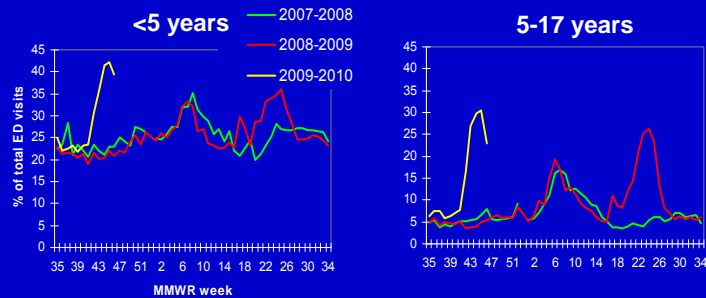
## Age comparison at the peak week of the 2008/09 seasonal influenza and nH1N1 wave 1

Age group	Seasonal flu peak (week 6)		Initial H1N1 wave 1 peak (wk 17)		Real H1N1 wave 1 peak (wk 24)	
	# visits	(% of total)	# visits	(% of total)	# visits	(% of total)
<5	576	(33%)	563	(34%)	601	(26%)
<b>5-17</b>	<b>509</b>	<b>(29%)</b>	338	(21%)	<b>843</b>	<b>(37%)</b>
18-49	521	(30%)	527	(32%)	657	(29%)
50+	134	(8%)	220	(13%)	200	(9%)
All ages	1740	(100%)	1648	(100%)	2301	(100%)

## 2009/2010 HEDSS surveillance, through MMWR week 46 (ending 11/21/09)



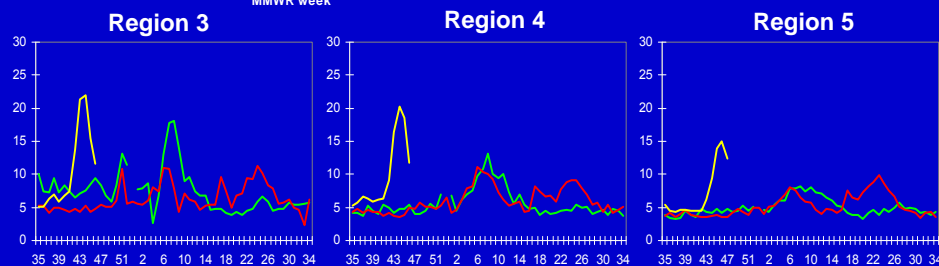
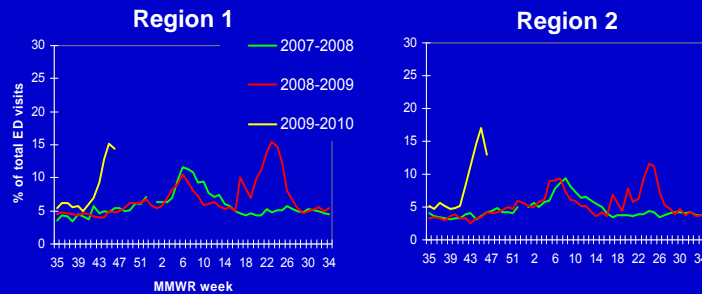
## 2009/2010 HEDSS data, by age



## Age comparison of the peak week of nH1N1 waves 1 and 2

Age group	H1N1 wave 1 peak (week 24)		H1N1 wave 2 peak (week 45)	
	# visits	(% of total)	# visits	(% of total)
<5	601	(26%)	882	(29%)
5-17	843	(37%)	940	(31%)
18-49	657	(29%)	1019	(33%)
50+	200	(9%)	210	(7%)
All ages	2301	(100%)	3051	(100%)

## 2009/2010 HEDSS data, by geographic region



## Comparison of excess visits/admissions during the peak 6 weeks of the seasonal and H1N1 waves

	Seasonal Peak* (weeks 4 – 9)	H1N1 wave 1 peak (weeks 21 – 26)	H1N1 wave 2 peak (weeks 41 – 46)
ED "fever/flu" visits	4115	6953	8866
Hospital "pneumonia" admissions	894	414	758

\* Peak is defined as the six week period where activity is highest in each wave

## Conclusions

- Similar to our experience in previous seasons, both systems were good predictors of influenza during the 2008/2009 seasonal peak
- During the initial nH1N1 peak, only ED visits were highly correlated with influenza activity
  - Suggests a larger impact in the outpatient setting; did not result in a large number of hospitalizations
  - This relative impact was confirmed by examining excess ED visits and hospitalizations
  - Impact on outpatient setting continues through second wave

## Conclusions

- Although the HEDSS proved excellent for monitoring the level of nH1N1 circulation, it was limited in detecting its onset
  - Initial peak during 1<sup>st</sup> wave was likely media driven
    - All geographic regions
    - All age groups
- Sudden increases in ED visits need to be examined with other systems before attributing them to influenza

## Conclusions

- The HEDSS system was effective in detecting which age groups were affected by nH1N1
  - During 1<sup>st</sup> nH1N1 wave, 5-17 year olds had the highest proportion of visits and a significantly higher percentage than was seen in the seasonal peak
  - This difference was not significant during the second wave

## Conclusions

- The HASS system was less sensitive to levels of nH1N1 activity
  - Provided a context to interpret the sharp increase in outpatient visits
  - No pronounced burden of hospital admissions associated with nH1N1 during the first wave
  - Burden of hospitalizations in 2<sup>nd</sup> wave appears to be similar to seasonal influenza
  - Data limitations do not allow assessment of disease burden among sub-groups (i.e. age)

## Acknowledgements

- Co-authors
  - Jessica Brockmeyer, MPH
  - Jaime Krasnitski, MPH
  - Alan Siniscalchi, MPH, MS
  - Matthew Cartter, MD, MPH
  - James Hadler, MD, MPH