

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 25 percent (1,060) of all EpiCenter anomalies detected during 2010 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 2010 (25 percent) exceeded that from 2008 (10 percent) but was much less than observed in 2009 (70 percent), which was almost entirely due to the Pandemic Influenza H1N1 outbreak. Seasonal illness health events attributed for 63 percent of all anomalies resolved as health events in 2010. Anomalies characterized as seasonal illness health events typically follow a seasonal trend that can generally be predicted with each new season, such as the tracking of seasonal influenza (October-May). An example of this classification is when an increase in emergency department visits for fever and/or flu-like symptoms is observed during increased influenza activity in a given jurisdiction. Anomalies characterized as naturally occurring disease outbreaks relate to an increase in emergency department visits that can be directly or indirectly attributed to an existing or ongoing disease outbreak in the community that may have no assumption of seasonality. An example of this classification is when a county has reported a norovirus outbreak in a local jurisdiction and the data supports the activity with an increase in vomiting and diarrhea symptoms in or around that same jurisdiction. Anomalies characterized as environmental health events relate to an increase in emergency department visits involving an exposure to chemicals or substances causing an adverse health reaction, normally presenting as a cluster of cases. An example of this classification is when a cluster of visits presenting with "carbon monoxide exposure" or "poisoning after house fire" or "cough and rash reaction after exposure to over-chlorinated pool" is observed at a local hospital facility.

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, 2010

Disposition	# of Health Events	% of Health Events
Environmental health event	25	2%
Naturally occurring disease outbreak	168	16%
Seasonal illness health event	666	63%
Unknown health event	201	19%
Total	1,060	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, 2010

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%	3	75%	1	25%	4	< 1%
Allen	0	0%	2	17%	10	83%	0	0%	12	1%
Ashland	0	0%	0	0%	0	0%	0	0%	0	0%
Ashtabula	0	0%	0	0%	0	0%	0	0%	0	0%
Athens	0	0%	0	0%	9	82%	2	18%	11	1%
Auglaize	0	0%	0	0%	0	0%	0	0%	0	0%
Belmont	0	0%	0	0%	2	100%	0	0%	2	< 1%
Brown	0	0%	0	0%	8	100%	0	0%	8	1%
Butler	0	0%	0	0%	13	100%	0	0%	13	1%
Carroll	0	0%	0	0%	0	0%	0	0%	0	0%
Champaign	2	67%	1	33%	0	0%	0	0%	3	< 1%
Clark	0	0%	1	20%	4	80%	0	0%	5	1%
Clermont	0	0%	0	0%	20	91%	2	9%	22	2%
Clinton	0	0%	0	0%	12	100%	0	0%	12	1%
Columbiana	0	0%	0	0%	0	0%	64	100%	64	6%
Coshocton	0	0%	0	0%	0	0%	0	0%	0	0%
Crawford	0	0%	0	0%	8	89%	1	11%	9	1%
Cuyahoga	1	1%	42	44%	28	29%	25	26%	96	9%
Darke	0	0%	0	0%	0	0%	0	0%	0	0%
Defiance	0	0%	0	0%	4	80%	1	20%	5	1%
Delaware	0	0%	0	0%	2	100%	0	0%	2	< 1%
Erie	0	0%	0	0%	17	100%	0	0%	17	2%
Fairfield	0	0%	0	0%	0	0%	0	0%	0	0%
Fayette	0	0%	0	0%	0	0%	0	0%	0	0%
Franklin	2	40%	0	0%	3	60%	0	0%	5	1%
Fulton	0	0%	0	0%	8	100%	0	0%	8	1%
Gallia	0	0%	0	0%	0	0%	5	100%	5	1%
Geauga	0	0%	0	0%	3	100%	0	0%	3	< 1%
Greene	0	0%	8	31%	16	62%	2	8%	26	3%
Guernsey	0	0%	0	0%	8	100%	0	0%	8	1%
Hamilton	6	16%	0	0%	31	84%	0	0%	37	4%
Hancock	2	13%	5	33%	6	40%	2	13%	15	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%	1	100%	0	0%	1	< 1%
Highland	0	0%	0	0%	8	100%	0	0%	8	1%
Hocking	0	0%	4	27%	11	73%	0	0%	15	1%
Holmes	0	0%	0	0%	2	100%	0	0%	2	< 1%
Huron	0	0%	0	0%	15	100%	0	0%	15	1%
Jackson	0	0%	2	100%	0	0%	0	0%	2	< 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%	0	0%	0	0%	5	100%	5	1%
Knox	0	0%	0	0%	0	0%	0	0%	0	0%
Lake	0	0%	0	0%	22	100%	0	0%	22	2%
Lawrence	0	0%	0	0%	0	0%	0	0%	0	0%
Licking	4	11%	32	87%	0	0%	1	3%	37	4%
Logan	0	0%	0	0%	11	100%	0	0%	11	1%
Lorain	0	0%	1	4%	22	96%	0	0%	23	2%
Lucas	7	12%	8	14%	32	56%	10	18%	57	5%
Madison	1	5%	3	15%	16	80%	0	0%	20	2%
Mahoning	0	0%	0	0%	7	100%	0	0%	7	1%
Marion	0	0%	0	0%	0	0%	11	100%	11	1%
Medina	0	0%	0	0%	9	100%	0	0%	9	1%
Meigs	0	0%	0	0%	0	0%	0	0%	0	0%
Mercer	0	0%	0	0%	0	0%	0	0%	0	0%
Miami	0	0%	0	0%	7	100%	0	0%	7	1%
Monroe	0	0%	0	0%	0	0%	0	0%	0	0%
Montgomery	0	0%	0	0%	0	0%	0	0%	0	0%
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%	1	100%	0	0%	1	< 1%
Noble	0	0%	0	0%	0	0%	0	0%	0	0%
Ottawa	0	0%	1	7%	13	93%	0	0%	14	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%	0	0%	0	0%	0	0%
Pike	0	0%	0	0%	0	0%	0	0%	0	0%
Portage	0	0%	0	0%	13	100%	0	0%	13	1%
Preble	0	0%	2	100%	0	0%	0	0%	2	< 1%
Putnam	0	0%	0	0%	10	100%	0	0%	10	1%
Richland	0	0%	1	25%	3	75%	0	0%	4	< 1%
Ross	0	0%	0	0%	23	100%	0	0%	23	2%
Sandusky	0	0%	0	0%	0	0%	1	100%	1	< 1%
Scioto	0	0%	6	67%	3	33%	0	0%	9	1%
Seneca	0	0%	4	9%	21	48%	19	43%	44	4%
Shelby	0	0%	12	40%	16	53%	2	7%	30	3%
Stark	0	0%	2	7%	27	93%	0	0%	29	3%
Summit	0	0%	14	40%	21	60%	0	0%	35	3%
Trumbull	0	0%	0	0%	62	57%	47	43%	109	10%
Tuscarawas	0	0%	0	0%	0	0%	0	0%	0	0%
Union	0	0%	0	0%	0	0%	0	0%	0	0%
Van Wert	0	0%	0	0%	9	100%	0	0%	9	1%
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%	12	86%	2	14%	0	0%	14	1%
Washington	0	0%	1	33%	2	67%	0	0%	3	< 1%
Wayne	0	0%	0	0%	1	100%	0	0%	1	< 1%
Williams	0	0%	0	0%	0	0%	0	0%	0	0%
Wood	0	0%	0	0%	11	100%	0	0%	11	1%
Wyandot	0	0%	0	0%	0	0%	0	0%	0	0%
State of Ohio	0	0%	4	7%	50	93%	0	0%	54	5%
Total	25	2%	168	16%	666	63%	201	19%	1,060	100%

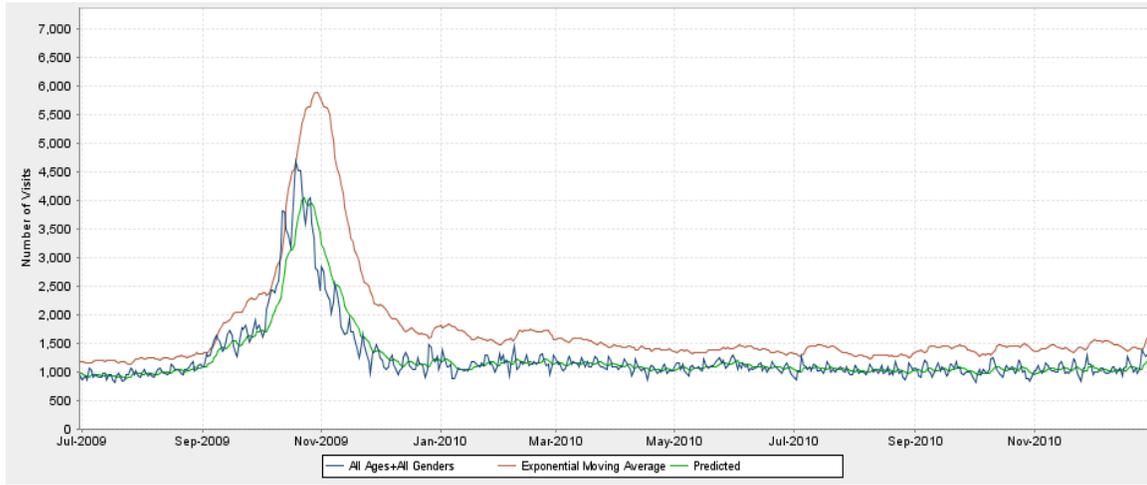
Data based on anomalies generated in the EpiCenter system 01/01/10 to 12/31/10.
Source of health event data: Ohio Department of Health Situational Monitoring and Event Detection Unit.

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 did not observe its typical peak in mid- to late February. This influenza season, however, was masked by the Pandemic Influenza H1N1 outbreak from 2009, which peaked in mid-October and finally returned to baseline levels in late November. This led to an uncharacteristic influenza season for 2010-2011.

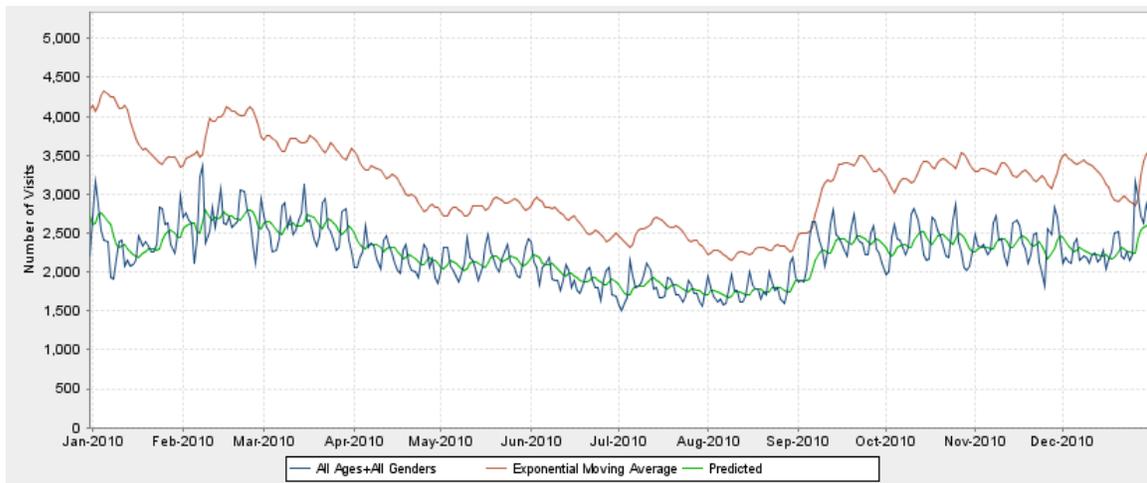
Figure 1: Seasonal Influenza Illness (Constitutional Syndrome) Trends in EpiCenter, Ohio, July 2009 – December 2010



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. As observed with constitutional illness, visit levels were not as pronounced as observed in 2009 due to the Pandemic Influenza H1N1 outbreak. Nearly a two-fold increase in total visit levels were observed in 2009 compared to 2010.

Figure 2: Seasonal Respiratory Illness Trends in EpiCenter, Ohio, January 2010 – December 2010

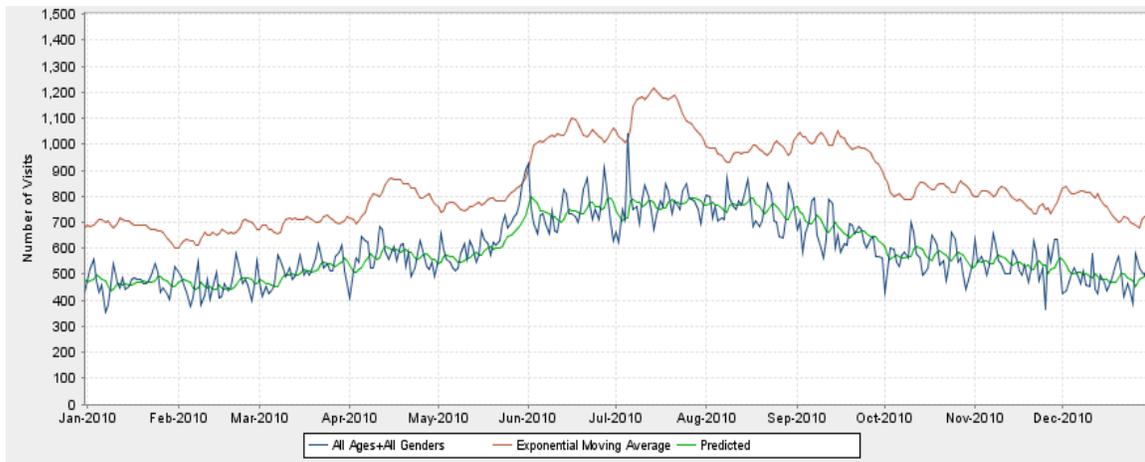


Source of data: Ohio Department of Health Situational Monitoring and Event Detection Unit.

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 2010 were very similar to those observed in 2009.

**Figure 3: Seasonal Rash Illness Trends in EpiCenter, Ohio
January 2010 – December 2010**



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