

Seton Family of Hospital Influenza Surveillance Strategies

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Presentation Overview

- Review Surveillance Methods used to Track Impact of H1N1 within SFH
- Review H1N1 Planning Process
- Implications for leadership and decision-making

Standard Hospital Reporting

- Notification of all hospitalizations for H1N1, ICU admissions, deaths of lab confirmed H1N1: they want this info by age group: <6 mos; 6-11 yrs, 1-4 yrs; 5-9yrs;10-18 yrs; 19-24 yrs; 25-49 yrs;50-64 yrs; and 65+ yrs
- Bed report: type, monitored, non-monitored, negative pressure/airborne isolation beds by the following units: Med/surg, ICU, PICU, NICU, Burn
- Number of licensed beds by facility/staffing ratios for each of the nursing units for occupied and vacant

Standard Hospital Reporting cont.

Ventilators by type/model/per site, whether they are adult/ped/neo, any transport ventilators, number of vents in use, number of vents in stand-by

Any staffing shortages that will effect ability to provide services in the next 72 hours

Any difficulty in obtaining or replenishing supplies

Standard Hospital Reporting (cont. 2)

Have we activated our disaster protocol or incident command center

Have we implemented surge strategies (early discharges, cancelling elective surgeries, augment personnel - extra staff, shifts, volunteers)

Has surge caused our facility to expand beyond our existing spaces (set up triage tents), activate mobile units or requested mutual aid

Pharmaceutical and PPE supplies

Aims of Novel Surveillance Strategies

- Achieve real time (~24 hours) data regarding:
 - Impact of ILI on ED visits
 - Total ED volume impact
 - Inpatient ILI impact
- Develop Context (range) Impact Model
- Develop Forecast Models for ED Volumes
- Identify Predictors or Correlates of Demand

Missing Links

- No centralized system for fast (<24 hour) surveillance monitoring
- Key information held in multiple un-integrated systems

Issues with Obtaining Real-Time Data

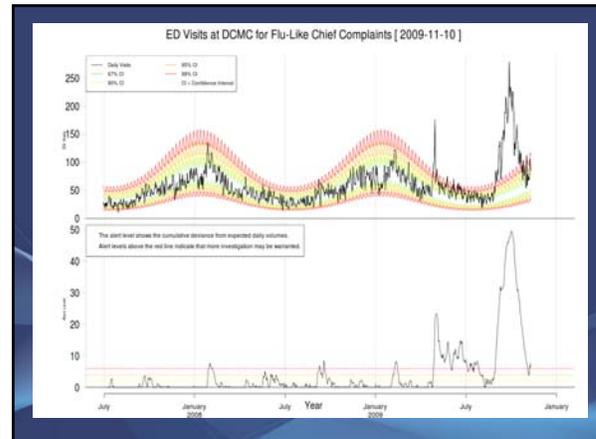
- Data Integration
 - Multiple data sources (EMR, admin databases, lab, pharmacy, etc.)
 - Automation vs. Manual Data Pulls
- Different Individuals Control Different Data Sources

Achieved: Automated data integration with single source access.

Understanding History

- All data must be considered within the context of what is expected.
- “Are these volumes we are experiencing typical or atypical? If atypical, how atypical?”
- Need to account for growth trends, seasonality, non-seasonal patterns.

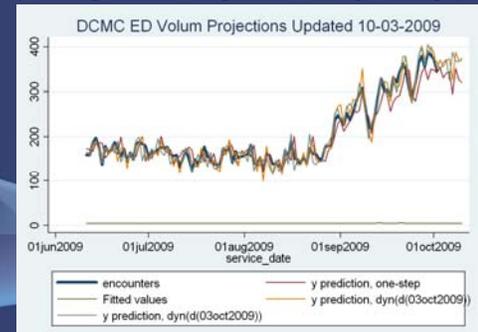
Achieved: Multivariate predictive model designed to determine PREDICTION INTERVALS over which we could plot actual data.



Forecast Modeling

- “Now that we understand what is happening now, is there a way we can predict the future?”
- Is the forecast error acceptable for planning purposes?
- **Achieved:** Compared multiple forecasting methods (ARIMA, linear regression, etc.) to assess near-term forecasts to deliver to site administration.

Ex: ARIMA Model (Autoregressive Integrated Moving Average)



Predictors of Volumes

- Identifying significant predictors, to some extent, depends on what one means by "significant".
- Ex: Weather, day of week, peak temperature, etc. can all be statistically significant predictors in various settings, but have a small actual impact.

Achieved: Examined impact of multiple data elements available on a daily basis in multivariate modeling.

Triggers for Increasing Capacity (ED Tents)

Demand Side Indicators

- Total ED Volume Trends and Projections
- ILI trends and projections
- ED Wait Times
- Percent of registered patients who "Left without being seen"

Left without Being Seen

- Typical = <3%
- Day before tent opened = 13%
- Day after tents opened = <3%

Planning and Operations

- Flu Working Group
 - Risk Management
 - Analytics and Epidemiology
 - Supply
 - Infection Control and Prevention
 - Occupational Health
 - Communications
 - Pharmacy
 - Physician Leaders
 - Nursing Leaders
 - Information Systems
- Weekly (prn daily) meetings to review data, assess risks, develop recommendations.

Scaled Assessment and Response

- Developed triage risk coding that defines
 - Level of risk
 - Actions to be taken (by department)
 - Frequency of actions
 - Levels of leadership engagement

Key Solutions

- Developed functional integrated working group to monitor all aspects of outbreak and impact.
- Integrated disparate data sources
- Developed functional near real-time surveillance system
- Surveillance done in the context of what was "expected" using historical data
- Developed forecasting models
- Regular communications with "on-the-ground" operations leadership

Response from Leadership

- Felt better informed
- Decision-making process smoother “a picture is worth a thousand words”
- Rapid and timely resource expansion and withdrawal, e.g. tents
- Early identification of “at risk” groups

THE END

