Miami-Dade County Health Department
Office of Epidemiology and Disease Control

VOLUME 7. ISSUE 9
SEPTEMBER 2006

Epi Monthly Report

Syndromic Surveillance in Miami-Dade County: Methods and Applications

Rodlescia S. Sneed, MPH; Guoyan Zhang, MD, MPH; Fermin Leguen, MD, MPH

Introduction

Syndromic surveillance is an investigational approach used by local, state, and federal public health entities to monitor trends of illness in communities. It relies on prediagnostic health data (e.g. emergency department chief complaints, over-the-counter medication sales) rather than laboratory-confirmed clinical diagnoses. Its primary purpose is to detect disease outbreaks, incidents and unusual public health events earlier than is possible with traditional public health surveillance methods.

Since August 2005, the Miami-Dade County Health Department (MDCHD) Office of Epidemiology and Disease Control (OEDC) has utilized a syndromic surveillance system that evaluates illness trends based on data from two sources: hospital emergency department visits and 911 calls to Miami-Dade Fire Rescue (MDFR). This report provides a description of the MDCHD syndromic surveillance system and its applications in the county's disease control initiatives.

Methods

911 Surveillance

The OEDC has direct access to the MDFR 911 database using a Virtual Private Network (VPN). Medical 911 calls to MDFR are placed into several syndrome categories by MDFR staff. On a daily basis, OEDC staff monitor the following categories: sickness (general), animal bites, trouble breathing, overdose, and abdominal pain. Various injury categories are also monitored. A historical baseline is established using data from the same day of the week over a 5-week period. When the daily number of calls in each category is more than 2 standard deviations above the historical baseline, an alert is generated. Data management is conducted using Oracle and Excel. By noon each day, an analyst evaluates all alerts and provides a summary report to key staff in the OEDC.

Emergency Department (ED) Surveillance

On a daily basis, 11 Miami-Dade County hospitals (Figure 1) automatically transmit electronic de-identified emergency department chief complaint data to the MDCHD. Data elements in the data file include patient age, sex, chief complaint, time of visit, race/ethnicity, discharge disposition (e.g. admitted, discharged, etc), zip code, and hospital name. Each chief complaint is then placed into one of 10 syndrome categories using ESSENCE, a data management/analysis system developed by Johns Hopkins University in conjunction with the Department of Homeland Security. The syndrome categories include respiratory, gastrointestinal, hemorrhagic, influenza-like, shock/coma, neurologic, fever, febrile, rash, botulism-like, and other. ESSENCE performs automatic data analysis, establishing a baseline with a 28-day exponential moving weighted average. Daily case data is then analyzed against this baseline to identify statistically sig-

Inside this issue:

Fermin Leguen MD, MPH

Chief Physician, Miami-Dade County Health Department

Director, Office of Epidemiology and Disease Control

8600 NW 17th Street
Suite 200
Miami, Florida 33126

Tel: (305) 470-5660
Fax: (305) 470-5533

E-mail:
fermin_leguen@doh.state.fl.us

nificant increases. A mild (yellow) alert is generated for alerts significant at the p<0.05 level and a high (red) alert is generated for those significant at the p<0.01 level. All information is available through a secure, password-protected internet site. Both MDCHD users and hospital users have access to the system. Hospital users can access individual-level data from their own hospital and aggregate data for Miami-Dade and other participating counties. County health department users have access to individual-level data from all Miami-Dade hospitals and aggregate data from other participating counties.

By noon each day, an analyst evaluates all alerts and provides a summary report to key staff in the OEDC. This report includes information on any epidemiologic clustering by age, zip code, hospital, race/ethnicity, or chief complaint. The analyst can also review the data spatially through the Geographic Information Systems (GIS) feature embedded in the ESSENCE software. If an alert is of epidemiologic significance, the analyst meets with the OEDC surveillance coordinator to determine if an investigation should be initiated. If necessary, the Infection Control Practitioners (ICPs) at hospitals involved in the alert are contacted for chart reviews. Five analysts are available to evaluate alerts generated in ESSENCE. On weekends, the analysts review ESSENCE data at home using the secure website. If an alert is of public health significance, the Senior Epidemiologist is contacted.

Applications

Influenza/Respiratory Disease Surveillance

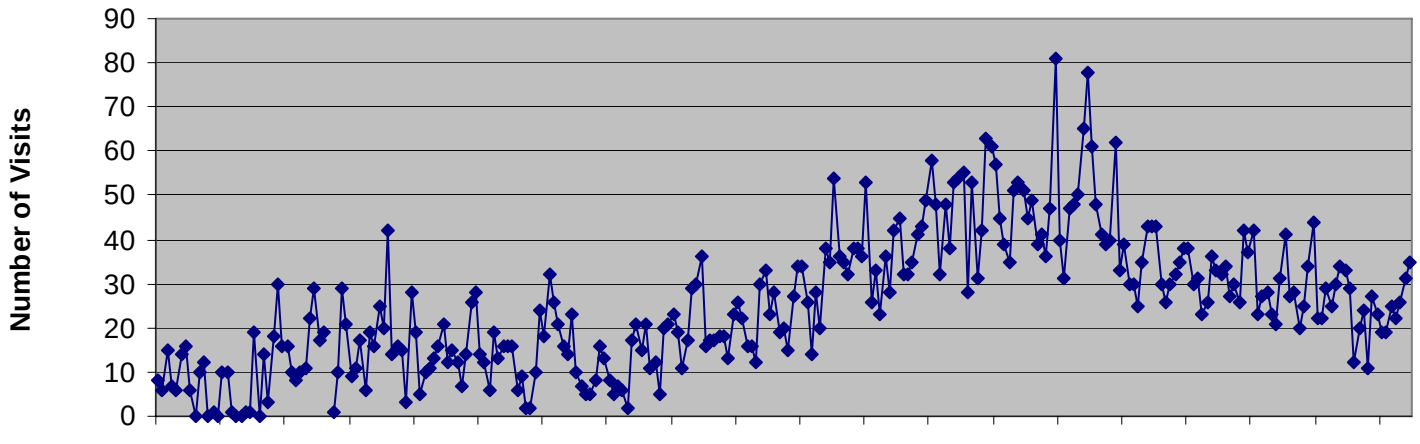
Syndromic surveillance data is one of the primary indicators used to evaluate influenza/respiratory disease activity in the county. ESSENCE includes an influenza-like illness category that consists of fever with either cough or sore throat. It can also include a complaint of "flu". During the influenza season, this data is used (in conjunction with other surveillance information) to report the weekly influenza activity to the State Bureau of Epidemiology. Additionally, this data is included in a weekly influenza surveillance report that is distributed to key MDCHD staff and posted to the MDCHD website. This report includes information on influenza activity by age group.

To monitor more severe respiratory illness, the ESSENCE respiratory illness category is used. Common chief complaints in this category include pneumonia, bronchiolitis, and difficulty breathing. Additionally the 'trouble breathing' category from the 911 call system is used to monitor respiratory illness.

Hurricane Surveillance

Communicable disease outbreaks of diarrhea and respiratory illness can occur after hurricanes when water and sewage systems are not working[1]. Additionally, the risk for injury during and after a hurricane is high[2]. Syndromic surveillance could be very useful for evaluating illness and injury trends associated with hurricane preparation, clean-up, and recovery efforts. After Hurricane Wilma, the OEDC was able to monitor gastrointestinal and respiratory illness using both the 911 and emergency department surveillance systems. To monitor injuries, all 911 injury-

Figure 1: Number of Influenza-Like Illness Visits to 6 Hospital Emergency Departments, Miami-Dade County, September 2005-April 2006



related calls were analyzed. Additionally, special queries in the emergency department surveillance system were used to monitor for hurricane-related injuries.

Figure 2: Number of Influenza-Like Illness Visits to 6 Hospital Emergency Departments by Age Group, Miami-Dade County, September 2005-April 2006

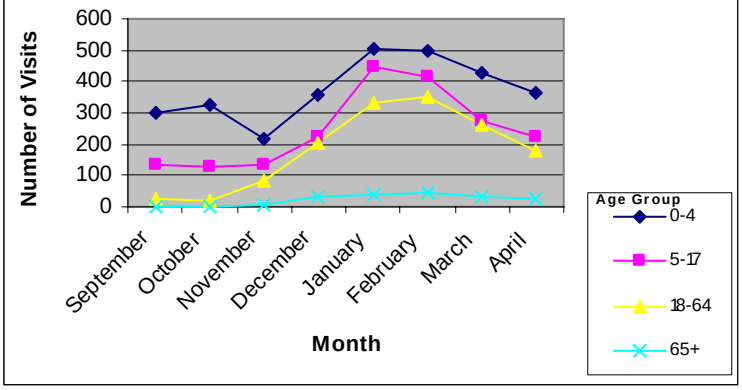
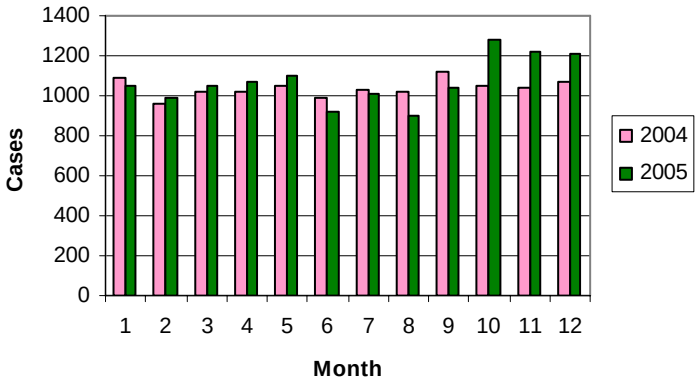


Figure3. Number of falls reported to Miami-Dade Fire Rescue, 2004-2005



Future Directions

Hospital Recruitment

The current Miami-Dade County emergency department surveillance system includes data from 11 of 22 acute care hospitals in Miami-Dade County. These hospitals provide about 73% of the county's annual ED services. The goal of this system is to capture at least 80% of all annual ED visits while including hospitals from the major geographic areas of the county. Five hospitals signed data usage agreements with the Miami-Dade County Health Department in May 2006 but have not yet started to transmit data. Two more hospitals are in the process of signing data usage agreements.

System Integration and Development

Integration and further development of our syndromic surveillance data sources is also an important goal. Currently, 911 and emergency department data are managed and analyzed separately. We plan to eventually integrate both data sources into the ESSENCE system. Further, we would like to explore the use of other forms of syndromic data, such as school absentee information, urgent care center visits, and laboratory data. All of these data sources could be potentially integrated into ESSENCE.

Evaluation Studies

We also plan to initiate a formal evaluation of the syndromic surveillance system using both federal recommendations[3] and the Syndromic Surveillance Standards for the State of Florida as guides. Components of the evaluation process will include the ability of the system to meet key performance indicators, sensitivity/specificity analyses for the syndrome categories, and user satisfaction with the system.

Special Event Surveillance

Historically, syndromic surveillance has been used to monitor illness after several large-scale events, including Democratic and Republican National Conventions, Super Bowls and Olympic Games. The MDCHD system will be an important component of bioterrorism surveillance before, during, and after Super Bowl XLI (to be held in Miami in February 2007). Additionally, it will be used to monitor conventions and other major events in the region.

Injury Surveillance

Current emergency department surveillance methods rely on special data queries to monitor injuries in the county. In the upcoming year, we plan to create formal syndrome categories within ESSENCE for this purpose. These categories can then be monitored via both routine surveillance and special event surveillance (e.g. hurricanes).

References

(1) CDC. After a Hurricane: Key Facts About Infectious Disease. Retrieved September 25, 2006 from http://www.bt.cdc.gov/disasters/hurricanes/keyfactsinfectiousdisease.asp

(2) CDC. Emergency Wound Care After a Natural Disaster. Retrieved September 25, 2006 from http://www.bt.cdc.gov/disasters/woundcare.asp

(3) CDC. Framework for Evaluating Public Health Surveillance Systems for Early Detection of Outbreaks: recommendations from the guidelines working group. MMWR May 7, 2004 / 53 (RR05); 1-11

Figure 4. Miami-Dade hospitals participating in ESSENCE

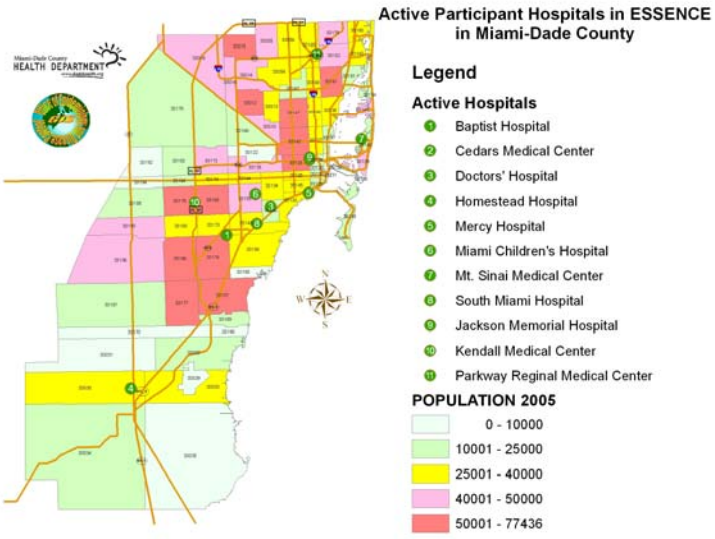
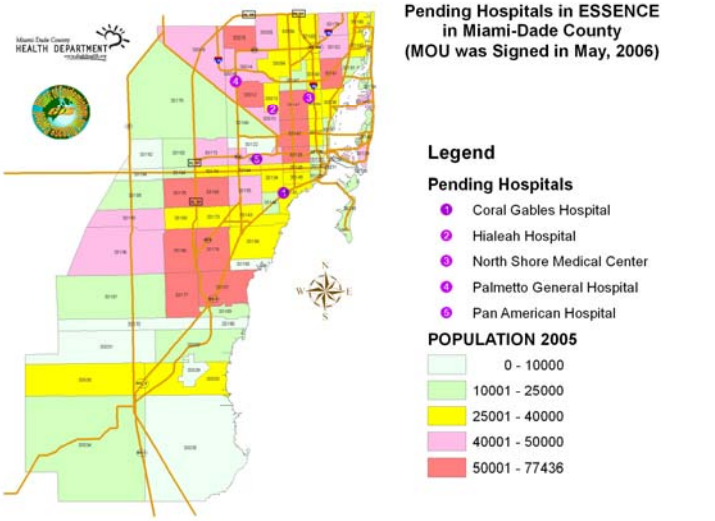


Figure 5. Miami-Dade hospitals pending participation in ESSENCE



AVIAN FLU WATCH

Unless indicated, information is current as of September 28, 2006

- **Since 2003, 251 human cases of avian influenza (H5N1) have been confirmed** by the World Health Organization (WHO). Of these, 148 have been fatal.
- **Countries with confirmed *human* cases** include Cambodia, China, Djibouti, Indonesia, Thailand, Vietnam, Iraq, Azerbaijan, Egypt and Turkey.
- **No human cases of avian influenza (H5N1) have been reported in the United States.**
- **The most recently confirmed human H5N1 case occurred in Indonesia.** The case, who died on September 28, was a 20-year-old male. He developed symptoms of fever and cough on September 17 and was hospitalized on September 24. This is the 68th case confirmed to date in Indonesia. Of these, 52 were fatal. The man's 24-year-old brother developed symptoms on September 16 and died of respiratory disease on September 24, two hours after hospital admission . Infection with the H5N1 virus is suspected, but cannot be confirmed as no samples were collected for testing. Both men had direct contact with dead chickens. Local agricultural authorities also found evidence of H5 infection in household birds. A third sibling, a 15-year-old female, was hospitalized on September 25 after developing symptoms of fever and cough. Initial test results received on September 27 were negative for the H5 virus subtype and positive for the H1 subtype, indicating an infection with normal seasonal influenza.
- **H5N1 has been confirmed in *birds* in several other countries since 2003.** H5N1 has been documented in birds in more than 30 countries in Europe & Eurasia, South Asia, Africa, East Asia and the Pacific, and the Near East. For a list of these countries, visit the World Organisation for Animal Health Web Site at http://www.oie.int/downld/AVIAN%20INFLUENZA/A_AI-Asia.htm.
- **No restrictions on travel to affected countries have been imposed.** Travelers should avoid contact with live poultry and monitor their health for ten days after returning from an affected country.

PARTICIPATE IN INFLUENZA SENTINEL PROVIDER SURVEILLANCE

Why does Florida need influenza sentinel providers?

Sentinel providers are key to the success of the Florida Department of Health's Influenza Surveillance System. An influenza sentinel provider conducts surveillance for influenza-like illness (ILI) in collaboration with the Florida State Health Department, Bureau of Epidemiology and the Centers for Disease Control and Prevention (CDC). Data reported by sentinel providers, in combination with other influenza surveillance data, provides a national picture of influenza virus and ILI activity in the U.S. and Florida.

What data do sentinel providers collect and how do they report?

Sentinel providers report the total number of patient visits each week and number of patient visits for ILI by age group (0–4 years, 5–24 years, 25–64 years, and ≥ 65 years) year round. These data are transmitted once a week via the internet or via fax to a central database at CDC. Most providers report that it takes **less than 30 minutes a week** to compile and report their data. In addition, sentinel providers can submit specimens from a subset of patients to the state laboratory for virus isolation **free of charge**.

Who can be an Influenza Sentinel Provider?

Providers of any specialty (e.g., family practice, internal medicine, pediatrics, infectious diseases) in any type of practice (e.g., private practice, public health clinic, urgent care center, emergency room, university student health center) are eligible to be sentinel providers.

Why Volunteer?

Epidemics of influenza usually occur during the winter months and are responsible for approximately 36,000 deaths per year in the United States. Influenza and pneumonia together were the eighth leading cause of death in Florida in 2004, with over 3,000 deaths statewide. Serious complications due to influenza can also occur in persons with chronic health conditions such as heart disease, diabetes, or HIV. Recently, human infections and deaths from bird flu (influenza A H5N1) reported worldwide since 2003 have generated great concern for this or another strain's potential for a pandemic.

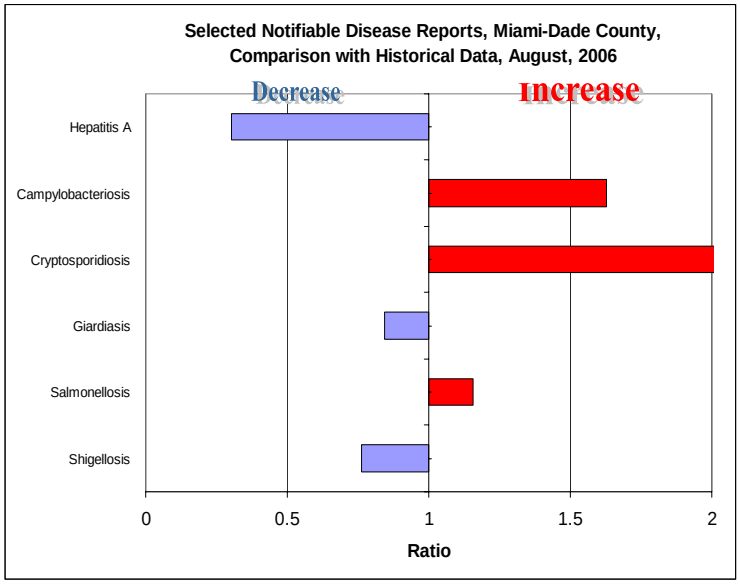
Data from sentinel providers are critical for monitoring the impact of influenza. In combination with other influenza surveillance data, they can be used to guide prevention and control activities, vaccine strain selection, and patient care. Sentinel providers receive feedback on the data submitted, summaries of Florida and national influenza data, a free subscription to CDC's Morbidity and Mortality Weekly Report (valued at $150.00) and the Emerging Infectious Diseases Journal. Most importantly, the data provided are critical for protecting the public's health.

For more information, please contact **Erin O'Connell** at 305-470-5660.

TO REPORT ANY DISEASE AND FOR INFORMATION CALL:

Office of Epidemiology and Disease Control

Childhood Lead Poisoning Prevention Program	(305) 470-6877
Hepatitis	(305) 470-5536
Other diseases and outbreaks	(305) 470-5660
HIV/AIDS Program	(305) 470-6999
STD Program	*(305) 325-3242*
Tuberculosis Program	*(305) 324-2470*
Special Immunization Program	(786) 845-0550



About the Epi Monthly Report

The Epi Monthly Report is a publication of the Miami-Dade County Health Department, Office of Epidemiology and Disease Control, The publication serves a primary audience of physicians, nurses, and public health professionals. Articles published in the Epi Monthly Report may focus on quantitative research and analysis, program updates, field investigations, or provider education. For more information or to submit an article, contact Diana Rodriguez, Managing Editor, or Rodlescia Sneed at 305-470-5660.

Monthly Report
Selected Reportable Diseases/Conditions in Miami-Dade County, August 2006

Diseases/Conditions	2006 this Month	2006 Year to Date	2005 Year to Date	2004 Year to Date	2003 Year to Date	2002 Year to Date
AIDS *Provisional	87	817	955	957	662	758
Animal Rabies	0	0	0	0	0	0
Campylobacteriosis	23	119	103	103	88	69
Chlamydia trachomatis	419	3093	2510	3193	2966	3221
Ciguatera Poisoning	0	0	0	0	0	0
Cryptosporidiosis	5	13	18	15	9	4
Cyclosporosis	0	0	11	1	1	1
Dengue Fever	0	1	1	3	1	2
Diphtheria	0	0	0	0	0	0
E. coli, O157:H7	0	0	0	2	0	0
E. coli, Non-O157	0	0	1	0	2	1
E. coli, Other	0	1	0	0	0	0
Encephalitis (except WNV)	0	0	0	1	0	1
Encephalitis, West Nile Virus	0	0	0	11	1	0
West Nile Fever	0	0	0	3	0	0
Giardiasis, Acute	22	141	140	207	117	144
Gonorrhea	193	1227	1061	1183	1261	1396
Hepatitis A	4	29	38	29	29	97
Hepatitis B	3	18	35	26	42	22
HIV *Provisional	109	790	1033	1196	1081	1316
Lead Poisoning	20	101	113	197	173	186
Legionnaire's Disease	0	7	2	7	4	1
Leptospirosis	0	0	2	0	0	0
Lyme disease	0	0	0	3	4	1
Malaria	3	10	7	11	8	8
Measles	0	0	0	1	0	0
Meningitis (except aseptic)	0	11	11	8	6	4
Meningococcal Disease	0	8	5	12	3	11
Mumps	0	0	0	0	0	0
Pertussis	0	5	9	9	7	4
Polio	0	0	0	0	0	0
Rubella	0	0	0	0	0	0
Rubella, Congenital	0	0	0	0	0	0
Salmonellosis	64	348	319	294	300	199
Shigellosis	16	83	192	124	213	164
Streptococcus pneumoniae, Drug Resistant	8	78	53	53	87	82
Syphilis, Infectious	24	151	110	138	115	139
Syphilis, Other	60	433	398	576	704	715
Tetanus	0	0	0	0	0	0
Toxoplasmosis	0	0	9	4	6	14
Tuberculosis *Provisional	19	134	125	152	143	147
Typhoid Fever	1	3	2	2	3	2
Vibrio cholera Type O1	0	0	0	1	0	0
Vibrio cholera Non-O1	0	0	0	0	0	1
Vibrio, Other	0	0	0	0	1	0

* Data on AIDS are provisional at the county level and are subject to edit checks by state and federal agencies.
** Data on tuberculosis are provisional at the county level.