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Kansas Department of Health & Environment

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Getting Smarter about Antibiotics

by Robert Geist, MPH, CIC, FAPIC

Antibiotics and antimicrobial agents have been used by humans in the earliest known civilizations, when molds and plant extracts were used to treat infections. However, it wasn't until 1928, when Alexander Fleming discovered that penicillin had the ability to kill bacteria and could be compounded into a medicine. Penicillin was quickly nicknamed 'the wonder drug' and 'the miracle drug' because it was exceedingly effective, on a scale never seen before, at treating many types of bacterial infections that had been among some of the most common causes of morbidity and mortality.

As more 'antibiotics' were quickly discovered the nicknames of 'wonder drugs' and 'miracle drugs' became widely attributed to all antibiotics, and this produced a perception of grand efficaciousness around their use. However, shortly after the introduction of antibiotics, scientists began to identify bacteria that were resistant to antibiotics.

Nearly three-quarters of a century later, antibiotic use has grown expansively and so has the development of antibiotic resistant bacteria. Infectious conditions caused by antibiotic resistant bacteria are difficult, and sometimes impossible to treat, causing increased morbidity and mortality. Each year in the United States, at least two million people become infected with bacteria that are resistant to antibiotics and at least 23,000 people die as a direct result of these infections. In addition, almost 250,000 people each year require hospital care for *Clostridium difficile* (*C. difficile*) infections. In most of these infections, the use of antibiotics was a major contributing factor leading to the illness. At least 14,000 people die each year in the United States from *C. difficile* infections.[1]

Today, antibiotics are among the most commonly prescribed drugs used in human medicine and up to 50% of all the antibiotics prescribed are not needed or are not optimally effective as prescribed. Data from the National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS) of community antibiotic prescriptions indicate that in 2014 in Kansas, between 941 to 996 prescriptions for antibiotics were given per 1,000 patients seen in outpatient setting. [2] That's nearly 1 prescription, per Kansan, per year, and places Kansas among the highest of prescribing states in the nation.

On September 18, 2014, the White House announced an Executive Order stating that the Federal Government will work domestically and internationally to detect, prevent, and control illness and death related to antibiotic-resistant infections by implementing measures that reduce the emergence and spread of antibiotic-resistant bacteria and help ensure the continued availability of effective therapeutics for the treatment of bacterial infections.

In Kansas, we are implementing specific activities targeted at reducing inappropriate antibiotic use and learning more about the existence of antibiotic resistance in our state. The Healthcare-Associated Infections (HAI) Program at KDHE has been expanded to now be the Healthcare-Associated Infections and Antimicrobial Resistance (HAI/AR) Program. In November, the Kansas Foundation for Medical Care (KFMC) joined me in presenting, alongside our counterparts in Missouri and the Centers for Disease Control and Prevention (CDC) at the Mid-West Antimicrobial Stewardship Collaborative where we discussed our plans and activities to address this issue moving forward.

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In January the HAI/AR Program, in conjunction with KFMC, will collectively host and reconvene the long-standing Healthcare-Associated Infections Advisory Group (a workgroup of all of the agencies, organizations, and partners involved in conducting and planning HAI prevention programs in Kansas) and will introduce and coordinate the new activities that involve antibiotic resistance prevention. This will be a major focus of this group moving forward.

The HAI/AR program has conducted a survey to understand how many hospitals have already implemented antibiotic stewardship committees, progress toward implementing core elements needed for success, and the successes and challenges experienced. Through this activity we identified a need to provide additional guidance to the 84 critical access hospitals in Kansas by developing a 'toolkit', similar to those produced by the CDC for other healthcare settings. We look forward to its release soon.

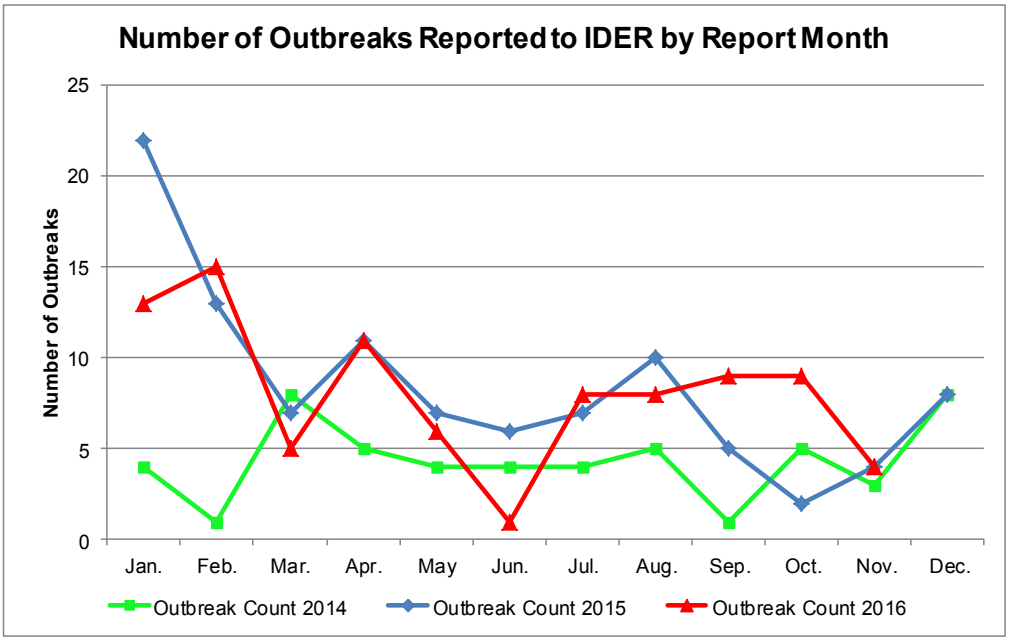
Additionally, we have surveyed clinicians on their testing and treating practices for asymptomatic bacteriuria. Infectious Disease Society of America (IDSA) guidelines recommend only testing and treating these types of cases in very specific, limited, circumstances. Yet, 76% (141 of 184) clinicians were aware of the IDSA guidelines but had treated asymptomatic patients with antibiotics. This study will assist the HAI/AR advisory group in further identifying opportunities for projects aimed at improving the understanding and use of the IDSA guidelines.

Another planned activity is to work with a pilot facility in Kansas to implement the Antibiotic Use and Resistance Module of the CDC's National Healthcare Safety Network. This will help facilities, regional partners, states, and the CDC better understand the interactions between bacterial infections, "bugs", and antibiotics, "drugs". Regional awareness and intervention, in a collaborative approach, is one of the most effective ways to address antibiotic resistance.

For additional information about antibiotic resistance and stewardship please visit https://www.cdc.gov/getsmart/community/.

References:

1. Centers for Disease Control and Prevention. Antibiotic Resistance Threats in the United States, 2013. (2014). Website: https://www.cdc.gov/drugresistance/threat-report-2013/
2. Fleming-Dutra, K., et al. (2016). "Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulaotry Care Visits, 2010-2011. "JAMA: the Journal of the American Medical Association 315(17): 1864-1873. Website: https://www.cdc.gov/getsmart/community/programs-measurement/measuring-antibiotic-prescribing.html



Date Reported	Exposure Setting	Transmission	Disease	County
11/04/2016	Prison or Jail	Person-to-Person	Norovirus	Pawnee
11/16/2016	School or College	Person-to Person	Non-reportable Condition	Barton
11/28/2016	School or College	Person-to-Person	Norovirus	Sedgwick

Vaccine-Preventable Disease Surveillance Indicators

by Mychal Davis, MPH

The completeness and quality of specific surveillance indicators for vaccine-preventable diseases (VPDs) reported to the Kansas Department of Health and Environment from November 1 to November 30, 2016 can be found in the table below. The bolded percentages represent the indicators that have less than 90% completion. The case counts presented in this report are preliminary numbers and are subject to change.

Keep up the good work! The indicators for date of birth, gender, race, and ethnicity were equal to or above the 90% benchmark of all VPDs reported from November 1 to November 30, 2016.

Still room for improvement... Pertussis cases had six indicators fall below the 90% benchmark. Varicella and *Streptococcus pneumoniae* cases had four indicators fall below the benchmark.

Please continue to focus on completing these fields in EpiTrax for all VPDs as the goal is to reach 90% or higher completion on all indicators. For questions regarding this data, please contact Mychal Davis at (785) 368-8208 or mychal.davis@ks.gov.

VPD Indicators Reported from November 1 to November 30, 2016 in Kansas

Indicators	*Haemophilus Influenzae,* invasive	Mumps	Pertussis	*Streptococcus pneumoniae,* invasive	Varicella
Number of reported cases	5	1	21	27	28
% of cases with date of birth	100%	100%	100%	100%	100%
% of cases with gender	100%	100%	100%	100%	100%
% of cases with race	100%	100%	95%	100%	100%
% of cases with ethnicity	100%	100%	90%	93%	100%
% of cases with onset date‡	100%	100%	**81%**	**70%**	**86%**
% of cases with hospitalized noted	100%	100%	**86%**	**85%**	96%
% of cases with died noted	100%	100%	**81%**	**85%**	93%
% of cases with vaccination status*	100%	100%	**86%**	**78%**	**82%**
% of cases with transmission setting¶	N/A**	100%	**86%**	N/A**	**11%**
% of cases with completed symptom profiles	N/A**	100%	**76%**	N/A**	**48%**

*Excludes cases with a State Case Status of "Out of State" or "Not a Case."
‡Data is pulled from onset date field within the clinical tab, not the investigation tab.
*Unknown is considered a valid response if patient is older than 18 years of age.
**Indicator field is not included in supplemental disease form; *S. pneumoniae* and *H. influenzae* do not have clinical case definitions.
§Indicator considered complete if either polysaccharide or conjugate pneumococcal vaccine history is documented.
¶Unknown is considered a valid response for this indicator.

EpiTrax Data Quality Indicators

by Sheri Tubach, MPH, MS

BEPHI has implemented a set of monthly quality indicators and performance measures to encourage data quality improvement in EpiTrax and timeliness of investigations. The first column is the EpiTrax field, the second column represents the number of cases with data in the field, and the third column, percent completed, represents the frequency of completion of the data field in EpiTrax. In order to align with preparedness targets for initiation of disease control measures and to set goals for case investigation completeness, targets for these measures are shown in the table below. We hope that these targets will help local health departments prioritize case investigations. County level indicators are now emailed to each local health department monthly. Percentages noted in red indicate a decrease in completeness compared to October 2016. The goal is to have a majority of indicators and performance measures at or above 90%. While many of the indicators have improved since last month, there are still indicators that are below 90%.

For questions, contact Sheri Tubach at Sheri.Tubach@ks.gov.

November 2016	State's Total Number of Cases* = 222	
EpiTrax Indicators		
EpiTrax Field	Number of Cases with Field Completed	Percent Completed
Address City	216	97
Address County	222	100
Address Zip	215	97
Date of Birth	221	100
Died	200	90
Ethnicity†	183	82
Hospitalized	202	91
Occupation	145	65
Onset Date	169	76
Pregnancy††	102	**81**
Race †	195	88
Sex †	220	99
Date LHD Investigation Started	175	79
Date LHD Investigation Completed	162	73
Persons Interviewed	146	**69**
Persons Lost to Follow-Up	21	10
Persons Refused Interview	5	2
Persons Not Interviewed	40	19
Performance Measures		
	Number of Cases	Percent of Cases
Diseases were reported on time according to disease reporting regulations***	189	**85**
Disease control measures began within the target for each disease^	131	**59**
Case investigations were completed within the target for each disease^	94	42

* Calculations do not include Hepatitis B - chronic, Hepatitis C – chronic, or Rabies.
** Out-of-state, discarded, deleted, or those deemed to be not a case are not included in this calculation.
† Unknown considered incomplete.
†† Pregnancy completeness calculated on females only.
^ See the table on the following page for disease control and case investigation targets.

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Disease Targets

Diseases	Disease Control (Days)*	Completed Case Investigation (Days)**
Anthrax; Botulism; Brucellosis; Cholera; Diphtheria; Hantavirus Pulmonary Syndrome; Hepatitis A; Influenza deaths in children <18 years of age; Measles; (Meningitis, bacterial); Meningococcemia; Mumps; Plague; Poliomyelitis; Q Fever; Rabies, human; Rubella; Severe acute respiratory syndrome (SARS); Smallpox; Tetanus; Tularemia; Viral hemorrhagic fever; Yellow fever	1	3
Varicella	1	5
Pertussis	1	14
Campylobacter infections; Cryptosporidiosis; Cyclospora infection; Giardiasis; Hemolytic uremic syndrome, post diarrheal; Hepatitis B, acute; Legionellosis; Listeriosis; Salmonellosis, including typhoid fever; Shigellosis; Shiga-toxin *Escherichia coli* (STEC); Trichinosis; Vibriosis (not cholera)	3	5
Arboviral disease (including West Nile virus, Chikungunya, and Dengue); *Haemophilus influenzae*, invasive disease; *Streptococcus pneumoniae*, invasive	3	7
Ehrlichiosis / Anaplasmosis; Lyme disease; Malaria; Spotted Fever Rickettsiosis	3	14
Hepatitis B, chronic; Hepatitis C, chronic; Hepatitis C, acute; Leprosy (Hansen disease); Psittacosis; Streptococcal invasive, drug-resistant disease from Group A Streptococcus; Toxic shock syndrome, streptococcal and staphylococcal; Transmissible spongioform encephalopathy (TSE) or prion disease	N/A	N/A

***Disease Control:** Calculated by using EpiTrax Fields: **(Date LHA Investigation Started) - (Date Report to Public Health)**

****Completed Case Investigation:** Calculated by using EpiTrax fields: **(Date LHD Investigation Completed) - (Date Reported to Public Heath)**

***** Disease Reporting:** Calculated by using EpiTrax fields: **(Lab Test Date, Date Diagnosed - Presumptive, or Date Diagnosed whichever date is earlier) - (Date Reported to Public Health)**≤ KDHE required disease reporting timeframe

Monthly Disease Counts

The Monthly Disease Counts Report will no longer be part of *Epi Updates*. Please refer to the Cumulative Case Reports of Diseases (http://www.kdheks.gov/epi/case_reports_by_county.htm) for current case count information.