

PROFILES OF SELECTED HEALTH EVENTS DETECTED IN EPICENTER

The Situational Monitoring and Event Detection (SMED) Unit at ODH manages the EpiCenter system, Ohio's statewide syndromic surveillance system. EpiCenter collects, classifies and monitors emergency department and urgent care center chief complaint data. Additionally, poison control center call data and reportable disease data from the Ohio Disease Reporting System (ODRS) are collected, analyzed and displayed in EpiCenter. It provides local public health and hospital users with the analytical and spatial tools needed for the early detection and tracking of important health events (e.g., outbreaks, seasonal illness, bioterrorism, environmental exposures, etc.) and real-time monitoring for situational awareness or "health intelligence."

Local health department epidemiologists and nurses conduct investigations of the anomalies detected by the EpiCenter system when visit levels within a given jurisdiction are statistically, significantly higher than normal for a 24-hour period. Approximately 40 percent (1,771) of all EpiCenter anomalies detected during 2011 were resolved as health events related to seasonal illness, naturally occurring diseases, unknown causes or due to other environmental exposures, after an initial assessment by local public health. The percentage of total anomalies resolved as health events for 2011 (40 percent) exceeded that from 2010 (25 percent) but was much less than observed in 2009 (70 percent), which was attributed to the Pandemic Influenza H1N1 outbreak. This year is likely more typical of what Ohio normally observes and represents increased utility of the EpiCenter system and an improved completion rate of anomaly investigations. Seasonal illness health events attributed for 71 percent of all anomalies resolved as health events in 2011. Anomalies characterized as seasonal illness health events are when an anomaly can be directly or indirectly related to a disease or illness that follows a typical seasonal pattern (i.e., fever and cough illness during cold and influenza season, rash illness over the Memorial Day holiday, gastrointestinal illness during Thanksgiving and Christmas holidays or during norovirus season, etc.). Anomalies characterized as naturally occurring disease outbreaks are when an anomaly can be directly or indirectly related to a disease outbreak as defined in the Infectious Disease Control Manual (IDCM) (i.e., commonly observed for enteric disease outbreaks due to *Shigella*, norovirus, *Salmonella* and respiratory/flu outbreaks such as pertussis, H1N1, H3N2v, etc.). Anomalies characterized as environmental health events are when an anomaly can be directly or indirectly related to an environmental cause or agent (i.e., chemical exposure, poisoning, extreme heat/cold exposure, etc.). Often, these anomalies present as a cluster of cases.

A breakdown of these events by type of health event and by jurisdiction is displayed in Table 1 and Table 2, respectively.

Table 1: Distribution of EpiCenter Health Events by Type, Ohio, 2011

Disposition	# of Health Events	% of Health Events
Environmental health event	12	1%
Naturally occurring disease outbreak	116	7%
Seasonal illness health event	1,264	71%
Unknown health event	379	21%
Total	1,771	100%

Source of health event data: Ohio Department of Health Situational Monitoring and Event Detection Unit.

Table 2: Distribution of EpiCenter Health Events by Jurisdiction, Ohio, 2011

County	Environmental Health Event		Naturally Occurring Disease Outbreak		Seasonal Illness Health Event		Unknown Health Event		Total	
	N	%	N	%	N	%	N	%	N	%
Adams	0	0%	0	0%	1	100%	0	0%	1	< 1%
Allen	0	0%	1	3%	36	97%	0	0%	37	2%
Ashland	0	0%	0	0%	1	100%	0	0%	1	< 1%
Ashtabula	0	0%	0	0%	12	100%	0	0%	12	1%
Athens	0	0%	0	0%	8	89%	1	11%	9	1%
Auglaize	0	0%	0	0%	6	100%	0	0%	6	< 1%
Belmont	0	0%	0	0%	0	0%	0	0%	0	0%
Brown	0	0%	0	0%	10	100%	0	0%	10	1%
Butler	0	0%	0	0%	23	100%	0	0%	23	1%
Carroll	0	0%	0	0%	0	0%	0	0%	0	0%
Champaign	0	0%	0	0%	12	100%	0	0%	12	1%
Clark	0	0%	0	0%	17	100%	0	0%	17	1%
Clermont	0	0%	0	0%	22	88%	3	12%	25	1%
Clinton	0	0%	0	0%	16	100%	0	0%	16	1%
Columbiana	0	0%	1	1%	18	21%	68	78%	87	5%
Coshocton	0	0%	0	0%	0	0%	0	0%	0	0%
Crawford	0	0%	0	0%	7	100%	0	0%	7	< 1%
Cuyahoga	0	0%	4	2%	88	38%	141	61%	233	13%
Darke	0	0%	0	0%	0	0%	0	0%	0	0%
Defiance	0	0%	0	0%	15	100%	0	0%	15	1%
Delaware	0	0%	0	0%	29	100%	0	0%	29	2%
Erie	0	0%	0	0%	24	96%	1	4%	25	1%
Fairfield	0	0%	1	100%	0	0%	0	0%	1	< 1%
Fayette	0	0%	0	0%	0	0%	0	0%	0	0%
Franklin	0	0%	0	0%	27	100%	0	0%	27	2%
Fulton	0	0%	0	0%	3	100%	0	0%	3	< 1%
Gallia	0	0%	2	100%	0	0%	0	0%	2	< 1%
Geauga	0	0%	0	0%	0	0%	0	0%	0	0%
Greene	5	16%	8	26%	18	58%	0	0%	31	2%
Guernsey	0	0%	0	0%	0	0%	0	0%	0	0%
Hamilton	1	1%	0	0%	74	99%	0	0%	75	4%
Hancock	0	0%	0	0%	12	100%	0	0%	12	1%
Hardin	0	0%	0	0%	0	0%	0	0%	0	0%
Harrison	0	0%	0	0%	0	0%	0	0%	0	0%
Henry	0	0%	0	0%	0	0%	0	0%	0	0%
Highland	1	8%	0	0%	12	92%	0	0%	13	1%
Hocking	2	10%	3	14%	15	71%	1	5%	21	1%
Holmes	0	0%	0	0%	3	100%	0	0%	3	< 1%
Huron	0	0%	2	7%	27	93%	0	0%	29	2%
Jackson	0	0%	0	0%	8	100%	0	0%	8	< 1%

County	Environmental Health Event		Naturally Occurring Disease Outbreak		Seasonal Illness Health Event		Unknown Health Event		Total	
	N	%	N	%	N	%	N	%	N	%
Jefferson	0	0%	1	5%	21	95%	0	0%	22	1%
Knox	0	0%	1	50%	1	50%	0	0%	2	< 1%
Lake	0	0%	0	0%	49	94%	3	6%	52	3%
Lawrence	0	0%	0	0%	0	0%	0	0%	0	0%
Licking	0	0%	55	86%	9	14%	0	0%	64	4%
Logan	0	0%	0	0%	23	100%	0	0%	23	1%
Lorain	0	0%	3	21%	11	79%	0	0%	14	1%
Lucas	1	1%	7	8%	60	65%	25	27%	93	5%
Madison	2	8%	1	4%	21	88%	0	0%	24	1%
Mahoning	0	0%	0	0%	17	100%	0	0%	17	1%
Marion	0	0%	0	0%	34	85%	6	15%	40	2%
Medina	0	0%	0	0%	33	92%	3	8%	36	2%
Meigs	0	0%	0	0%	0	0%	0	0%	0	0%
Mercer	0	0%	0	0%	4	100%	0	0%	4	< 1%
Miami	0	0%	0	0%	9	100%	0	0%	9	1%
Monroe	0	0%	0	0%	0	0%	0	0%	0	0%
Montgomery	0	0%	0	0%	13	81%	3	19%	16	1%
Morgan	0	0%	0	0%	0	0%	0	0%	0	0%
Morrow	0	0%	0	0%	0	0%	0	0%	0	0%
Muskingum	0	0%	0	0%	5	100%	0	0%	5	< 1%
Noble	0	0%	0	0%	0	0%	0	0%	0	0%
Ottawa	0	0%	0	0%	16	100%	0	0%	16	1%
Paulding	0	0%	0	0%	0	0%	0	0%	0	0%
Perry	0	0%	0	0%	0	0%	0	0%	0	0%
Pickaway	0	0%	0	0%	1	100%	0	0%	1	< 1%
Pike	0	0%	0	0%	0	0%	0	0%	0	0%
Portage	0	0%	0	0%	3	100%	0	0%	3	< 1%
Preble	0	0%	2	33%	3	50%	1	17%	6	< 1%
Putnam	0	0%	0	0%	10	100%	0	0%	10	1%
Richland	0	0%	6	75%	2	25%	0	0%	8	< 1%
Ross	0	0%	2	6%	26	76%	6	18%	34	2%
Sandusky	0	0%	0	0%	6	100%	0	0%	6	< 1%
Scioto	0	0%	0	0%	3	11%	24	89%	27	2%
Seneca	0	0%	0	0%	24	67%	12	33%	36	2%
Shelby	0	0%	4	67%	1	17%	1	17%	6	< 1%
Stark	0	0%	0	0%	48	96%	2	4%	50	3%
Summit	0	0%	0	0%	43	88%	6	12%	49	3%
Trumbull	0	0%	0	0%	55	44%	71	56%	126	7%
Tuscarawas	0	0%	5	71%	2	29%	0	0%	7	< 1%
Union	0	0%	0	0%	5	83%	1	17%	6	< 1%
Van Wert	0	0%	0	0%	30	100%	0	0%	30	2%
Vinton	0	0%	0	0%	0	0%	0	0%	0	0%

County	Environmental Health Event		Naturally Occurring Disease Outbreak		Seasonal Illness Health Event		Unknown Health Event		Total	
	N	%	N	%	N	%	N	%	N	%
Warren	0	0%	7	19%	29	81%	0	0%	36	2%
Washington	0	0%	0	0%	0	0%	0	0%	0	0%
Wayne	0	0%	0	0%	11	100%	0	0%	11	1%
Williams	0	0%	0	0%	0	0%	0	0%	0	0%
Wood	0	0%	0	0%	20	100%	0	0%	20	1%
Wyandot	0	0%	0	0%	0	0%	0	0%	0	0%
State of Ohio	0	0%	0	0%	82	100%	0	0%	82	5%
Total	12	1%	116	7%	1,264	71%	379	21%	1,771	100%

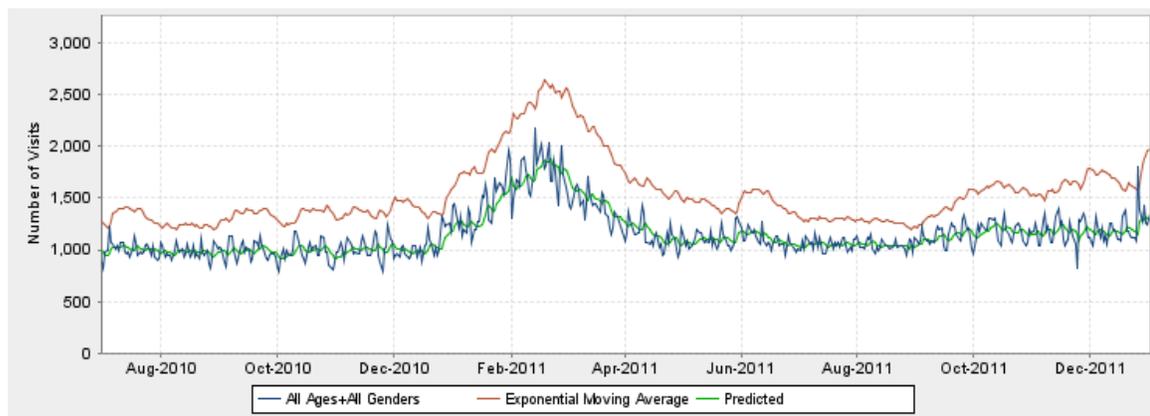
Data based on anomalies generated in the EpiCenter system 01/01/11 to 12/31/11.
Source of health event data: Ohio Department of Health Situational Monitoring and Event Detection Unit.

TRACKING OF SEASONAL TRENDS

While EpiCenter provides the analytic platform and functional capabilities to detect large-scale health events (e.g., bioterrorism and large-scale outbreaks), its utility on a daily basis is to provide leadership and key public health partners with real-time situational monitoring of trends and patterns observed in the data. Some common examples of seasonal trends that are observed annually include the following: seasonal influenza (typically from October to April), seasonal respiratory illness at the commencement of the school year (late August/early September) and seasonal rash illness over Memorial Day weekend. In each of the three charts below (Figures 1-3), the exponential moving average algorithm was used for threshold calculations, which includes a 17-day training window for predictions as well as a 17-day training window for thresholds for a total of 34 days of historical data.

As illustrated in Figure 1, constitutional symptoms returned to its typical peak in mid- to late February

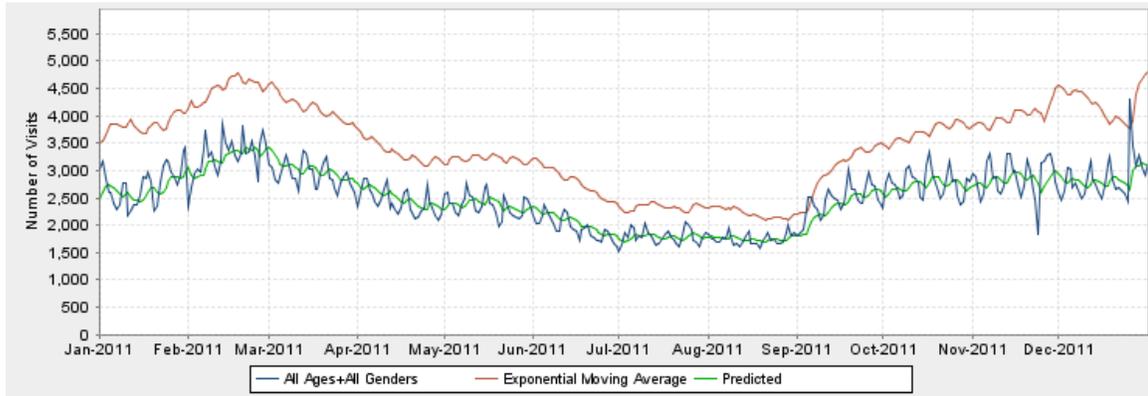
Figure 1: Seasonal Influenza Illness (Constitutional Syndrome) Trends in EpiCenter, Ohio, July 2010 – December 2011



Source of data: Ohio Department of Health Situational Monitoring and Event Detection Unit.

As shown in Figure 2, respiratory illness generally remained elevated throughout the entire cough/cold/flu season, afterward returning to normal baseline levels during the summer months. Then it began to increase at the commencement of the school year (late August into early September) and continued to elevate with the incidence of influenza season.

Figure 2: Seasonal Respiratory Illness Trends in EpiCenter, Ohio, January 2011 – December 2011



Source of data: Ohio Department of Health Situational Monitoring and Event Detection Unit.

As illustrated in Figure 3, rash illness peaked on Memorial Day weekend (it typically reaches its highest peak on Memorial Day Monday) and remained elevated throughout the summer months. The general trends showed a slight increase early in the week (Sunday-Tuesday) followed by a decline through the end of the week and into the weekend. The Memorial Day holiday is significant as this tends to mark the start of outdoor summer activities (e.g., hiking, camping, boating, fishing), which increases environmental exposures and contact with poison ivy and biting insects. The trends observed in 2011 were very similar to those observed in 2010 and 2009.

Figure 3: Seasonal Rash Illness Trends in EpiCenter, Ohio January 2011 – December 2011



Source of data: Ohio Department of Health Situational Monitoring and Event Detection Unit.