VIRGINIA
EPIDEMIOLOGY BULLETIN

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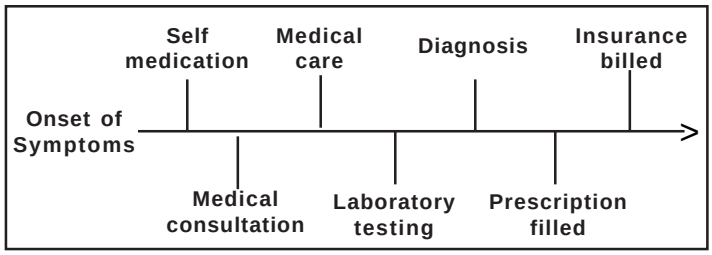
Syndromic Surveillance in Virginia

Traditional surveillance for reportable diseases is based on suspected or confirmed diagnoses from healthcare providers. However, increased demand for the rapid detection of acute public health threats has led to the development of new approaches to identify disease cases or outbreaks that may deserve intervention.



Syndromic surveillance focuses on the early period before clinical diagnosis or laboratory confirmation of a particular disease by using 'alternative' health-related data sources (see Figure). Instead of waiting for confirmed diagnoses, these indicators can help to detect events, including acts of bioterrorism, earlier than would be possible with traditional disease surveillance systems. For example, large numbers of people in emergency rooms complaining of respiratory symptoms in September may indicate an early flu season…or the intentional release of pneumonic plague. This information is important to public health workers who can use it to help detect a problem and notify clinicians in the community if an unusual disease event is suspected

Although these new tools do not affect most healthcare providers directly, it is helpful for providers in Virginia to know about resources that are being developed.

In This Issue:

Therefore, this article reviews the current activities related to the use of syndromic surveillance in Virginia.

Manual Evaluation of Syndromic Data

Although originally used for short-term surveillance (e.g., political conventions, the Olympics) syndromic surveillance methods are increasingly being used for routine monitoring. Since the events of September 11, 2001, health districts in Northern and Eastern Virginia have collaborated with area hospitals to detect health changes in the community. Under the authority of the *Code of Virginia* related to special surveillance, health district personnel review emergency department chief complaint logs each day to classify visits into broad symptom categories ("syndromes"). Syndrome tallies are tracked over time, and the detection of higher-than-expected levels are 'flagged' to receive public health follow-up, including reviewing the patients' demographic and geographic information, and potentially contacting facilities to gather more information. Daily communication with the Maryland and Washington, D.C., health departments assures coordinated monitoring of the National Capital Region. In some cases, the syndromic surveillance process has also yielded additional benefits, including stronger relations between the local public health departments and area healthcare systems, as well as improved follow-up for some conditions (e.g., rabies follow-up for animal bites).

The Future of Syndromic Surveillance

Syndromic surveillance is a relatively new tool, and all of its strengths (and weaknesses) are still being explored. Although manual data reviews have been in place in some parts of Virginia for more than three years, efforts are being made to develop electronic methods that will be more time efficient, will enable consideration of a broader range of data sources, and will help to facilitate data analysis. Two examples of these are ESSENCE and BioSense.

ESSENCE

The Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) is a web-based application developed by the Johns Hopkins University Applied Physics Laboratory and the Division of Preventive Medicine at the Walter Reed Army Institute of Research. ESSENCE uses chief complaint data from participating emergency departments, supplemented by sales data for over-the-counter medications, diagnoses from Department of Defense (DOD) ambulatory care facilities, and Medicare claims data. Events are grouped into eight "syndromic clusters" consistent with emerging infections and bioterrorism

(see table).[1] Grouping by syndrome decreases the variability of the data, allows more accurate monitoring of baseline levels, and facilitates comparisons between data sources. Algorithms evaluate time and space clustering using mapping and trend analysis.[2] Findings are then presented in easy to read tables and are visually presented on maps to enable recognition of events that cross political boundaries.

Table. ESSENCE Syndromes

Death
Gastrointestinal - acute upper and/or lower GI
Neurologic - acute CNS infection
Rash - acute condition consistent with smallpox, viral hemorrhagic fever (e.g., macules, papules, vesicles, bruising)
Respiratory - e.g., common cold, sinus infection
Sepsis
Unspecified Infection
Other

BioSense

BioSense is a web-based syndromic surveillance tool developed and hosted by the Centers for Disease Control and Prevention (CDC). State and local public health officials are given access to appropriate regional information. This system provides graphic and tabular displays of sentinel clinical data from the DOD and the Veterans Administration and information from other national data sources to provide public health officials with the ability to analyze health information for their communities. Syndrome groupings and aberration detection algorithms are used to identify unusual patterns for public health investigation.

Conclusions

Syndromic surveillance allows daily interaction between the medical care community and public health workers, and may provide valuable lead-time for detecting seasonal events (e.g., influenza, norovirus) or for alerting public health authorities of a problem (e.g., a bioterrorism event). Syndromic surveillance may also be used to monitor the size, spread, and tempo of an outbreak after it is detected[1] or to provide reassurance that a large-scale outbreak is not occurring (e.g., during a high-profile community event).

However, the actual effectiveness of syndromic surveillance is still being evaluated. The ability of syndromic surveillance to detect outbreaks earlier than conventional surveillance methods depends on the size of the outbreak, the population affected, the data sources, the syndrome definitions used, the criteria for investigating unusual patterns, and the healthcare provider's ability to detect and report unusual cases.[2] Other issues that need to be resolved include the lack of standardization in syndrome definitions, the statistical methods used for detection, and the optimal follow-up protocols.

There is no substitute for the astute healthcare provider or laboratorian alerting the health department of unusual patient presentations.[2] Syndromic surveillance DOES NOT replace healthcare providers', laboratory directors', and school administrators' responsibility to report diseases to their local health departments. However, it appears that syndromic surveillance may add a new dimension to the disease detection capabilities of local health departments in Virginia.

For more information, see *Syndromic Surveillance: Reports from a National Conference* in the MMWR, September 24, 2004 / Vol. 53 / Supplement (available at: http://www.cdc.gov/mmwr/preview/su5301toc.htm).

Submitted by: Lesliann Helmus, MS, Surveillance Chief

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An Outbreak of Norovirus Gastroenteritis Associated with a Robotics Competition

Background: In March 2004, epidemiologists, nurses and environmental health specialists from Henrico County and Richmond City Health Departments and the Office of Epidemiology investigated an outbreak of nausea, vomiting and diarrhea associated with a robotics competition in Richmond.

Methods: Several steps were taken to determine the extent and cause of the outbreak, including: 1. Surveys of robotics team leaders, volunteers, judges and staff; 2. A cohort study of five selected robotics teams; and 3. A cohort study of engineering school students, faculty and staff who attended a catered reception associated with the robotics competition. Environmental health specialists investigated the establishment that catered the reception. Stool specimens from 15 robotics team participants and 5 employees of the catering establishment were submitted for laboratory analysis.

Results: Surveys showed that attendance at the catered engineering school reception was significantly associated with illness (RR=9.2, p<.0000001 and RR= 5.0, p=0.0240). Cohort studies indicated that 52-84% of persons who ate ham or turkey sandwiches at the reception became ill. Eleven specimens from robotics team participants and one specimen from an employee of the catering establishment tested positive for norovirus by reverse transcriptase polymerase chain reaction (RT-PCR). No violations in food preparation practices at the catering establishment were documented.

Discussion: While none of the catering establishment employees admitted to illness prior to the engineering school reception, it is likely that ham and turkey sandwiches served at the event were contaminated during preparation by an ill or recently-ill employee, explaining the sharp peak in the number of cases following the reception. Person-to-person transmission was likely an important cause of illness in cases with later dates of onset.

Dawn Hawkins, MS

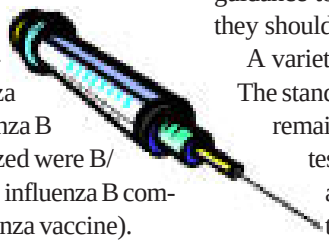
Flu Corner

Influenza Activity in Virginia and the U.S.

As of December 8, 2004, the Division of Consolidated Laboratory Services (DCLS) and hospital laboratories had reported six confirmed cases of influenza type A by direct fluorescent antibody (DFA) and/or culture. As a result, Virginia influenza activity was listed as Local (i.e., increased influenza-like illness (ILI) in one region and lab confirmed flu in that region or two or more institutional outbreaks in a single region with lab confirmation). Overall, in the U.S. one state/territory had reported regional activity, two had reported local activity, 37 states/territories had reported sporadic influenza activity, and 12 had reported no activity. The proportion of deaths attributable to pneumonia and influenza in 122 cities monitored by the Centers for Disease Control and Prevention (CDC) was below baseline values.

The CDC reports that during the week ending November 27, 2004, 29 (2.1%) of 1,382 specimens tested by the World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System (NREVSS) laboratories were positive for influenza. Since October 3, WHO and NREVSS laboratories have tested a total of 15,512 specimens for influenza viruses with 201 (1.3%) positives detected.

Of the 201 influenza isolates identified, 146 (72.6%) were influenza A viruses and 55 (27.4%) were influenza B viruses. Sixty-five (44.5%) of the 146 influenza A viruses identified have been subtyped and all were H3N2 viruses. The CDC has antigenically characterized 36 influenza viruses: all 26 of the influenza A (H3N2) isolates were A/Fujian/411/2002-like (the influenza A (H3N2) component in the 2004-05 influenza vaccine). All 10 of the influenza B viruses that were characterized were B/Shanghai/361/2002-like (the influenza B component in the 2004-05 influenza vaccine).



Go to the CDC website at http://www.cdc.gov/flu/weekly/fluactivity.htm for up-to-date details on influenza surveillance in the U.S.

Influenza Vaccine Update

To date, VDH has received 255,150 doses of flu vaccine, all of which have been distributed to health departments and other healthcare providers based on the locally identified needs of high-risk populations. An additional 54,000 doses of vaccine will be allocated by the Division of Immunization for distribution by the CDC in early January.

VDH has received 114,950 doses of flu vaccine (100% of the original order) for the Virginia Vaccines for Children (VFC) program. These doses have been distributed to private providers and health departments for vaccination of high-risk VFC Program eligible children.

Interim Guidance for Influenza Diagnostic Testing

During the current flu season, the diminished supply of influenza vaccine and the limited supply of influenza antivirals could increase the demand for influenza testing. As a result, on November 22, 2004 the CDC released guidance to help clinicians determine when they should order influenza testing.

A variety of influenza tests are available. The standard for the diagnosis of influenza remains virus culture. However, a rapid test or immunofluorescence staining are the tests of choice to help with the decision to use antiviral medications. When not available, the decision to use antiviral medications should be made on clinical grounds rather than waiting for the results of virus culture.

1) **Testing Outpatients for Influenza**
   Tests do not need to be done on all patients with symptoms of influenza. Once influenza has been documented in the community or geographic area, a clinical diagnosis can be made for patients with signs and symptoms consistent with influenza. For individual patients a test is most useful when it is most likely to help with treatment decisions (e.g., use of antiviral agents). However, not every patient with influenza requires antiviral medication.
2) **Testing Inpatients for Influenza**
   Detection of influenza and prompt implementation of control measures is critical for the control of institutional outbreaks. When there is influenza activity in the community, consider influenza testing, including virus culture, for patients who develop signs and symptoms of influenza while they are in a healthcare facility.

Please see the CDC website at http://www.cdc.gov/flu/professionals/treatment/0405antiviral guide.htm for more information.

Epidemiology in Virginia

The Office of Epidemiology and the Emergency Preparedness and Response programs held a symposium on November 17, 2004 in Charlottesville to share experiences on activities that have occurred across Virginia in 2003-4. Approximately 200 public health staff, infection control professionals, laboratory personnel, and healthcare providers attended the conference.

Presentations covered a broad range of topics. These included outbreak investigations for salmonellosis, staphylococcus intoxication, pertussis, influenza, varicella, methicillin resistant *Staphylococcus aureus* (MRSA) and tuberculosis. In addition, presentations covered Hurricane Isabel-related mortality, West Nile virus surveillance, the use of geocoding for STD data analysis, and the Division of Consolidated Laboratory Services' (DCLS) participation in the national PulseNet program.

While the quality of all of the presentations was extremely high, Ms. Dawn Hawkins from the Division of Surveillance and Investigation was awarded the 2004 Grayson B. Miller award for excellence for her presentation on the investigation of a large norovirus outbreak (see page 2).

Cases of Selected Notifiable Diseases Reported in Virginia*

Disease	Total Cases Reported, October 2004						Total Cases Reported Statewide, January through October		
		Regions							
	State	NW	N	SW	C	E	This Year	Last Year	5 Yr Avg
AIDS	47	8	21	2	7	9	560	657	684
Campylobacteriosis	63	8	24	19	7	5	573	710	544
***E. coli* O157:H7**	8	1	5	0	2	0	35	33	53
Giardiasis	75	16	24	16	7	12	448	285	321
Gonorrhea	705	42	57	95	173	338	7,406	7,594	8,413
Hepatitis, Viral									
A, acute	19	2	8	5	2	2	115	85	119
B, acute	31	2	6	10	7	6	220	149	135
C, acute	0	0	0	0	0	0	16	7	6
HIV Infection	76	5	14	9	24	24	723	674	713
Lead in Children†	68	4	5	21	24	14	688	667	589
Legionellosis	4	1	2	0	0	1	42	82	36
Lyme Disease	34	1	26	1	1	5	151	81	114
Measles	0	0	0	0	0	0	0	0	3
Meningococcal Infection	4	1	1	0	0	2	18	23	36
Mumps	0	0	0	0	0	0	2	1	6
Pertussis	35	7	4	5	12	7	170	87	74
Rabies in Animals	39	8	11	8	5	7	410	449	469
Rocky Mountain Spotted Fever	7	1	2	0	2	2	30	28	21
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	158	29	49	23	21	36	1,049	889	1,002
Shigellosis	23	1	15	1	6	0	142	383	399
Syphilis, Early§	20	2	4	1	1	12	173	137	208
Tuberculosis	44	2	21	2	8	11	228	225	227

Localities Reporting Animal Rabies This Month: Accomack 1 raccoon; Albemarle 1 raccoon; Arlington 2 raccoons; Augusta 1 skunk; Bedford 1 raccoon; Bland 1 skunk; Charles City 1 raccoon; Fairfax 2 bats, 1 cat, 2 foxes, 3 raccoons; Frederick 1 skunk; Hanover 1 fox, 2 raccoons; Highland 1 raccoon; Isle of Wight 1 raccoon; King George 1 skunk; Lynchburg 1 skunk; Mathews 1 fox; Middlesex 1 fox, 1 skunk; Montgomery 1 bat; Patrick 1 raccoon; Powhatan 1 raccoon; Prince William 1 skunk; Rockbridge 1 skunk; Rockingham 1 cat; Smyth 2 skunks; Stafford 1 fox; Suffolk 1 raccoon, 1 skunk; Wythe 1 raccoon.
Toxic Substance-related Illnesses: Asbestosis 2; Adult Lead Exposure 2; Pneumoconiosis 9.
*Data for 2004 are provisional. †Elevated blood lead levels ≥10µg/dL. §Includes primary, secondary, and early latent.

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