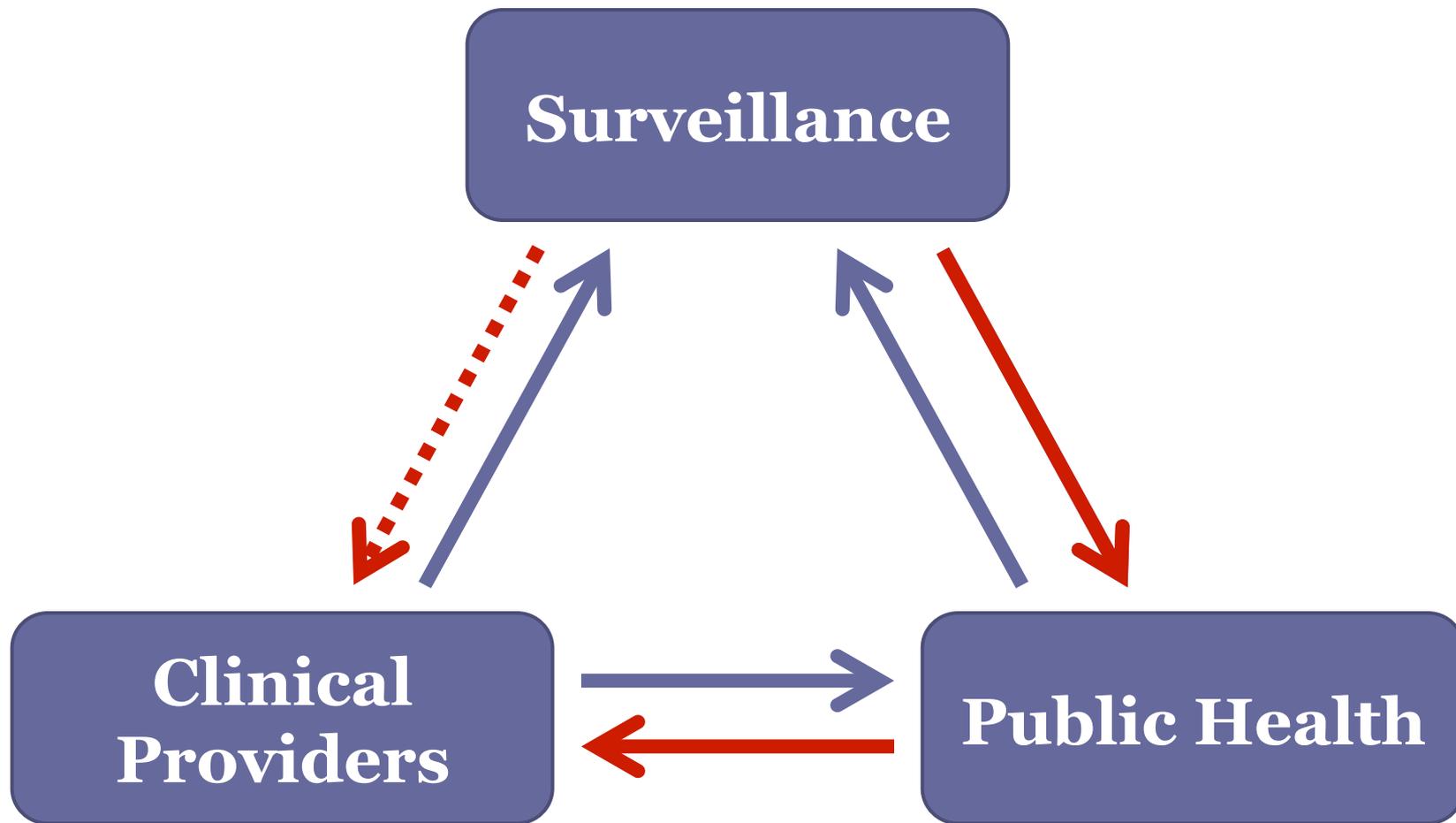


Clinical use of Surveillance: Managing Emergency Department Crowding with Google Flu Trends

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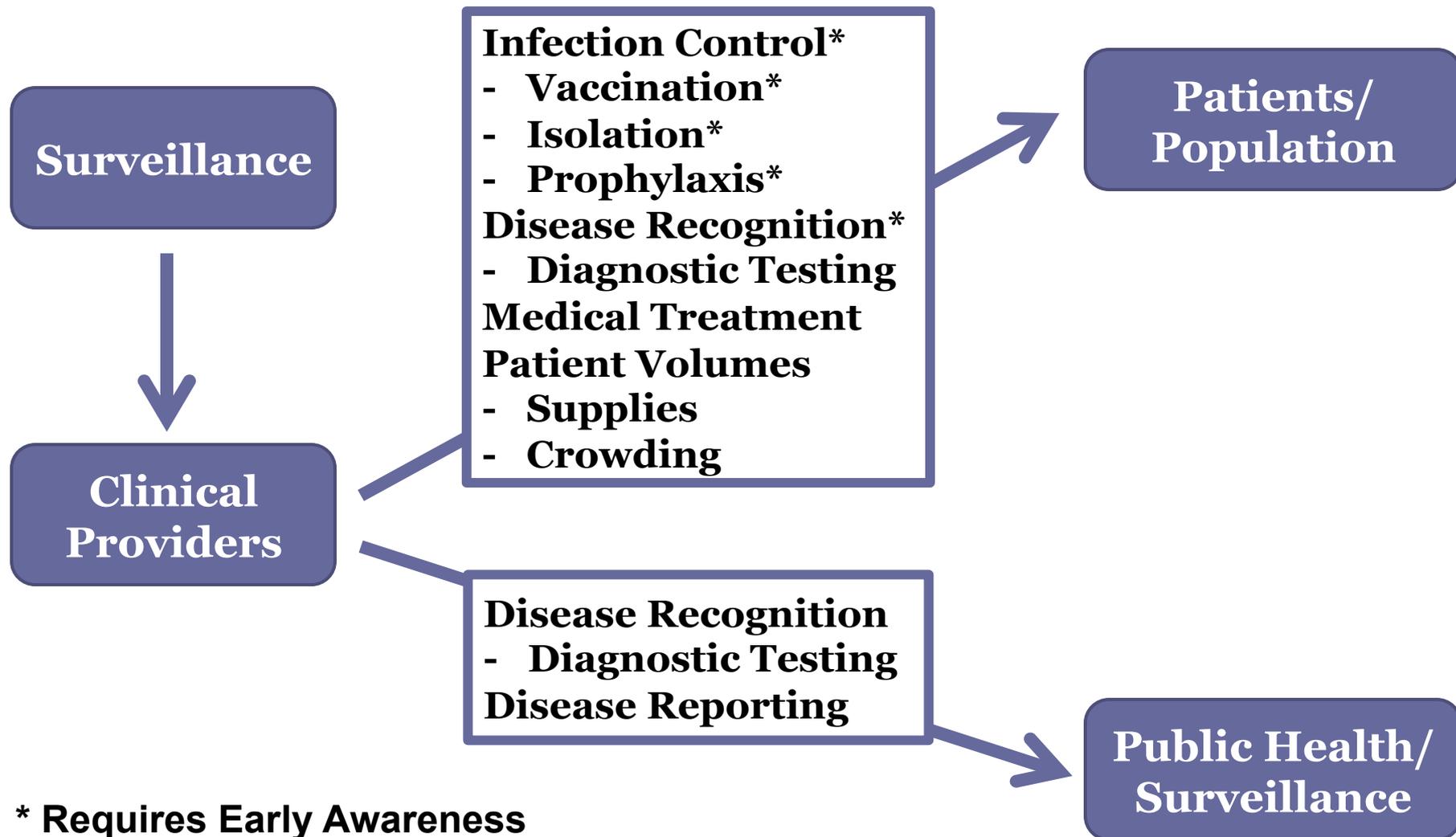


Communication with Clinicians

- **Time limitations**
- **Access to data**
 - **Volume/Presentation of Data**
 - **Access to surveillance tools**
- **Information Requirements**
 - **Timely**
 - **Locally Applicable**
 - **Reliable Data Source**
 - **Easily Accessible/Focused**

Surveillance Designed FOR Clinical Practice

Direct to Provider Surveillance

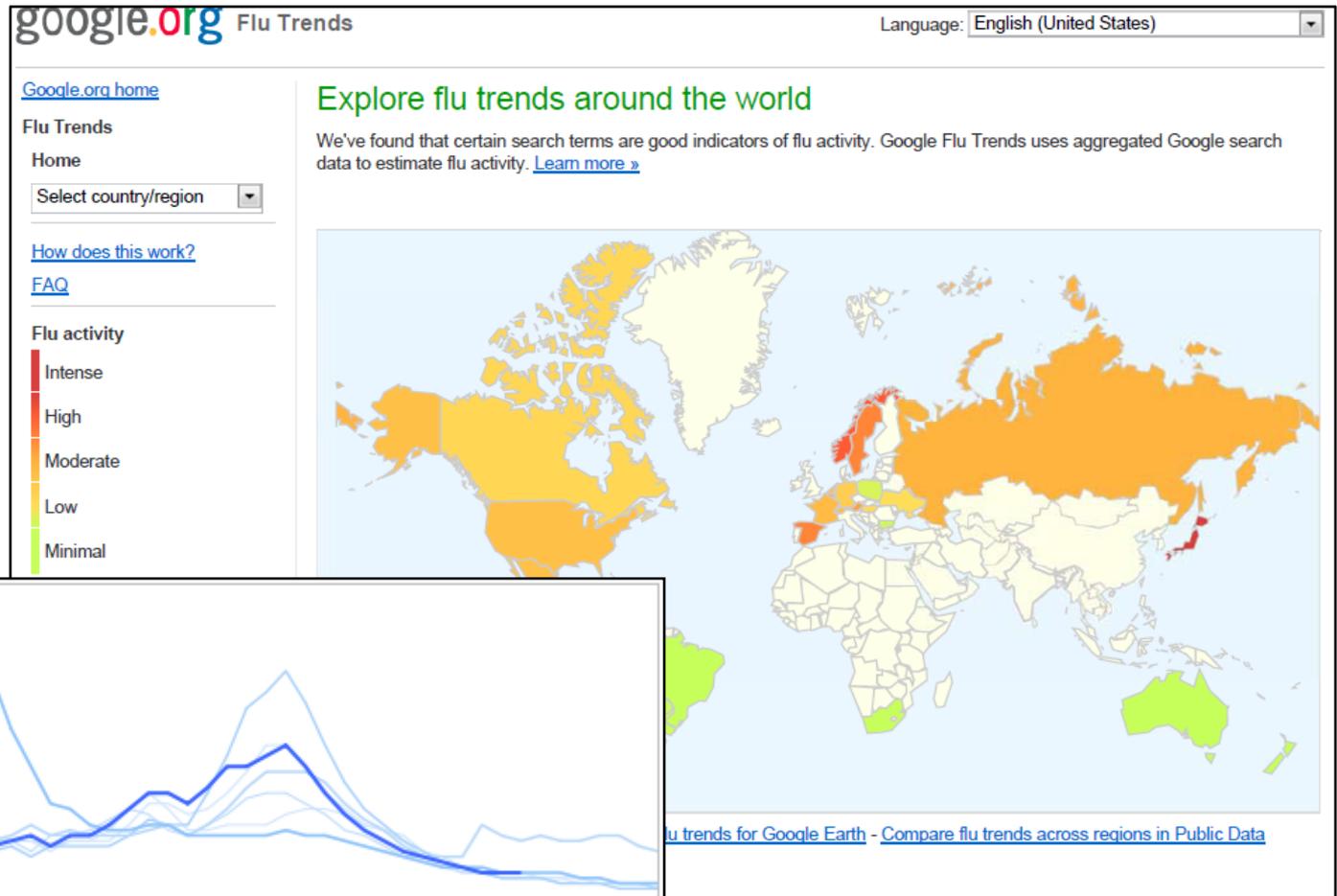


* Requires Early Awareness

Example Influenza:

- **Common**
 - **Seasonal outbreaks**
 - **Affects 5%-20% of the US population**
- **Annual variation**
 - **Time of year**
 - **Severity**
- **Diagnosis impacts clinical management**
 - **Antivirals**
 - **Antibiotics**
 - **Ancillary testing**
- **Prevalence impacts clinical care**
 - **Diagnostic testing**
 - **Patient management**
 - **Crowding / increased patient visits**

Surveillance with Google Flu Trends



Why the Emergency Department?

- **Influenza prevalence impacts clinical care:**
 - **Diagnostic Testing Decisions**
 - **Clinical Diagnosis**
 - **Antiviral Treatment**
 - **Antibiotic Treatment**
 - **Ancillary Testing**

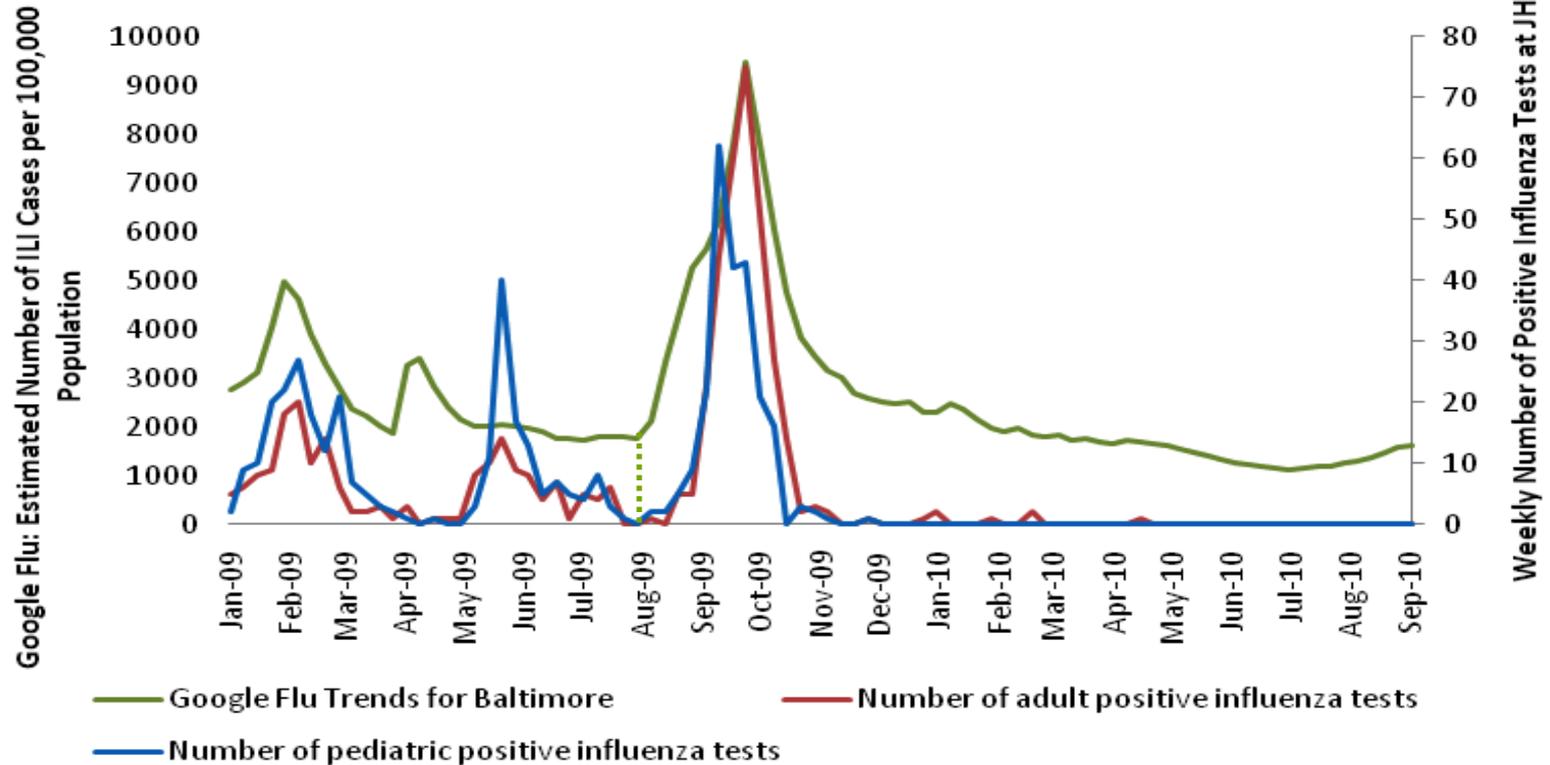


Why the Emergency Department?

- **As the healthcare “Safety Net,” ED demand rises during influenza outbreaks**
 - **Even during small influenza peak, ED volumes increased by 7% ***
- **Crowding:**
 - **ED’s currently stretched and near capacity with limited capacity to accommodate major surges in patient volumes**
 - **Unpredicted surges have a negative impact on emergency care**
 - **Crowding and treatment delays**
 - **Poor quality of care**
 - **Increased risk of errors**
 - **Detection/Prediction with a rapid response could offset influenza related surge**

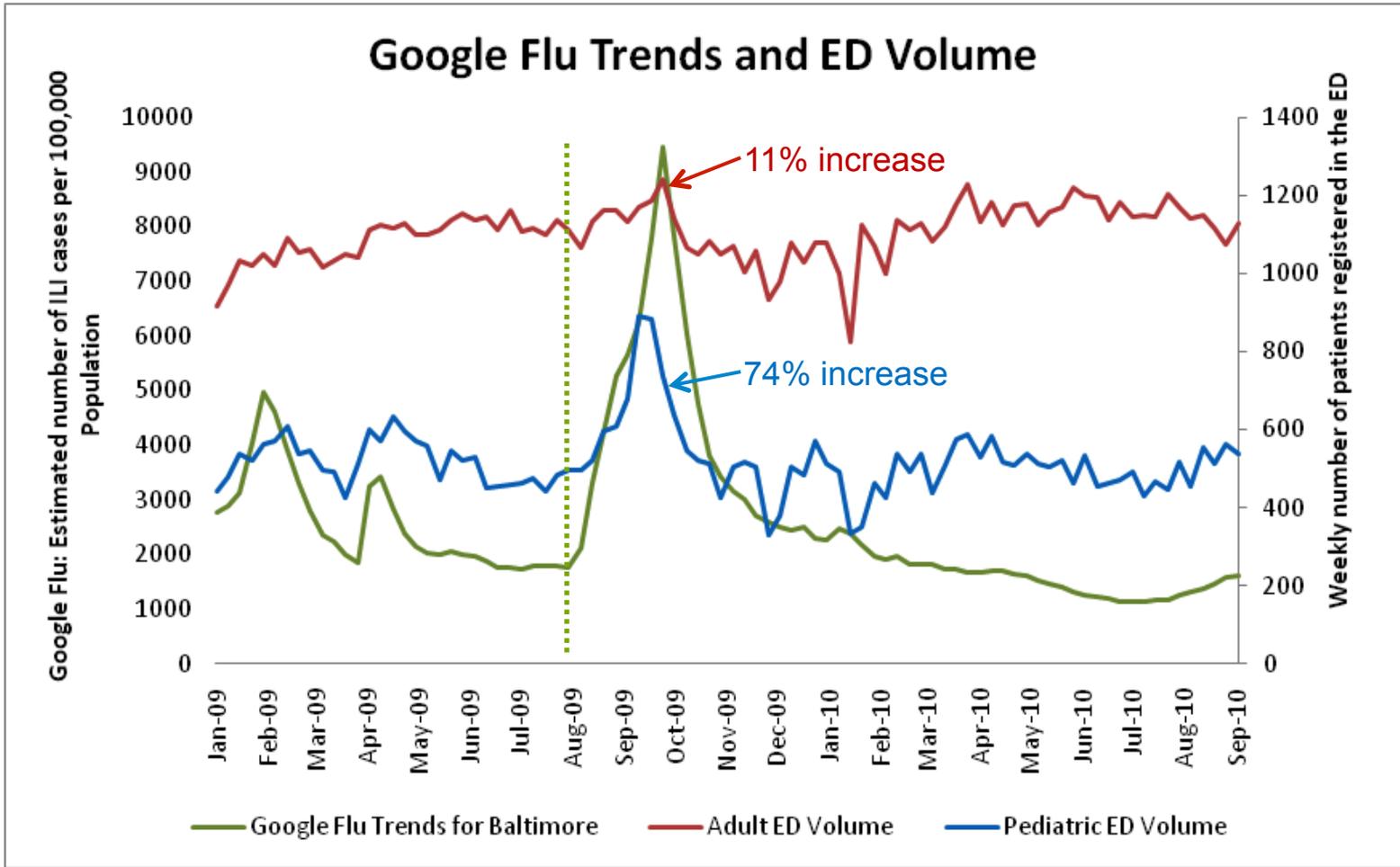
* McDonnell WM, Nelson DS, Schunk JE. Should we fear "flu fear" itself? Effects of H1N1 influenza fear on ED use. Am J Emerg Med. 2011.

Google Flu Trends and Number of Postive Influenza Tests



Correlation coefficients between **Google Flu Trends** and JHH patients with influenza

Adult		Pediatrics	
No Lag	1 wk lag	No Lag	1 wk lag
0.876	0.823	0.718	0.741



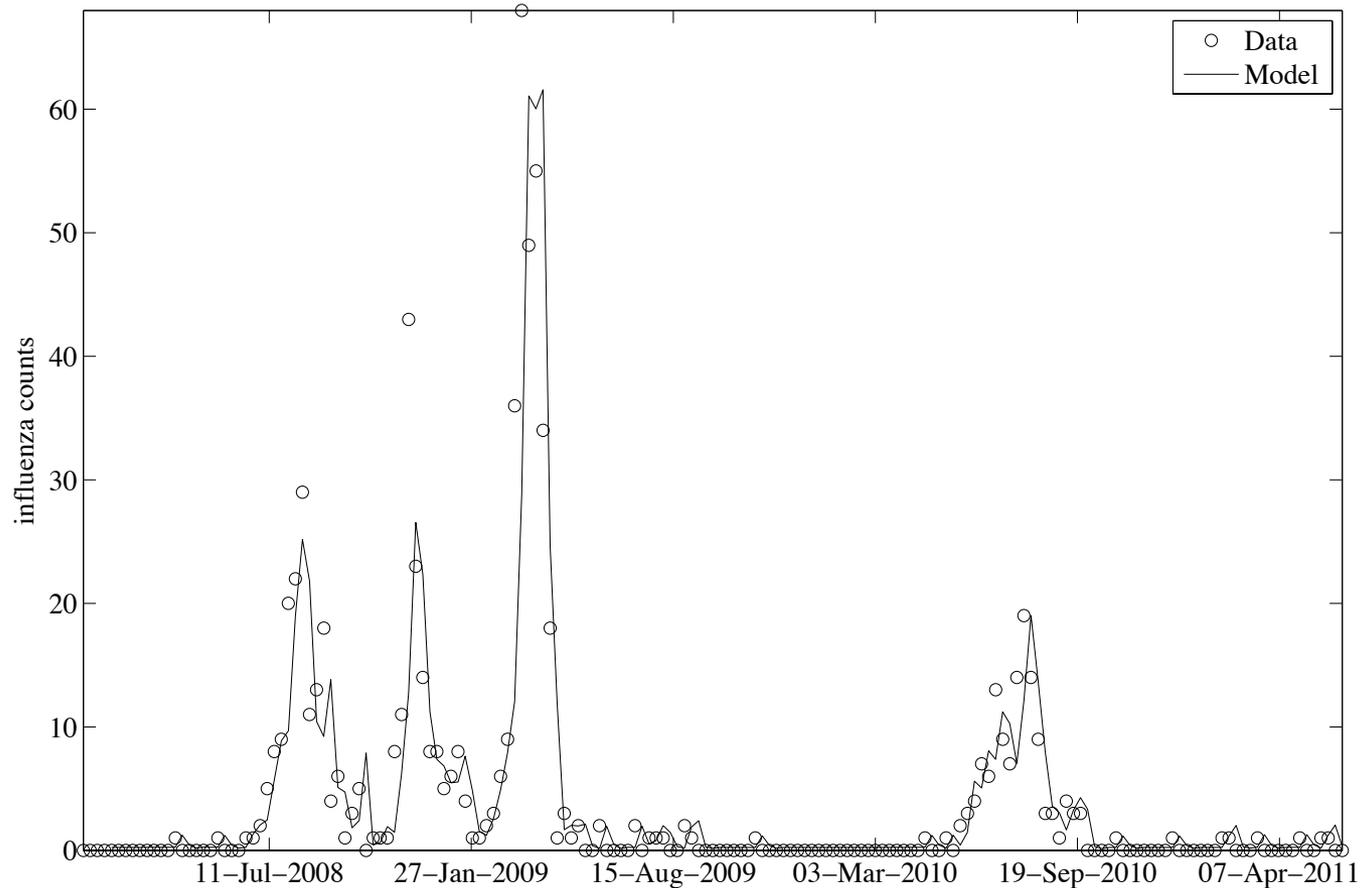
Correlation coefficients between **Google Flu Trends** and ED Volume

Adult		Pediatrics	
No Lag	1 wk lag	No Lag	1 wk lag
<0.40	<0.40	0.649	0.707

Forecasting

- **Improved management of Influenza-related ED crowding with advance warning.**
- **Develop and validate a forecast model which would be practically useful and have broad applicability for providing advanced warning of an influenza outbreak at the medical center level**
 - **Flexible**
 - **Geographically targeted**
 - **Data sources available in real time**

Final Forecast Model: GARMA (3,0) with Google Flu Trends



Next Steps

- **Externally Validate:** Test predictive model in other geographic locations
- **Disseminate:** Create a practical tool to enable easy use of forecast model at other medical centers
- **Incorporate:** Link forecast model with a rapid response to incorporate into real world practice

Conclusions

- **Direct to provider surveillance can improve patient care as well as public health and surveillance initiatives**
- **Direct to provider surveillance requires surveillance tools specifically designed for clinical use**
- **City-level GFT has a strong correlation individual medical center data**
- **We developed a practical, geographically focused forecast model based on real-time easily accessible data**

PACER Google Flu Team:

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