



Tarrant County Public Health Influenza Surveillance Program & Syndromic Surveillance

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Presentation Objectives

After this presentation you should be able to:

- Identify possible data sources for syndromic surveillance
- Summarize the benefits of syndromic surveillance over traditional passive surveillance



Presentation Overview

- Tarrant County Influenza Surveillance Program
- Syndromic Surveillance
- ESSENCE
- Incorporation of data
- Special considerations



Tarrant County

Influenza Surveillance Program

- Passive surveillance
 - Organizations report influenza-like illnesses, absenteeism, and rapid influenza test results
- Active surveillance
 - Healthcare facilities collect specimens for influenza typing and respiratory virus detection

2012-2013 Participation:

Health Care Facilities

Hospital <small>(15 participate in ESSENCE, 2 are ESSENCE only)</small>	18
Physician/Clinic	25
Long-term Care Facility	3

Community Partners

College/University	4
Business	2
Independent School Districts	14
Public Charter School	1



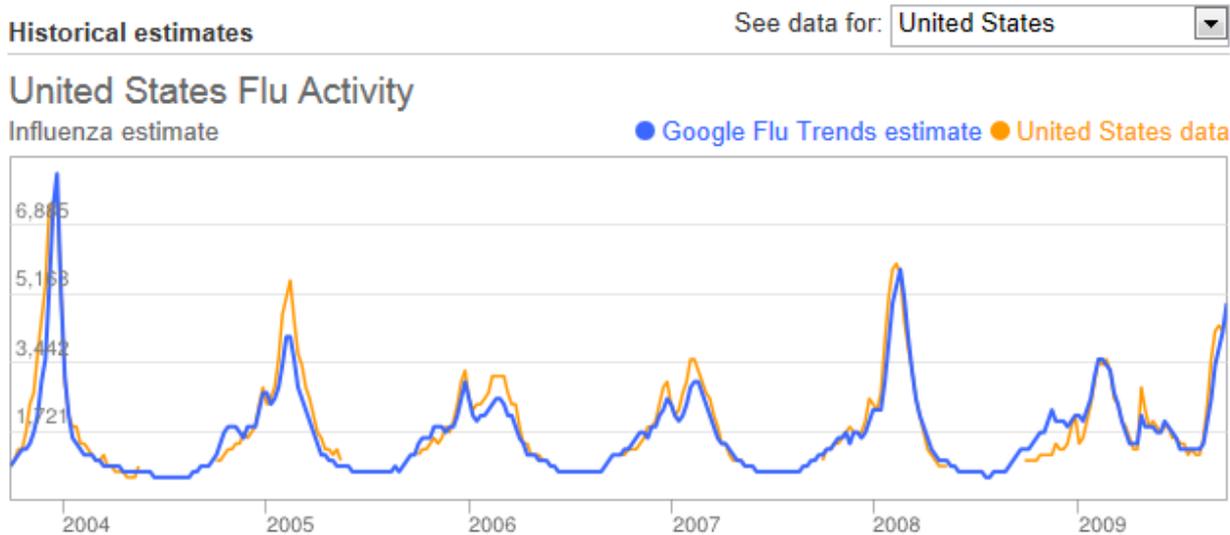
Syndromic Surveillance – section IVi of handbook

- ❑ Rapid, automated surveillance systems based on syndromes
 - **Syndrome** of Influenza-like Illness = **Symptoms** of *fever* with *cough* or *sore throat*
- ❑ Non-traditional data sources
 - ER chief complaints & ICD9 codes
 - Pharmaceutical/Medication sales
 - Online search queries

Syndromic Surveillance

□ Google Flu Trends

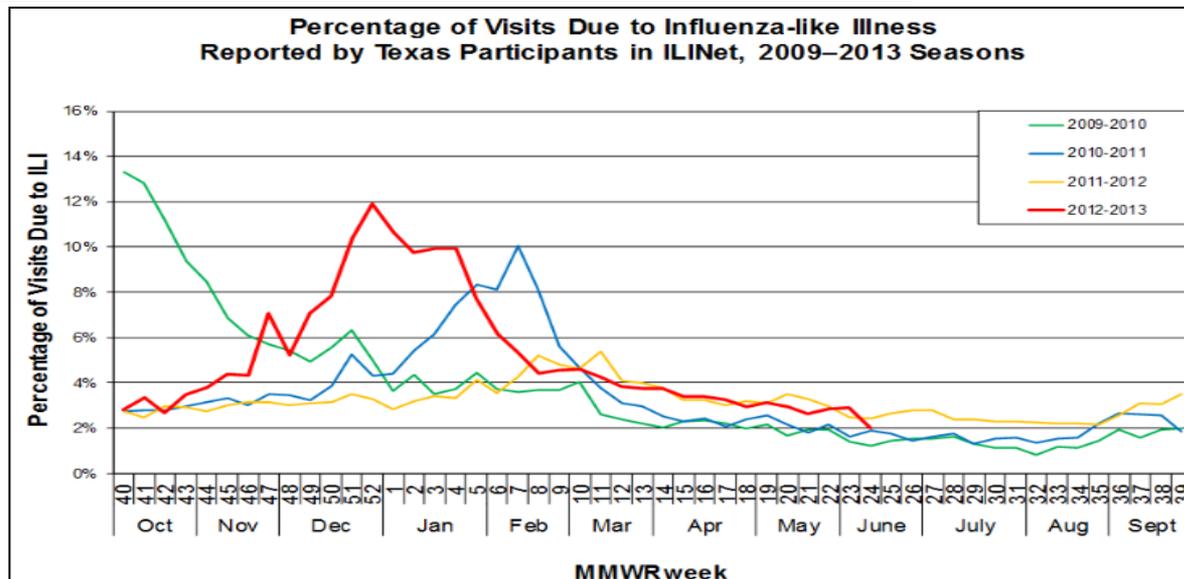
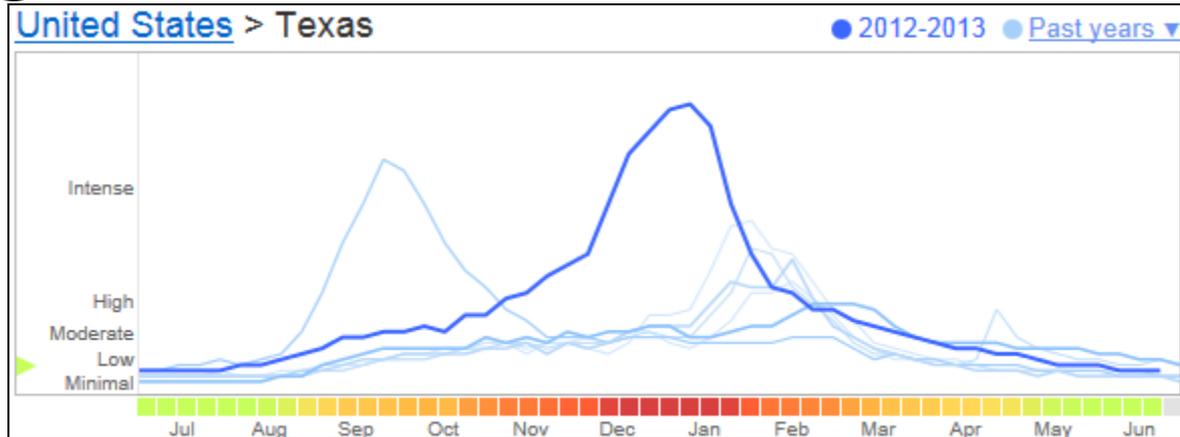
- Tracks keywords concerning flu within Google searches



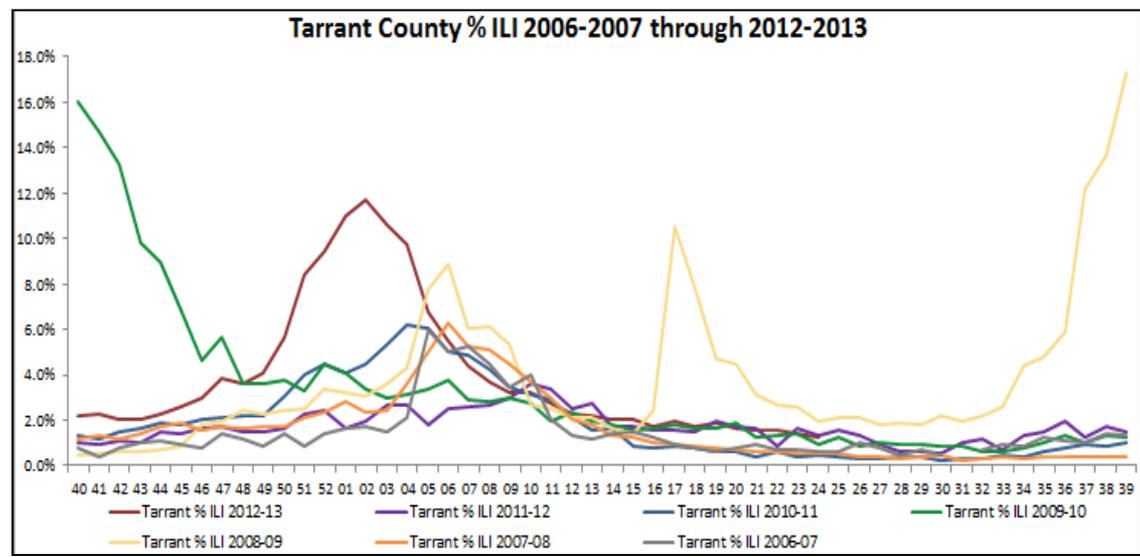
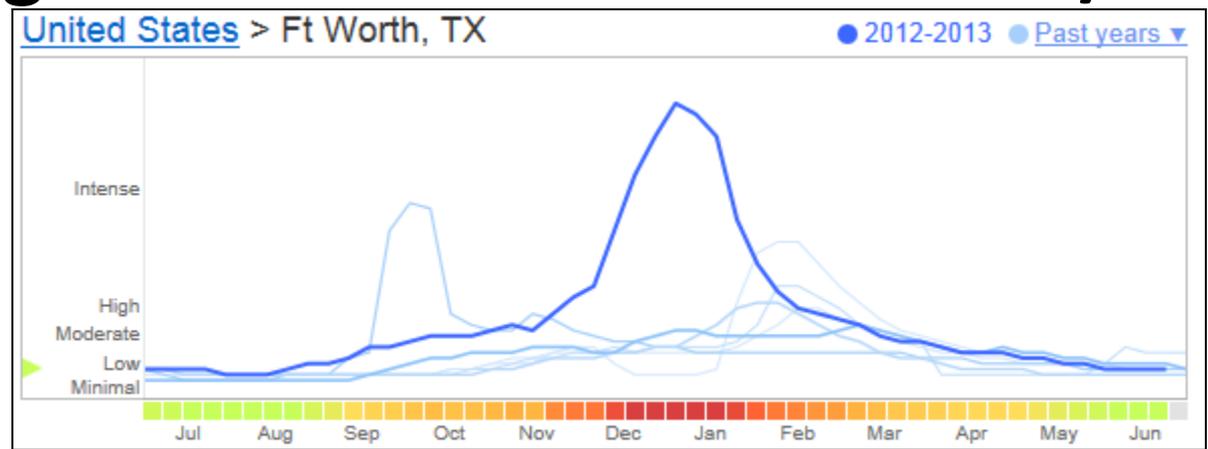
United States: Influenza-like illness (ILI) data provided publicly by the [U.S. Centers for Disease Control](http://www.cdc.gov).

Graph taken from <http://www.google.org/flutrends/about/how.html>

Google Flu Trends vs. ILINet %ILI Texas



Google Flu Trends vs. %ILI Tarrant / Fort Worth



Graph taken from <http://www.google.org/flu Trends/us/#1026411> and Tarrant County Influenza Surveillance



ESSENCE

- Electronic Surveillance System for the Early Notification of Community-based Epidemics
- Developed by Johns Hopkins University Applied Physics Laboratory
- Uses ICD9 codes and ER Chief Complaints
- Automatic feed from hospitals – 46
- Secure website

ESSENCE

- ❑ **Syndromes – ICD9 or Chief Complaint based**
 - Botulism-like, Fever, Gastrointestinal, Hemorrhagic Illness, Neurological, Other, Rash, Respiratory, Shock/Coma
- ❑ **Subsyndromes – Chief Complaint based**
 - Altered mental status, Hypotension, Sore Throat, ILI...

ESSENCE Syndrome example

HOME
Help

History of ESSENCE | Syndrome Definitions | Detector Algorithms | Data Dictionary

Alert List | myAlerts | Event List | Overview Portal | Query Portal | Matrix Portal | Weekly Percent | Map Portal | Remote Data | Bookmarks | Query Manager | User Admin

Bookmark Name Bookmark Page Add URL to Comment: No Comments Available

ESSENCE - North Central Texas Syndrome Definitions

[Chief Complaint Based](#) | [Chief Complaint Explanation](#) | [ICD9 Based](#)

Chief Complaints Based Syndrome Definitions Explanation

Select Age:
Younger than 1

Enter the text of the Chief Complaint for an explanation of our syndrome classification:

Expand/Hide All
 Summary
 Changes

No changes were made.

 Syndrome Matches

Matched	Partially Matched
NonTopLevelMatches	FeverTL
Resp	Hemr_ill
	Neuro

Matched	Partially Matched
FeverOrChills	FeverOnly
ILI	Hemoptysis
Cough	
Fever	

Syndromes

- NonTopLevelMatches
- Resp

Legend	
Matched	
Incomplete Match	
No Match	

NonTopLevelMatches

ILI or AsthmaGroup or GeneralExclusions

ILI

Influenza or (Fever and (Cough or SoreThroat))

Fever

**6 needed;
10 obtained**

FEVER	10
HAY FEVER	-10
BLISTER	-10
FEBRILE	10
TEMPERATURE	6
WARM	4
HOT	4
HIGH	2
FEELS	2
FEELING	2
FEEL	2
ELEVATED	2
BODY	2

Cough

ESSENCE Syndrome example

Chief complaint of "cough fever"

NonTopLevelMatches

ILI or AsthmaGroup or GeneralExclusions

ILI

Influenza or (Fever and (Cough or SoreThroat))

Fever

6 needed; 10 obtained	
FEVER	10
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TEMPERATURE	6
WARM	4
HOT	4
HIGH	2
FEELS	2
FEELING	2
FEEL	2
ELEVATED	2
BODY	2

Cough

Chief complaint of "cough feels hot"

NonTopLevelMatches

ILI or AsthmaGroup or GeneralExclusions

ILI

Influenza or (Fever and (Cough or SoreThroat))

Fever

6 needed; 6 obtained	
HOT	4
FEELS	2
HAY FEVER	-10
BLISTER	-10
FEVER	10
FEBRILE	10
TEMPERATURE	6
WARM	4
HIGH	2
FEELING	2
FEEL	2
ELEVATED	2
BODY	2

Cough

% ILI from ESSENCE

- ❑ Queries Bookmarked
 - Edit hospital, dates, and subsyndrome
- ❑ Total number of patients seen
 - subsyndrome = all
- ❑ Number of ILI patients by age groups

Reporting for Week:	_____ through _____
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Tarrant County Public Health
Division of Epidemiology and Health Information
INFLUENZA SURVEILLANCE WEEKLY REPORT FORM

I. HOSPITALS / CLINICS / SENTINEL PHYSICIANS

Name of Organization	
----------------------	--

Total Patients Seen	
---------------------	--

Number of Patients with ILI* (by age group)	< 1	1-4	5-14	15-24	25-44	45-64	≥65

* Influenza-like illness (ILI). ILI is defined as fever ≥ 100°F PLUS a cough or sore throat, in the absence of another known cause other than influenza.

Number of Flu Tests Performed		
Number of Positive Flu Results	Type A	
	Type B	

ESSENCE % ILI Data

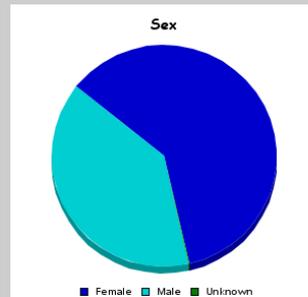
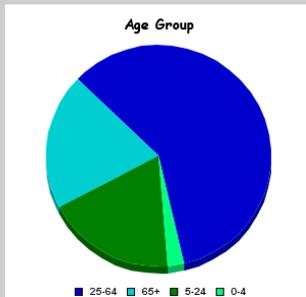
ESSENCE - North Central Texas Data Details

Description

Data Source	Emergency Room Data by Hospital Location
Geography System	Hospital
Hospital	[REDACTED]
Medical Grouping System	ChiefComplaintSubSyndromes
ChiefComplaintSubSyndromes	All
Detector	Regression/EWMA 1.2
Age Group	All
Sex	All
Disposition Category	All
Discharge Diagnosis	All
Start Date	16Jun2013
End Date	22Jun2013

Configuration Options

Pie Graphs



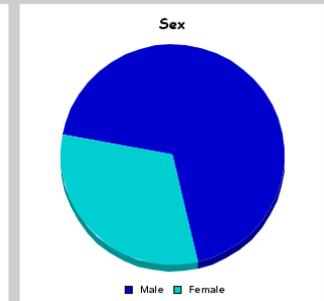
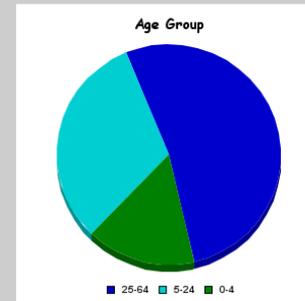
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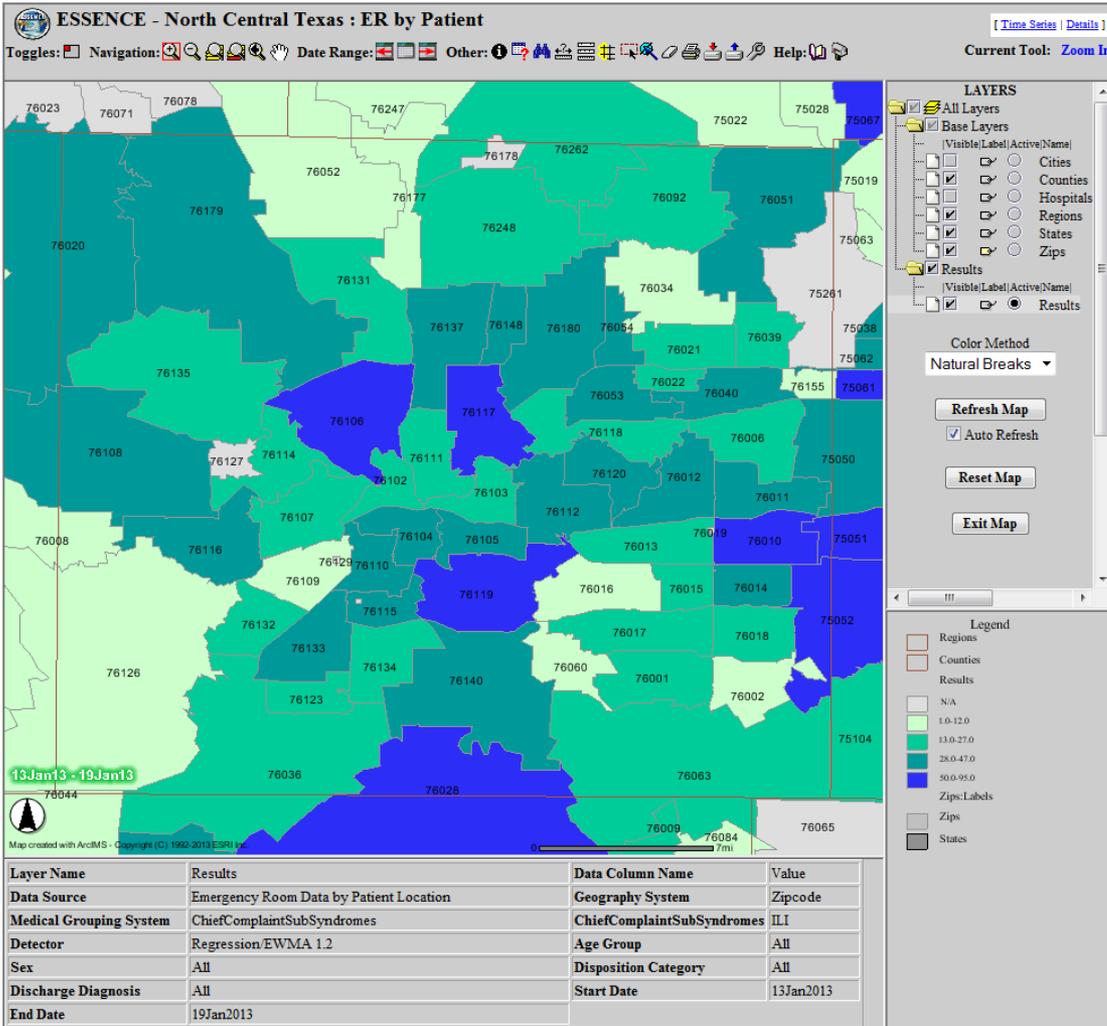
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Hospital	[REDACTED]
Medical Grouping System	ChiefComplaintSubSyndromes
ChiefComplaintSubSyndromes	ILI
Detector	Regression/EWMA 1.2
Age Group	All
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Disposition Category	All
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Start Date	16Jun2013
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Configuration Options

Pie Graphs



ESSENCE ILI Map



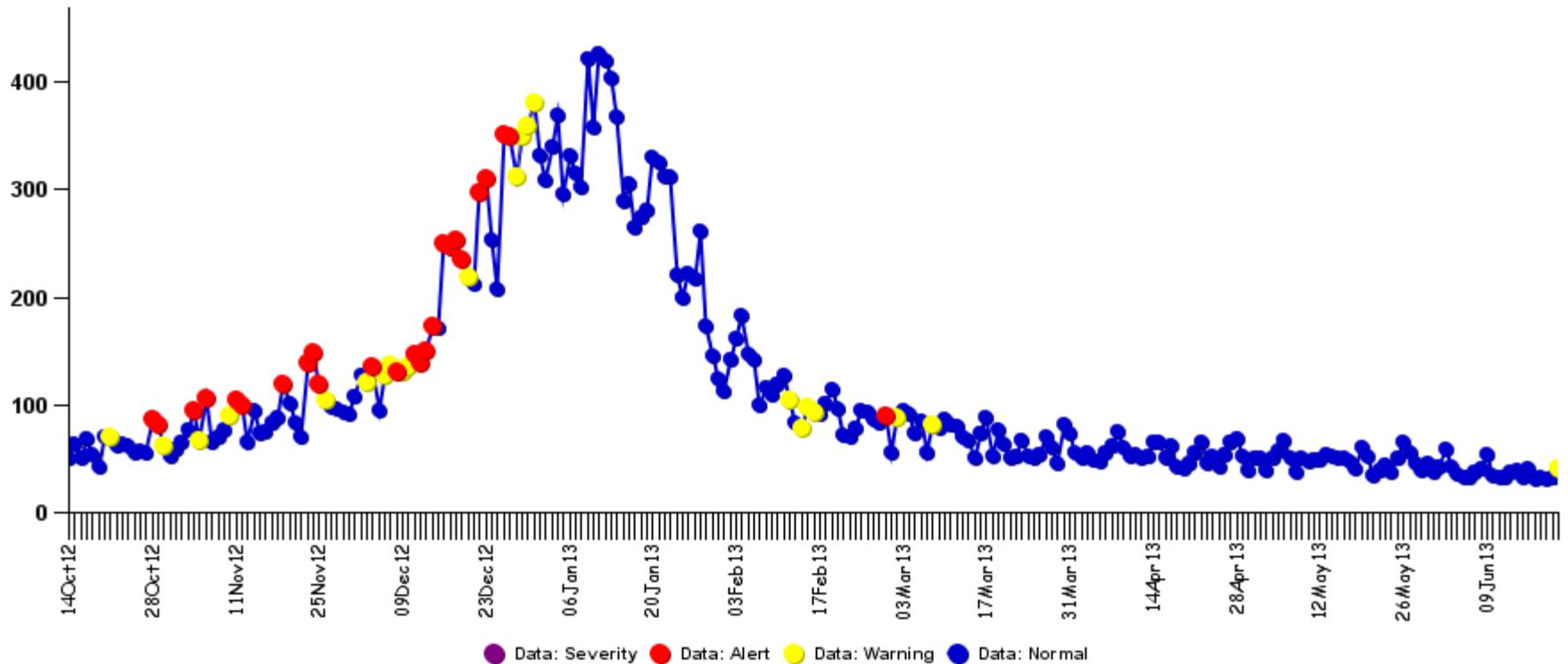
- Count data
- Shared zipcodes are labeled as just one county
- Must include neighboring counties

Benefits

- May provide earlier indication of outbreaks
 - Alerts notify of unexpected increases
- Includes more variables than traditional surveillance
 - Gender, age, zip code, list of complaints
- Steady availability of data

Alerts

Daily Data Counts



Special Considerations Recap

- Misclassification of chief complaints
- Connection errors and outages
- Map
 - Zipcode data not specific to county
 - Zipcode counts – not percentage of population or visits

Report Sample - www.tarrantcounty.com/flu



Tarrant County Public Health
Division of Epidemiology and Health Information

Tarrant County Influenza Surveillance Weekly Report
CDC Week 06 : February 03-09, 2013

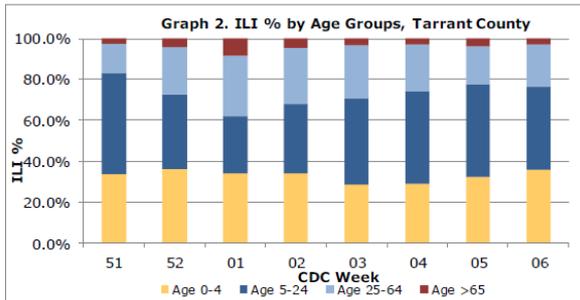
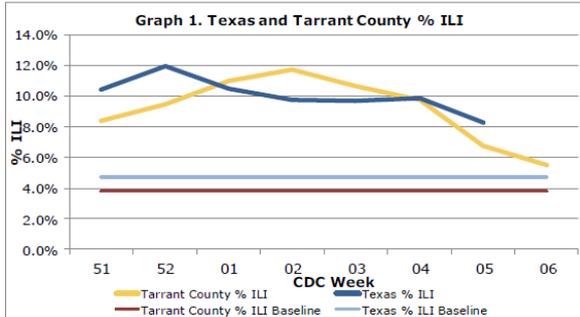
Influenza Activity Code, County and State Levels

Tarrant County: Week 06	Tarrant County: Week 05	Texas: Week 05
Widespread	Widespread	Regional

Respiratory Virus Activity Summary

- The percentage of reported influenza-like illness (ILI) in Tarrant County **decreased** from 6.8% in week 05 to 5.5% in week 06 and is currently above the 2012-2013 Tarrant County baseline (3.8%).
- The percentage of all cause absenteeism was 4.8% during week 06 in Tarrant County. Absenteeism due to ILI and school nurse office visits due to ILI were 4.2% and 3.9% respectively during week 06 in Tarrant County.
- The percentage of rapid flu test positives in Tarrant County **decreased** from 25.2% in week 05 to 19.7% in week 06.
- During the 2012-2013 influenza season, **1** Tarrant County influenza-associated pediatric death has been reported. As of week 05, 12 influenza-associated pediatric deaths have been reported in Texas, with a total of 59 reported nationwide.
- During the 2012-2013 influenza season, **no** influenza outbreaks have been reported in Tarrant County schools.
- During the 2012-2013 influenza season, **2** localized influenza outbreaks have been reported within institutions in Tarrant County.
- Since last report, **7** surveillance specimens were tested by The North Texas Regional Laboratory. The following types and number of viruses were detected in these specimens: **Influenza A H3 (2), Influenza B (3)**.
- Cumulatively this season, the North Texas Regional Laboratory at Tarrant County Public Health has tested **156** surveillance specimens.
- At the state level during week 05, the proportion of outpatient visits for ILI (8.3%) was **above** the Texas baseline (4.8%).
- At the national level during week 05, 23.3% of specimens tested and reported to the CDC were positive for influenza. The proportion of outpatient visits for ILI (3.6%) was **above** the national baseline (2.2%), and the proportion of deaths attributed to pneumonia and influenza (9.0%) was **above** the epidemic threshold (7.4%).

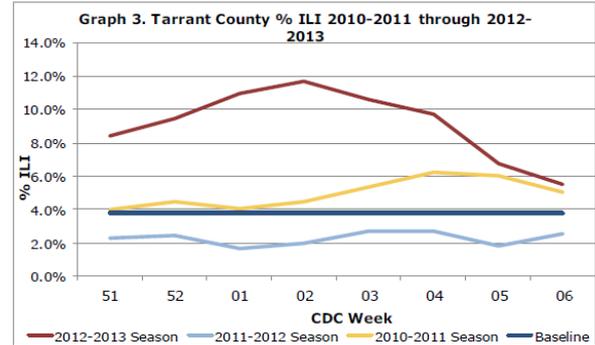
Eight-Week Influenza Like Illness (ILI): Local and State Levels



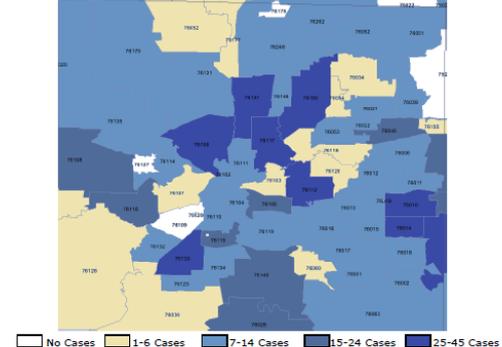
In week 06, 5.5% of visits to health care providers were due to ILI. ILI levels are currently above the county established baseline of 3.8% and lower than state of Texas levels. In Tarrant County, of 1369 patients presenting with ILI the majority (40.8%) were in the 5-24 years of age group; 65 years and older accounted for the lowest percentage of health care visits due to ILI (2.6%).

NOTE: Tarrant County ILI activity is assessed using information provided by surveillance participants and the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE). Texas ILI activity is assessed using information provided by a network of physicians. For week 06, 43 surveillance participants reported ILI information to Tarrant County Public Health. For week 05, 37 physicians reported information to the Texas Department of State Health Services.

Tarrant County Historical ILI and ESSENCE Geographical Distribution Map



Map 1. Tarrant County ER ILI Cases by Zip Code, Week 06

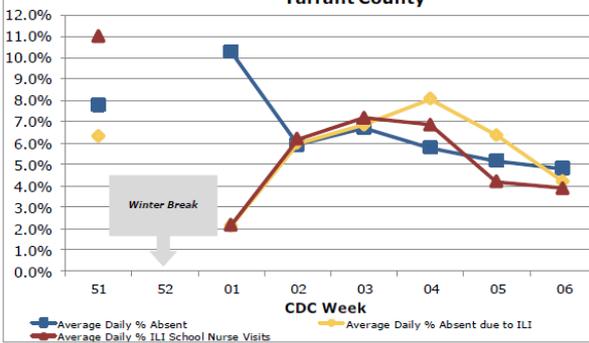


NOTE: Tarrant County ILI distribution map is from ESSENCE and includes data from 46 hospitals that voluntarily provide data based on chief complaints of Tarrant County residents admitted to Emergency Departments in North Central Texas. This map represents the number of cases from each zip code, not the percent. Zip codes with larger populations are expected to have more cases.

Report Sample - www.tarrantcounty.com/flu

Rapid Influenza Test Results and School Absenteeism

Graph 4. 2011-2012 Absenteeism and ILI, Tarrant County



NOTE: Tarrant County absenteeism and student ILI is collected from 17 school districts with schools located within Tarrant County. For week 06, 13 school districts provided general absenteeism data, 11 school districts provided data regarding absenteeism due to ILI, and 10 school districts provided data regarding nurses' office visits due to ILI.

Table 1. Influenza Rapid Test Results, Tarrant County

CDC Week Number	04 (Jan 20-26)	05 (Jan 27-Feb 2)	06 (Feb 3-9)
# Influenza Tests Performed	2254	2854	2192
% Influenza Positive	26.0%	25.2%	19.7%
# Influenza A Positive	410	421	235
% Influenza A Positive	69.8%	58.6%	54.5%
# Influenza B Positive	177	298	196
% Influenza B Positive	30.2%	41.4%	45.5%
# Non-differentiated Positive	0	0	0
% Non-differentiated Positive	0.0%	0.0%	0.0%

NOTE: Tarrant County rapid influenza test results are reported weekly by influenza surveillance participants. For CDC week 06, rapid influenza test results were reported by 15 hospitals, 10 healthcare clinics, 2 universities, 2 long term care facility, and 1 business.

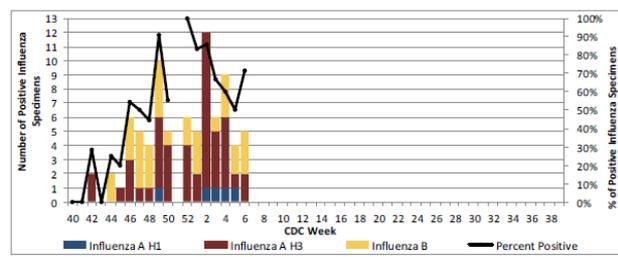
Influenza Confirmatory Test Results: Tarrant County

Table 2. North Texas Regional Laboratory: Respiratory Virus Results¹

	Current Week	2012-2013 Season
Number of Specimens Tested	7	156
Positive Specimens	5 (71.4%)	107 (68.6%)
Influenza A	2 (40.0%)	51 (47.7%)
Influenza A H1	0 (0.0%)	5 (9.8%)
Influenza A H3	2 (100.0%)	46 (90.2%)
Influenza A, Inconclusive subtype	0 (0.0%)	0 (0.0%)
Influenza A, Unsubtypeable ²	0 (0.0%)	0 (0.0%)
Influenza B	3 (60.0%)	31 (29.0%)
Respiratory Syncytial Virus	0 (0.0%)	6 (5.6%)
Adenovirus	0 (0.0%)	3 (2.8%)
Human Metapneumovirus	0 (0.0%)	0 (0.0%)
Parainfluenza-1	0 (0.0%)	0 (0.0%)
Parainfluenza-2	0 (0.0%)	3 (2.8%)
Parainfluenza-3	0 (0.0%)	1 (0.9%)
Rhinovirus	0 (0.0%)	16 (15.0%)
Inconclusive ³	0 (0.0%)	2 (1.3%)

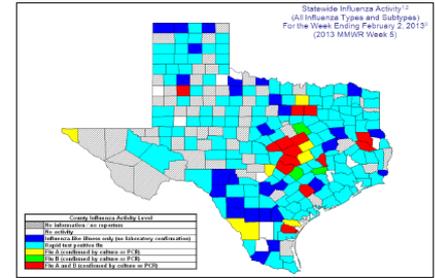
¹ Laboratory results based on real-time PCR analysis; information is for the 2012-2013 season.
² Influenza A subtype not determined; further analysis pending.
³ Inconclusive for influenza A and influenza B; not included in positive specimens count.
 NOTE: Percentages do not add up to 100% due to co-infections; if specimens have tested positive with co-infections: 1 specimen tested positive for both rhinovirus and adenovirus, 1 specimen tested positive for both rhinovirus and parainfluenza type 3, 1 specimen tested positive for both influenza B and adenovirus, 1 specimen tested positive for both influenza B and Respiratory Syncytial Virus, 1 specimen was inconclusive for influenza A and B but positive for rhinovirus.

Graph 5. North Texas Regional Laboratory: Influenza Virus Results¹



Texas and National Influenza and ILI Activity

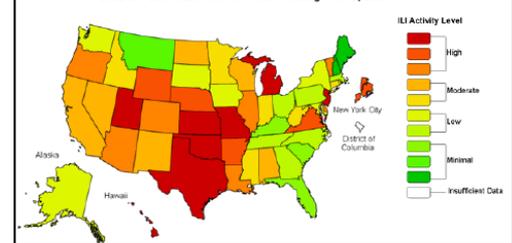
Map 2: Texas County Specific Influenza Activity, CDC Week 05



Influenza activity level corresponds to current MMWR week only and does not reflect previous weeks' activity. The majority of influenza cases are not reportable by law to the Texas Department of State Health Services. This map contains data from sentinel sites and does not represent all influenza cases in the state. Positive laboratory results are reported according to specimen collection date or date received in the lab if the former is unknown. <http://www.dshs.state.tx.us/idcu/disease/influenza/surveillance/2013/>

Map 3: ILINet Activity Level Indicator Map, CDC Week 05

Influenza-Like Illness (ILI) Activity Level Indicator Determined by Data Reported to ILINet 2012-13 Influenza Season Week 5 ending Feb 02, 2013



Data collected in ILINet are used to produce a measure of ILI activity by state. Activity levels are based on the percent of outpatient visits in a state due to ILI and are compared to the average percent of ILI visits that occur during spring and fall weeks with little or no influenza virus circulation. This map uses the proportion of outpatient visits to health care providers for influenza-like illness to measure the ILI activity level within a state. It does not, however, measure the extent of geographic spread of flu within a state. Therefore, outbreaks occurring in a single city could cause the state to display high activity levels. Data collected in ILINet may disproportionately represent certain populations within a state, and therefore, may not accurately depict the full picture of influenza activity for the whole state. <http://www.cdc.gov/flu/weekly/>



Thank you! Any questions?

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References

- "2012 - 2013 Texas Influenza Surveillance Information." *Texas Department of State Health Services*. Texas Department of State Health Services, n.d. Web. 10 June 2013.
- Brannan, Lesley, Carol Davis, Suparna Bandyopadhyay, Irene Brown, Grace Kubin, and Martha Thompson. *Texas Influenza Surveillance Handbook*. Austin: Texas Department of State Health Services, 15 May 2012. PDF.
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- "History of ESSENCE." *ESSENCE - North Central Texas*. N.p., n.d. Web. 10 June 2013