Bureau of Epidemiology & Public Health Informatics

Kansas Department of Health and Environment

EPI UPDATES

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Kansas Department of Health & Environment

Bureau of Epidemiology & Public Health Informatics

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Joining the Frontlines in the Battle against a Serious Intestinal Illness

by Robert Geist, MPH, CIC

When serious infections from a common organism rapidly become more frequent, more serious, and are harder to treat, the problem merits the close attention of healthcare professionals and those who serve to protect the public's health. The organism of concern is *Clostridium difficile* (commonly called *C. diff.)*, and infections from this organism are largely linked to delivery of healthcare. The Kansas Department of Health and Environment's (KDHE) Healthcare Associated Infections (HAI) Program, along with other healthcare partners and providers, have taken a multipronged approach to address issues that can lead to infections caused by *C. difficile*.

What is *C. difficile* and how does it cause serious intestinal illness?

C. difficile is often found living in harmony in the gastrointestinal (GI) tract of about 3% of healthy adults and 70% of infants. Normally, it takes up residence along with the 500 to 1,000 other different microbial species that call the GI tract home throughout life and are normally kept in balance by one another. *C. difficile* is a gram-positive, rod-shaped, spore-forming bacteria that is anaerobic (lives in the absence of oxygen) and optimally adapted to live in humans.

How does this relatively normal GI flora cause serious infections?

The growing problem is largely attributed to how this organism has changed over the past several decades in response to antibiotic therapies. The organism has become more virulent. Ordinary strains of *C. difficile* produce two toxins, called toxins A and B, but some current strains can produce up to 16 times more toxin A and 23 times more toxin B.

When presented with an intestinal tract where antibiotic therapy has removed the good microorganisms that normally protect us, *C. difficile* can take advantage, proliferate, and cause serious infections. The toxins *C. difficile* produces injure the lining of the colon, producing diarrhea, inflammation, and sometimes cause a life-threatening condition called toxic megacolon.

(Continued on page 2)

CALENDAR OF UPCOMING EVENTS:

EpiTrax User Group

When: Wed. Feb. 27, 2013 at 9:00 — 10:30 a.m.

Register: https://www1.gotomeeting.com/register/610518737

EpiTrax Training Webinar Series—Epi & Surveillance Performance Measures

When: Thurs. Mar. 14, 2013 at 9:00 — 10:30 a.m.
Register: https://www1.gotomeeting.com/register/816251416 or

When: Thurs. Mar. 14, 2013 at noon—1:30 p.m.
Register: https://www1.gotomeeting.com/register/850073896

(Continued from page 1)

How is *C. difficile* spread and who is affected?

Persons with *C. difficile* shed the organism in feces. *C. difficile* can survive in its vegetative (active) state in the presence of oxygen for up to 24 hours, at which point it can transition into a spore form. The spore form (where it has shriveled up and the outer layer forms a tough protective shell) can survive on inanimate surfaces for up to two years. The spore form of *C. difficile* is so hardy that alcohol-based hand gels have no effect on them. Persons can unknowingly pick up the spores and either acquire the organism themselves or transfer it to others, where it is acquired through ingestion.

Although *C. difficile* infections can occasionally crop up without rhyme or reason, the vast majority of victims are patients in hospitals or long-term care facilities. The great majority of them have received antibiotics. Patients with serious illnesses and prolonged hospitalizations are at particular risk, as are people over 65 years of age. Because stomach acid helps fight off *C. difficile*, powerful anti-ulcer medications in the proton-pump inhibitor family may also increase vulnerability. Virtually any antibiotic can pave the way for *C. difficile*, but the most frequent offenders are the drugs that are most likely to alter the GI bacteria. In addition to clindamycin, common offenders include broad-spectrum penicillins, cephalosporins, and fluroquinolones.

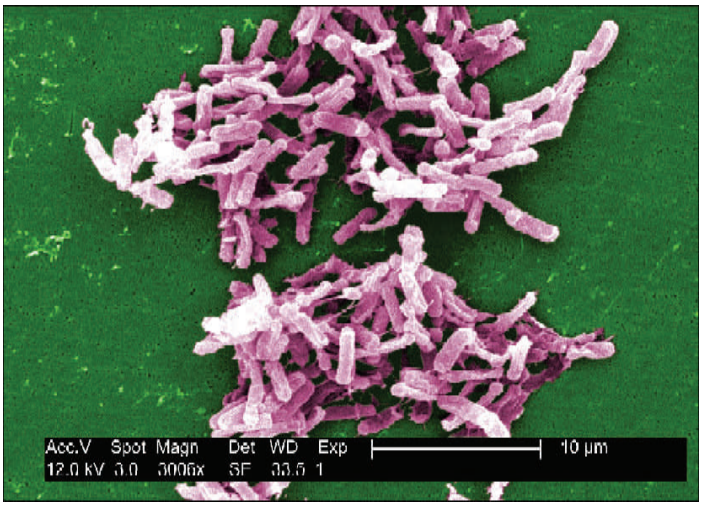
How big is the problem?

While several HAI infections are declining in the U.S., *C. difficile infections* are at historical highs. *C. difficile* infections are linked to 14,000 deaths in the U.S. and at least one billion dollars in extra health care costs each year. Deaths related to *C. difficile* have increased 400% between 2000 and 2007. Almost half of infections occur in people younger than 65, but more than 90% of deaths occur in people 65 and older. About 25% of *C. difficile* infections first show symptoms in hospital patients; 75% first show in nursing home patients or in people recently cared for in doctors' offices and clinics.

What is being done to prevent *C. difficile infections*?

The problem is multifaceted and requires a multipronged approach. Beginning in 2011, the Kansas HAI Plan requested voluntary participation from healthcare facilities to begin reporting *C. difficile* infections through the National Healthcare Safety Network, through which partnering facilities were able to share data with KDHE. This was an important first step in attempting to quantify the effects of *C. difficile* in Kansas. While initial reporting in 2011 and 2012 was not yet robust enough to develop a clear picture, beginning in 2013 new reporting requirements at the national level from the Centers for Medicare and Medicaid Services (CMS) have ensured that vastly more *C. difficile* data will be available this year.

In December 2012, the Kansas Foundation for Medical Care (KFMC), in collaboration with KDHE's HAI Program and other key healthcare partners, kicked off a statewide initiative to reduce healthcare acquired *C. difficile* infections. This project, working with seven partner facilities, will provide the knowledge and tools needed to empower facilities to take the necessary steps to prevent *C. difficile* infections, improve patient care, and enhance antimicrobial stewardship efforts focused on better use and coordination of antibiotics, antimicrobial products, and proton-pump inhibitors.



Clostridium difficile

KDHE's HAI Program has also been working with Kansas Department on Aging and Disability Services (KDADS) on initiatives to prevent infections from C. difficile. In January 2013, KDADS published Guidelines for the Prevention and Control of Clostridium difficile in Long Term Care Facilities (link: www.aging.ks.gov/AdultCareHomes/Newsletters/Sunflower/2013January.pdf). In addition, the program has been working with KDADS and long-term care facilities, to provide education on the admission of residents with *C. difficile* and on sharing of important infection control information when residents with *C.difficile* transfer between healthcare facilities.

In addition, KDHE's HAI Program frequently provides education and consultation on the identification of *C. difficile* infections for surveillance, use of evidence-based infection prevention and control methods, and implementation of antimicrobial stewardship programs to prevent infections. To learn more, two excellent resources provided by the program are: Living with *C.difficile* (brochure) (azdhs.gov/phs/oids/hai/documents/HAIcommittee/cdiff-living-with-pamplet-professional.pdf) and the CDC's Vital Signs (newsletter) *Making Healthcare Safer, Stopping C. difficile Infections* (www.cdc.gov/vitalsigns/HAI/index.html).

To learn more about the Kansas HAI Program, please call Joseph Scaletta at (785) 296-4090.

Vaccine-Preventable Disease Surveillance Indicators

Chelsea Raybern, MPH

The completeness and quality of specific surveillance indicators for vaccine-preventable diseases (VPDs) reported to the Kansas Department of Health and Environment from January 1—31, 2013, can be found in the table below. The bolded percentages represent the indicators that have less than 90% completion. Fields in EpiTrax that were filled in as unknown or left blank were considered unanswered for the completeness of indicators. The case counts presented in this report are preliminary numbers and are subject to change.

Keep up the good work! Date of birth, gender, and race were completed for at least 90% of all VPDs reported from January 1—31, 2013; and ethnicity was greater than 90% for all VPDs except for *Streptococcus pneumonia* cases. All surveillance indicators were completed for the one mumps case and for at least 94% of varicella cases except for transmission setting. Local health departments completed 100% of the investigations for all of the reported varicella cases. Whether the patient had died was completed for at least 95% of VPDs, with the exception of *Haemophilus influenzae* cases. The median number of days for local health departments to accept *Haemophilus influenzae* and *Streptococcus* pneumoniae cases were zero and one, respectively.

Still room for improvement…Completeness of onset date and vaccination status was much lower than 90% for more than half (*Haemophilus influenzae*, influenza-associated pediatric mortality, pertussis, and *Streptococcus pneumoniae)* of the reported VPDs in January. Transmission setting for pertussis and varicella cases was only completed for 33% and 53% of reported cases, respectively. A majority of the indicators for *Streptococcus pneumoniae* cases were below 90% complete including ethnicity (85%), onset date (51%), hospitalization (88%), vaccination status (37%), and completed investigations (80%). Completed investigations were lower than 90% for more than half of all reported VPDs (*Haemophilus Influenzae*, influenza-associated pediatric mortality, pertussis, and *Streptococcus pneumonia*). Even though the median number of days for local health departments to accept *Streptococcus pneumonia* cases was one, the range was zero to 43 days. Also, the median number of days for acceptance of varicella cases was seven days with a range of zero to 14 days.

Please focus on completing these fields in EpiTrax for all VPDs as the goal is to reach 90% or higher completion on all indicators. For the one timeliness indicator (report to case acceptance), the data shows delayed case acceptance, so please work towards accepting cases and starting the investigation the same day the local health department receives notification.

For questions regarding this data, please contact Chelsea Raybern at (785) 296-0339 or craybern@kdheks.gov.

VPD Indicators Reported from January 1—31, 2013 in Kansas

Indicators	*Haemophilus Influenzae*, invasive	Influenza-associated pediatric mortality	Mumps	Pertussis	*Streptococcus pneumoniae*, invasive	*Varicella*
Number of reported cases	8	2	1	33	41	32
% of cases with date of birth	100%	100%	100%	100%	100%	100%
% of cases with gender	100%	100%	100%	100%	100%	100%
% of cases with race	100%	100%	100%	91%	93%	97%
% of cases with ethnicity	100%	100%	100%	91%	**85%**	94%
% of cases with onset date	**38%**	**50%**	100%	**88%**	**51%**	94%
% of cases with hospitalized noted	**88%**	**50%**	100%	94%	**88%**	100%
% of cases with died noted	**88%**	100%	100%	100%	95%	97%
% of cases with vaccination status	**75%**	**50%**	100%	**73%**	**37%**	94%
% of cases with transmission setting	N/A§	N/A§	100%	**33%**	N/A§	**53%**
% of investigations completed by local health departments†	**75%**	**50%**	100%	**88%**	**80%**	100%
Median # of days from report to case acceptance (range)‡	0 (0-6)	0 (0-4)	4 (4)	3 (0-11)	1 (0-43)	7 (0-14)

*Indicator considered complete if either polysaccharide or conjugate pneumococcal vaccine history is documented
§Indicator field not included in supplemental disease form
†Status includes when local health department completes investigation, approves the case, or when the case is closed by state
‡Time from public health report date to when local health department accepts case

	Month Reported to EpiTrax - January 2013						
	State Case Status					Grand Total	Average 2010—2012
	Not Available	Confirmed	Not a Case	Probable	Suspect		
Disease	**Count**	**Count**	**Count**	**Count**	**Count**	**Count**	**Count**
Campylobacteriosis	22	10	1	0	22	**55**	**39**
Cholera (*Vibrio cholerae)*	0	0	1	0	0	**1**	**1**
Cryptosporidiosis	0	1	0	1	0	**2**	**2**
Dengue	2	0	0	0	0	**2**	**2**
Ehrlichiosis, *Ehrlichia chaffeensis* (f. HME)	0	0	0	1	0	**1**	**1**
Ehrlichiosis/Anaplasmosis, undetermined	0	0	1	0	0	**1**	**1**
Giardiasis	4	8	0	0	1	**13**	**7**
Haemophilus influenzae, invasive disease (Including Hib)	0	8	1	0	0	**9**	**9**
Hepatitis A	39	1	28	5	2	**75**	**39**
Hepatitis B pregnancy event	2	0	0	0	0	**2**	**2**
Hepatitis B virus infection, chronic	9	1	14	24	0	**48**	**48**
Hepatitis B, acute	0	0	2	1	0	**3**	**3**
Hepatitis C virus, past or present	92	71	27	1	9	**200**	**105**
Hepatitis C, acute	2	0	0	0	0	**2**	**2**
Influenza	0	13	1	0	29	**43**	**36**
Influenza-associated pediatric mortality	0	2	0	0	0	**2**	**2**
Legionellosis	2	1	0	0	1	**4**	**3**
Listeriosis	1	0	0	0	0	**1**	**1**
Lyme Disease (*Borrelia burgdorferi)*	10	2	2	0	0	**14**	**14**
Meningitis, bacterial other	2	0	0	0	1	**3**	**2**
Mumps	2	0	5	0	0	**7**	**7**
Non-Reportable Condition	0	8	0	0	0	**8**	**8**
Norovirus	0	5	1	0	18	**24**	**21**
Outbreak Case—unknown etiology	0	5	0	0	0	**5**	**5**
Pertussis	14	14	5	7	1	**41***	**21**
Q-Fever (*Coxiella burnetti),* acute	1	0	0	0	0	**1**	**1**
Rabies, animal	5	4	2	2	2	**15**	**9**
Salmonellosis	0	18	0	0	0	**18**	**18**
Shiga toxin-producing *Escherichia coli* (STEC)	2	5	0	0	0	**7**	**7**
Shigellosis	0	7	1	0	0	**8**	**8**
Spotted Fever Rickettsiosis (RMSF)	4	0	2	0	0	**6**	**6**
Streptococcal disease, invasive, Group A	0	5	0	0	0	**5**	**5**
Streptococcal disease, invasive, Group B	1	0	1	0	0	**2**	**2**
Streptococcus pnemoniae, invasive disease	6	34	3	0	0	**43**	**43**
Tetanus *(Clostridium tetani)*	0	0	1	0	0	**1**	**1**
Tularemia (*Francisella tularensis)*	1	0	0	0	0	**1**	**1**
Varicella (Chickenpox)	10	3	12	18	2	**45**	**24**
West Nile virus non-neuroinvasive disease	0	0	1	0	0	**1**	**1**
Yersiniosis	1	0	0	0	0	**1**	**1**
Grand Total	**234**	**226**	**112**	**60**	**88**	**720**	

* Increase in case count is due to outbreak(s).

EpiTrax Updates & Reminder

1. As of **January 1, 2013**, the Kansas Department of Health and Environment (KDHE) will no longer be expecting local health department staff to investigate Hepatitis A cases that have only a total antibody positive laboratory result. These cases will be marked "Not a case" and closed by KDHE staff. If an IgM result is then received, the case will be reopened for investigation.
2. Since KDHE is now receiving some laboratory reports through electronic laboratory reporting (ELR), staff are occasionally entering negative Hepatitis B and C results. These cases will be marked "Not a case" and closed. If laboratory results indicating infection are received later, the case will be reopened for investigation. In addition, KDHE is entering new laboratory results for previously "Confirmed" cases. If the case is not reopened, the local health department investigator is not expected to do further investigation.
3. A new report has been created in the AVR under the "LHD Reports" folder titled "Open Investigations Report." To access this report click on "File" then "Open." This will bring up a window with available folders. Double click the "LHD Reports" folder and highlight the "Open Investigations Report" then click "Open." It will open as an Excel file. (You will need to adjust column and row width with the "Format" tool). This report includes only cases in your jurisdiction that have not been routed to the state for review ("Approved by LHD") or closed. This report allows you to track the completion of core demographics and timeliness of investigation of your open cases (at the time you pull the report) by disease. The following is a list of the column headers in the report and the EpiTrax fields they corresponds to:

Excel Header	Corresponding Field in EpiTrax	Comments
MD Dis Nm	Disease name	Clinical tab
ME Rec Nbr	Record number	Administrative tab
ME PH Stat	Public health status	Where the case is in the routing workflow – in the case header
ME LHD Case Stat Cd	LHD case status	Administrative tab
ME St Case Stat Cd	State case status	Administrative tab
ME Dt Rptd to PH	Date reported to public health	Sorted by this field in descending order (most recent cases on top)
ME Invstgtr	Investigator	In the case header
ME Dt inv Strtd	Date investigation started	Administrative tab - Date calculated by the system when an investigator accepts the case
ME Dt Inv Cmpl	Date investigation complete	Administrative tab - Date calculated by the system when the "Complete" button is hit
ME Dt Updtd	Date Updated	Date the case was last updated
Dt_frst_rep_to_LHD	Date first reported to local health department	Administrative tab - This field is not calculated by the system, but was added to account for cases that were reported to the LHD prior to being reported to the state. This date should not be later than the "Date first reported to public health"
Dt_LHD_Inv_Started	Date local health department investigation started	Administrative tab - This field is not calculated by the system, but was added to account for cases where the LHD investigation starts prior to the date that an investigator accepts the case in EpiTrax.
Dt_LHD_inv_cmpltd	Date local health department investigation completed	Administrative tab - This field is not calculated by the system, but was added to account for cases where the LHD investigation is completed prior to the date that an investigator hits "Complete" in the case in EpiTrax.
MP Frst Nm	First name	Demographics tab
MP Lst Nm	Last name	Demographics tab
MP Brth Gndr	Birth gender	Demographics tab
MP Brth Dt	Date of birth	Demographics tab
MP Ethncty	Ethnicity	Demographics tab
MP Race	Race	Demographics tab
ME City	City	Demographic tab - Address
ME Cnty	County	Demographic tab - Address
ME Pstl Cd	Zip code	Demographic tab - Address
ME Dt Dis onst	Onset date	Clinical tab
ME Dt Dis Diag	Diagnosis date	Clinical tab
ME Hospitalized	Hospitalized	Clinical tab
ME Died	Died	Clinical tab
ME Preg	Pregnant	Clinical tab
ME Outbrk Assoc Cd	Outbreak associated	Administrative tab

Please email epitraxadmin@kdheks.gov, if you have any questions or feedback. Thank you!

Tracking Sexually Transmitted Infections with Quality Improvement, Google Maps©, and Data

Barbara Berry, APRN, Geary County Health Department, Research Director
Michele Fischer, LPN, Geary County Health Department, Research Assistant
Jennifer Schwartz, MPH, Research Epidemiologist, Research Advisor

Background

There is urgency among the Geary County Health Department (GCHD) staff to lower the high sexually transmitted infection (STI) rates in Geary County. The staff is concerned due to reports from the Kansas Department of Health and Environment (KDHE) indicating that Geary County had the highest Chlamydia rate in Kansas, and was second only to Wyandotte County for the highest rate of gonorrhea (KS STD Statistics, 2011). Over the years, GCHD staff has pulled together to lower Geary County's teen pregnancy rate, which for decades had consistently been highest in the state. The staff has also established a community collaborative with an obstetrics and gynecology clinic, medical clinic, federally qualified health center dental clinic, the March of Dimes, and a local charity to lower the high infant mortality rate.

The staff feels empowered by these victories and is up to the challenge to lower STI rates. However, questions remain as to how to take on such a formidable challenge, and what tools are available. The staff is approaching this challenge by relying on years of training in Quality Improvement (QI) provided by KDHE, Kansas Association of Local Health Departments, and Kansas Health Institute. As a result of this training, GCHD has developed a QI culture and is equipped to systematically approach problems and discover solutions.

Methods

One of the first lessons in QI is to thoroughly know the data. For this reason, the health department's staff needs to know who and where the STI clients are so that prevention, treatment, and education can be tailored to their needs. To discover this information, all 421 clients who were tested for STI at the health department in 2012 were included. This sample also contained 120 clients who were treated for STI due to the following reasons: lab confirmed STI diagnosis, STI symptoms, or contact to a diagnosed case. The 120 treated clients represent the population of interest because they were more likely to practice at risk behavior and had a higher risk of contacting an STI. Demographic information for the sample was compiled from GCHD's database. Addresses were plotted using Google Maps ©.

Measures

Descriptive statistics that categorize the population were used to visualize who the clients were. Google Maps© was used to determine where the clients were in Geary County. Sample clusters, dividing features, neighborhood characteristics, and socio-economic status were noted.

Results

Table 1 provides demographics for the sample of 421 clients who were tested for STI. The data shows that Non-Hispanic African Americans were tested in slightly higher numbers than Non-Hispanic Caucasians. Hispanics were tested in significantly lower numbers, while other groups were not seen in sufficient numbers to impact the data.

Table 1. Race and ethnicity of clients tested for STI in 2012

	NON-HISPANIC	HISPANIC	TOTAL
BLACK OR AFRICAN AMERICAN	200	6	206
CAUCASIAN	172	29	201
NATIVE AMERICAN/ ALASKA NATIVE	0	2	2
ASIAN/PACIFIC ISLANDER	3	0	3
NATIVE HAWAIIAN	2	0	2
OTHER	3	1	4
UNKNOWN	2	1	3
TOTAL	382	39	421

Demographics

Tables 2 and 3 refer to the number of clients from the sample of 120 clients who needed treatment. The tables show that about the same number and percentage of African American and Caucasian females needed treatment; and comprise the largest groups followed by African American males.

Table 4 shows that the average age of clients needing treatment was 28 years for females and 25 for males.

Table 2. Race, ethnicity, and gender of clients treated for STI in 2012

	FEMALE	MALE	HISPANIC		TOTAL
			Female	Male	
BLACK OR AFRICAN AMERICAN	34	27	1	1	63
CAUCASIAN	37	8	8	2	55
NATIVE AMERICAN/ ALASKA NATIVE	1	0	0	0	1
ASIAN/ PACIFIC ISLANDER	0	1	0	0	1
NATIVE HAWAIIAN	0	0	0	0	0
TOTAL	72	36	9	3	120

Table 3. Percentage by race, ethnicity, and gender of clients who needed treatment

	FEMALE	MALE	Total
BLACK OR AFRICAN AMERICAN	28%	23%	51%
CAUCASIAN	31 %	7%	38%
HISPANIC	8%	3%	11%
Total %	67%	33%	100%

Table 4: Average age of clients that needed treatment by race and gender

	FEMALE (years)	MALE (years)
BLACK OR AFRICAN AMERICAN	28	25
CAUCASIAN	27	26

Google Maps© Results

The next step in the process was to determine where clients in the treatment sample were located so that effective outreach could be provided. The addresses were available in the health department's database and plotted using Google Maps©, to look for clusters and location characteristics.

Discussion

From the demographic data, the populations at risk in the community who will most likely seek treatment for STI at the local health department are: African American and Caucasian females, and African American males who are between the ages of 25-28. To gain information about client location, clusters were examined on Google Maps©. Clients who accessed services at the local health department were located in low to moderate income apartments, mobile home parks, and low income rental houses that were dispersed throughout Junction City, Geary County's largest semi-urban town, with *US Census* 2011 population estimate of 35,323. Having identified at-risk clients and locations, the staff's next job is to use the QI process to discover best methods of outreach, which may include social media, that will appeal to these populations.

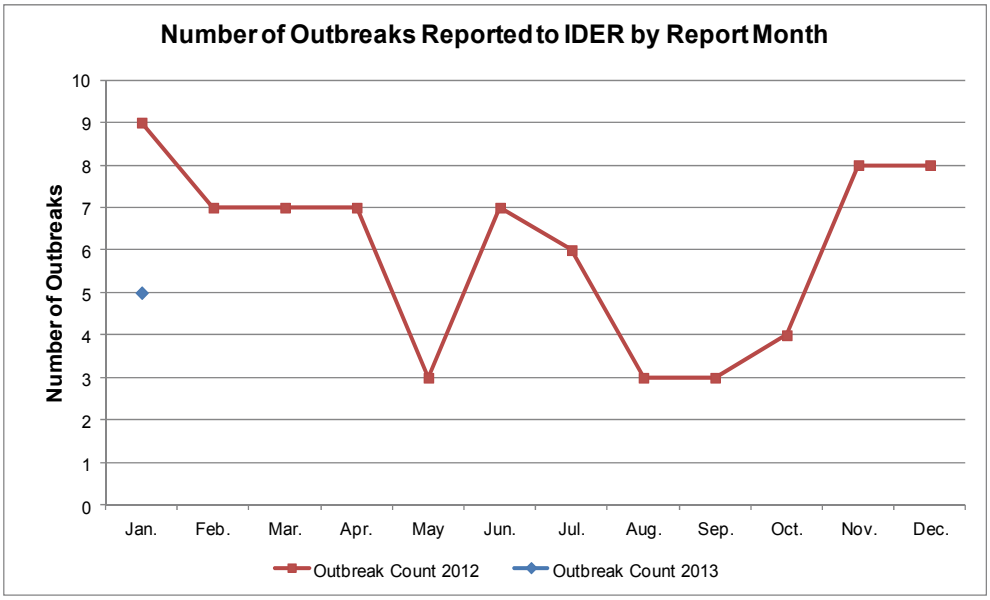
References

Dariotis et al, (2011), *Racial-Ethnic Disparities in Risk Behaviors and STDs During the Transition to Adulthood for Young Men*, Journal of the American Medical Association, www.ncbi.nlm.nih.gov/pmc/articles/PMC3132868/.

Kansas Department of Health and Environment, KS STD Statistics, www.kdheks.gov/std/std_reports.html.

United States Census 2012, http://quickfacts.census.gov/qfd/maps/kansas_map.html.

Monthly Outbreak Summaries



Facility Type	Organism	Transmission	County	Reported Date
Hotel or Motel	Non-Reportable Condition	Water	Saline	1/4/2013
School or College	Norovirus	Person-to-Person	Crawford	1/9/2013
Adult Care Facility	Norovirus	Person-to-Person	Shawnee	1/10/2013
Adult Care Facility	Influenza	Person-to-Person	Shawnee	1/22/2013
Other	Norovirus	Indeterminate/Other/Unknown	Pawnee	1/29/2013