Bureau of Epidemiology & Public Health Informatics

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Preliminary Analysis of Heat-Related Deaths in Kansas, 2011

By Henri Ménager, MPH

Background

Each year in the United States, heat waves cause thousands of injuries, illnesses, and deaths; many of which are easily preventable with simple interventions[1]. According to the U.S. National Weather Service, a heat wave is "a period of abnormally and uncomfortably hot and unusually humid weather. Typically a heat wave lasts two or more days"[2]. However, there is no one technical definition of heat wave as the effects and interpretation of hot weather vary by region depending on climate and population characteristics [3]. Studies have shown, during heat waves, mortality increases by 3.7% compared to non heat wave days[4]. During the summer of 1995, for example, a heat wave claimed more than 400 lives in Chicago, Illinois[5]. The 1995 heat wave lasted 16 days; however days with high temperatures do not have to be consecutive to have a significant effect on mortality[6].

When appropriate measures are not in place, heat waves can cause significant amount of excess mortality, especially among the elderly, the poor, and disenfranchised populations [7]. Studies have shown that widows and widowers as well as unmarried subjects [8] are particularly vulnerable to high summer temperatures [9] and increasing social contact was associated with favorable health outcomes following exposure to high ambient temperatures [10, 11]. Previous studies have also shown that the elderly, and especially those with chronic diseases and psychiatric illnesses, were at higher risk than other of dying during heat waves [7, 10, 12].

In an effort to assess the health impacts of high ambient temperatures in Kansas, an ad hoc surveillance system was set up to monitor heat-related health events reported on death certificates and by Kansas hospitals. The focus of this report is on the information collected from the death certificates and does not include data from the hospital reports; which are described elsewhere.

Methods

For the purpose of this study, as death certificates with heat exposure or high ambient temperature listed as the immediate or underlying cause of death were submitted to the Office of Vital Statistics (OVS) at the Kansas Department of Health and Environment (KDHE), additional information from these certificates was collected and entered into a database to maintain an accurate and current count of deaths.

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Calendar of Upcoming Events:

EpiTrax Training:

EpiTrax trainings for local health department system users are being held through February. Sign up on KS-TRAIN. If you have any questions, please contact Susan Dickman at (785) 296-7732 or epitraxadmin@kdheks.gov

Have an upcoming event you would like included in the next issue?

Contact vbarnes@kdheks.gov with details.

Heat-related death was defined as any death that occurred between May 1 and September 30, 2011 among Kansas residents and where exposure to environmental heat or a condition caused or exacerbated by exposure to environmental heat was listed as the immediate or the underlying cause of death on the death certificate. SAS 9.2 was used to calculate descriptive statistics such as frequencies, means, range, mode and standard deviations.

Results

From May 1 to September 30, 2011, the state of Kansas experienced a number of days with excessive ambient temperatures. Based on temperature records from the National Climatic Data Center (NCDC)[13], 10 urban centers across the state had an average of 77.7 days at or above 90° Fahrenheit during the period of May 1 to September 30, 2011. Although important, heat index was not used in this study. As of November 22, 2011, 29 heat-related deaths were reported by Kansas coroners; resulting in a crude death rate of 1.01/100,000 (Figure 1). Of those, 7 (24.1%) were women and 22 (75.9%) were men (Figure 2). The average age of the decedents was 67.0 years for women (CI 53.9-81.1) and 64.9 years for men (CI 59.5-73.6). Overall, the average age was 66.7 years (CI 58.1-71.7). Most of the decedents, (23 or 82.1%) were white non-Hispanic. Twenty of the decedents (69.0%) had a high school education or less. Seven (24.1%) had some college education. Three of the decedents (10.3%) were married at the time of death. The remaining 89.7% included 16 who were divorced (55.2%), 8 who never married (27.6%) and 2 (6.9%) who were widowed.

Nineteen of the 29 decedents (65.5%) died in their own residences, most of which (63%) lacked a functioning air conditioner as noted on the death certificates in the injury description field. The remaining died in hospice facilities (6.9%), in hospital emergency rooms (6.9%) and in other places (18.5%) such as parking lots, prisons, alley ways, or fields. Eleven of the decedents (37.9%) resided in Sedgwick County and the remaining 18 (62.1%) lived in 13 other counties. Two of the deaths (6.9%) were work-related.

Twenty-two decedents (75.9%) had been diagnosed with a chronic disease such as cardiovascular disease and diabetes prior to the heat exposure reported on the death certificate. Anti-psychotic medication and intoxication with alcohol or drugs were major factors leading to the death of many decedents. Seven (24.1%) had intoxication as an immediate or underlying cause of death. In the lowest age quartile, 53 years or younger, this proportion was 57.1% (4 out of 7). In addition, a large proportion of the women who died (42.9%) had intoxication as an immediate or underlying cause of death.

Discussion

In the US, heat waves cause more deaths than floods, hurricane, and tornadoes combined[14]. In the past two decades, heat waves have claimed many lives in the Midwest region of the United States [15, 16]. In Kansas, in the summer of 2011, the occurrence of an unusually high number of days with maximum daily temperatures above 90° F coincided with 29 heat-related deaths. The number of deaths is likely to be an under-count since the diagnosis criteria medical examiner and coroner jurisdictions have been shown to vary greatly [17]. In addition, the reported crude rates may be unstable due to small numbers in some demographic categories.

Risk factors for morbidity and mortality due to excessive ambient heat, as well as the characteristics of vulnerable populations, have been well documented. They include the elderly and the very young, co-morbidities, physical exhaustion, alcohol and drugs abuse, poor housing conditions,

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Figure 1. Number of Heat-Related Deaths by Date of Death, Kansas, Summer 2011

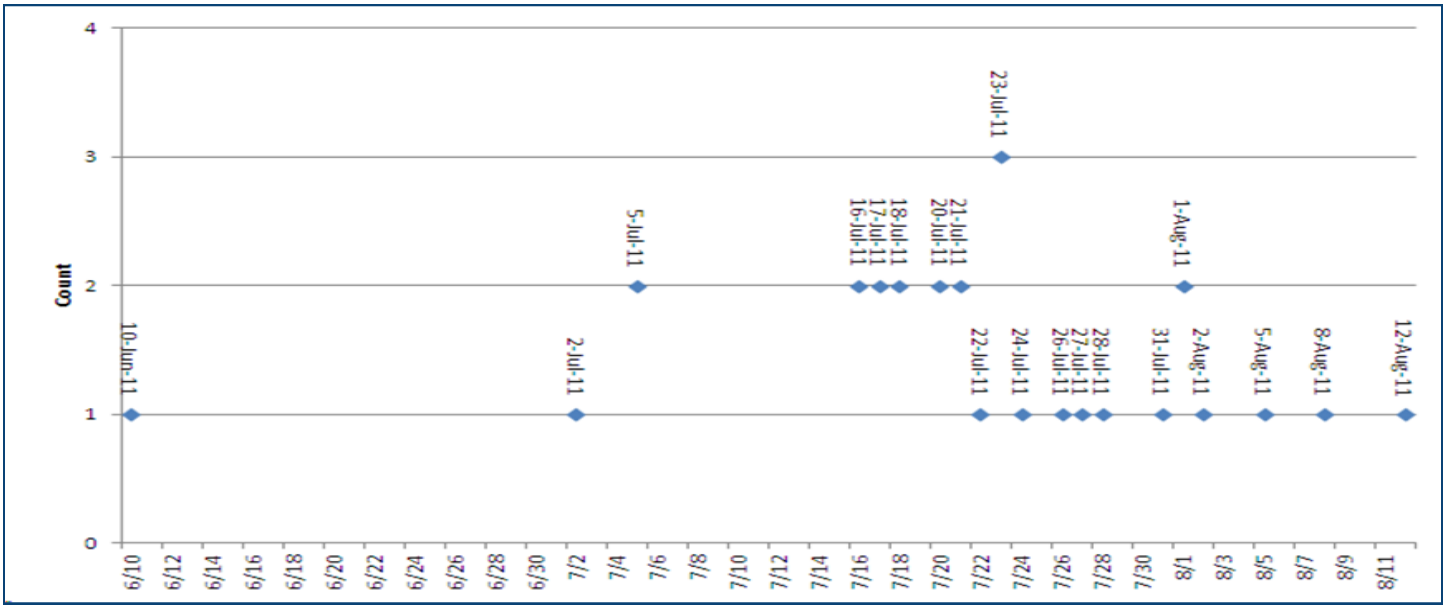

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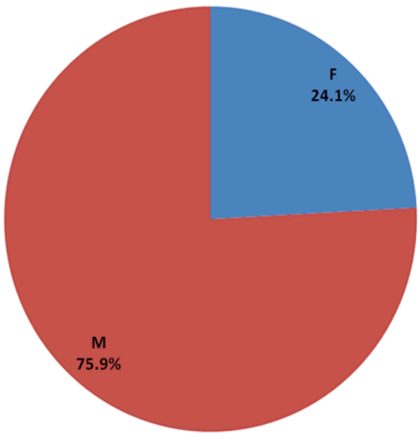
Figure 2. Percent of Heat-Related Deaths by Sex, Kansas, Summer



and social isolation among others [1, 18, 19]. Most of those risk factors were identified in this group of decedents in 2011. The finding of this study, which showed a higher proportion of men dying from heat-related causes compared to women, was surprising as previous studies have found that women were more at risk of dying during heat events than men [7, 9, 20].

During episodes of excessive heat, attention should be focused on those high-risk groups to reduce injuries, illnesses, and deaths. Relief efforts should include availability of cooling places, encouraging active cooling behaviour using air conditioning and fans, assistance to the elderly and individuals with chronic diseases, education for athletes and coaches, and education for the general public. Mental health and substance abuse-related professionals should inform their clients of the danger of environmental heat exposure and increase their surveillance efforts[21]. Summer weather forecast should include heat index information [14] in addition to maximum and minimum temperatures and businesses should monitor workers exposed to strenuous activities and prolonged activity in the sun[18].

Conclusions

Twenty nine heat-related deaths were recorded in Kansas during the summer of 2011. All the decedents had at least one of the known risk factors for mortality associated with heat waves. In this study, elderly, unmarried men, with high school level of education or less and living in homes with non functioning air conditioner were more at risk than others of dying from elevated ambient temperature. Research has shown that those deaths are preventable if proven preventive measures are in place. In order to reduce the vulnerability of the Kansas population to future periods of excess heat, a comprehensive set of preventive measures should be initiated. In addition, more studies, including studies of non-fatal morbidity events, are needed to fully understand the local risk factors associated with heat-related deaths in Kansas.

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References

1. Kilbourne, E.M., et al., *Risk factors for heat-stroke. A case-control study.* JAMA, 1982. **247** (24): p. 3332-6.

2.NWS. *Glossary*. 2009 [cited 2011 Oct 10]; National Weather Service]. Available from: http://nws.noaa.gov/glossary/index.php?letter=h .

3. Knowlton, K., et al., *The 2006 California heat wave: impacts on hospitalizations and emergency department visits.* Environ Health Perspect, 2009. **117**(1): p. 61-7.

4.Anderson, G.B. and M.L. Bell, *Heat waves in the United States: mortality risk during heat waves and effect modification by heat wave characteristics in 43 U.S. communities.* Environ Health Perspect, 2011. **119**(2): p. 210-8.

5.Whitman, S., et al., *Mortality in Chicago attributed to the July 1995 heat wave.* American journal of public health, 1997. **87**(9): p. 1515-8.

6.Gasparrini, A. and B. Armstrong, *The impact of heat waves on mortality.* Epidemiology, 2011. **22**(1): p. 68-73.

7.Basu, R., *High ambient temperature and mortality: a review of epidemiologic studies from 2001 to 2008.* Environ Health, 2009. **8**: p. 40.

8.Schifano, P., et al., *Susceptibility to heat wave-related mortality: a follow-up study of a cohort of elderly in Rome.* Environ Health, 2009. **8**: p. 50.

9.Stafoggia, M., et al., *Vulnerability to heat-related mortality: a multicity, population-based, case-crossover analysis.* Epidemiology, 2006. **17**(3): p. 315-23.

10.Bouchama, A., et al., *Prognostic factors in heat wave related deaths: a meta-analysis.* Archives of internal medicine, 2007. **167**(20): p. 2170-6.

11.Reid, C.E., et al., *Mapping community determinants of heat vulnerability.* Environ Health Perspect, 2009. **117**(11): p. 1730-6.

12.Lamb, K.V., C. O'Brien, and P.J. Fenza, *Elders at risk during disasters.* Home Healthc Nurse, 2008. **26**(1): p. 30-8; quiz 39-40.

13.NCDC. *National Climatic Data Center: Protecting the Past, Revealing the Future*. 2011 [cited 2011 Oct 10]; National Climatic Data Center]. Available from: http://www.ncdc.noaa.gov/oa/ncdc.html.

14.Hartz, D.A., et al., *Climate and heat-related emergencies in Chicago, Illinois (2003-2006).* Int J Biometeorol, 2011.

15.*Heat-related deaths--Chicago, Illinois, 1996-2001, and United States, 1979-1999.* MMWR. Morbidity and mortality weekly report, 2003. **52**(26): p. 610-3.

16.Weisskopf, M.G., et al., *Heat wave morbidity and mortality, Milwaukee, Wis, 1999 vs 1995: an improved response?* American journal of public health, 2002. **92**(5): p. 830-3.

17.Wolfe, M.I., et al., *Heat-related mortality in selected United States cities, summer 1999.* Am J Forensic Med Pathol, 2001. **22**(4): p. 352-7.

18.Knobeloch, L., et al., *Heat-related illness and death, Wisconsin, 1995.* Wis Med J, 1997. **96**(5): p. 33-8.

19.Leon, L.R. and B.G. Helwig, *Heat stroke: role of the systemic inflammatory response.* Journal of applied physiology, 2010. **109**(6): p. 1980-8.

20.Green, H., et al., *An analysis of factors contributing to a series of deaths caused by exposure to high environmental temperatures.* The American journal of forensic medicine and pathology, 2001. **22**(2): p. 196-9.

21.Cusack, L., C. de Crespigny, and P. Athanasos, *Heatwaves and their impact on people with alcohol, drug and mental health conditions: a discussion paper on clinical practice considerations.* J Adv Nurs, 2011. **67**(4): p. 915-22.

Monthly Outbreak Summaries

Cherokee County Varicella Outbreak – On September 12, 2011, the Kansas Department of Health and Environment was notified by the Cherokee County Health Department (CCHD) about a varicella outbreak in an elementary school. CCHD immediately contacted the school nurse to obtain a list of varicella cases associated with this outbreak and to identify any susceptible contacts. Nine cases were initially identified ranging from 3 to 9 years of age. Two cases were later diagnosed with bug bites leaving seven cases. The onset dates ranged from August 9, 2011 to September 13, 2011. The identified cases were isolated in their homes until six days after the first crop of vesicles appeared or until the lesions crusted over. No susceptible contacts were identified.—RG

Gastroenteritis Outbreak Associated with a Restaurant – Ellis County - On December 14, 2011, the Kansas Department of Agriculture (KDA) received a foodborne illness complaint. The caller stated that she and her daughter became ill with gastrointestinal symptoms after dining together at an Ellis County fast food restaurant, and was aware of others who experienced symptoms after eating there. ECHD began the outbreak investigation the next afternoon by interviewing the complainant, who provided contact information for five additional individuals who ate at the same restaurant.

A case was defined as any individual experiencing vomiting and/or diarrhea within 48 hours of eating at the fast food restaurant in Ellis County, Kansas from December 9 through December 11, 2011. Six suspect cases were identified; five were interviewed, and one did not return repeated telephone calls. The five individuals represented three separate households: one pair of individuals who dined together on December 11, another pair that dined together on December 9, and one individual who also dined on December 9. All were residents of Ellis County, and all met the case definition. Each individual reported vomiting, and two individuals also reported diarrhea. The median incubation period was 35 hours from the time of meal (range, 15 to 38 hours). The duration of illness was reported for three individuals; it ranged from approximately four to six days (median 4.8 days).

No common exposures other than the restaurant were reported among the three households. All individuals consumed fountain drinks with ice, and different menu items; however, because each menu item contained similar ingredients, illnesses could not be conclusively linked to an item. No stool specimens were collected, and no definitive diagnosis was obtained for the five cases.

Although the restaurant was associated with illness, neither the etiology of the outbreak nor the vehicle of transmission could be determined.

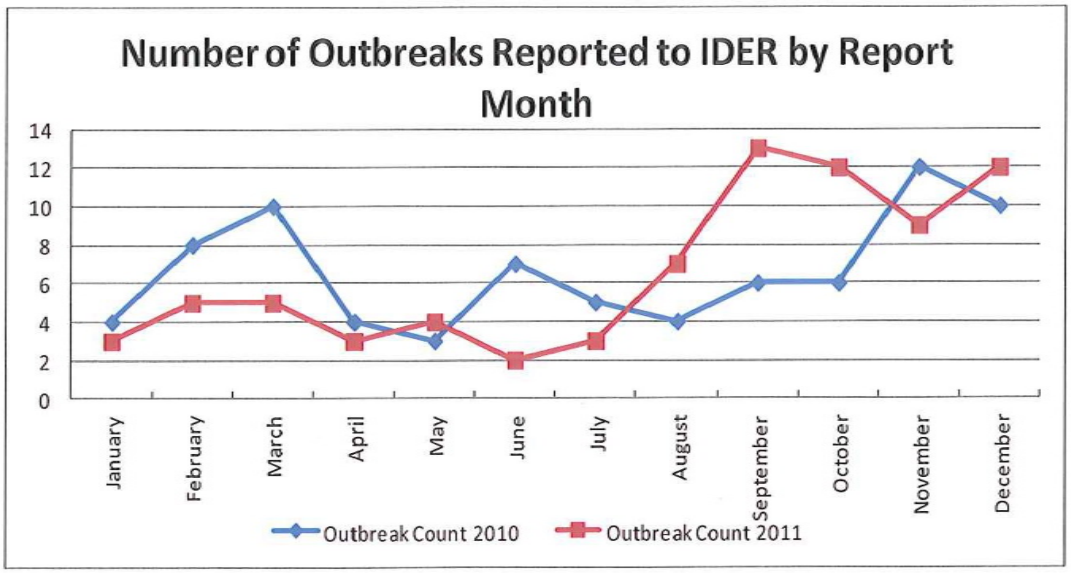
The inspection of the fast food restaurant was conducted on December 15, 2011. The restaurant inspection by KDA revealed one critical violation — improper cooling times were observed. Of the fifteen employee surveys returned to KDHE, two employees reported diarrhea on December 10, but no other symptoms of gastrointestinal illness.—DN

Cheyenne County Influenza Outbreak -On December 16, Cheyenne County Health Department (CCHD) was alerted to a cluster of influenza-like illnesses that had occurred among a group of co-workers. The investigation revealed that seven coworkers had become ill following attendance at a holiday party. Additionally, one family member of a coworker was also affected. Two specimens were obtained and tested positive for influenza. These were the first confirmed cases of influenza detected for the 2011-2012 influenza season. CCHD and KDHE worked with the employer and the families to ensure appropriate post exposure prophylactic treatment was made available for those who were ill. In addition, influenza vaccination was offered to those that were unvaccinated.—RG

Cherokee County Giardiasis Outbreak Associated with a European Cruise—On December 29, Cherokee County Health Department (CCHD), performing routine follow-up of a case of giardiasis, identified a cluster of cases that had traveled together on a European cruise vacation on the Danube River from November 7-14. Four cases of gastrointestinal illness were identified. Two cases reside in Kansas, one case in Iowa, and one case in Illinois. Two individuals tested positive for *Giardia lamblia*. The CDC Vessel Sanitation Program was notified and was following up with public health agencies in Europe.—RG

For reports of recently conducted outbreak investigations, please visit our website at http://www.kdheks.gov/epi/outbreaks.htm

To report an outbreak call the Epi Hotline at 1-877-427-7317



Norovirus Outbreaks in Three Long Term Care Facilities in Kansas

By Sheri Anderson and Robert Geist

According to the Centers for Disease Control and Prevention (CDC), norovirus causes more than 20 million gastrointestinal illness cases annually in the United States. Noroviruses can cause severe diarrhea and vomiting. This illness is self-limiting and usually lasts several days. Infection usually begins with rapid onset of vomiting, watery (non-bloody) diarrhea with abdominal cramps and nausea. Loss of fluids is the most common complication, especially among the young and elderly. Time between exposure to the virus and symptoms can be anywhere between 12 and 48 hours. It only takes a few viral particles to cause infection and an infected individual can infect thousands of others. Infection results from eating food and drinks contaminated with norovirus. It also occurs when touching surfaces or objects contaminated with norovirus, and then placing hands in the mouth or by having direct contact with another person who is infected. Both stool and vomit are infectious. Infected individuals may carry the virus for weeks after symptoms stop. This report describes three norovirus outbreaks occurring in long term care facilities in Kansas from November to December 2011.

On November 21, 2011, the Bureau of Epidemiology and Public Health Informatics at the Kansas Department of Health and Environment (BEPHI-KDHE) was notified by a long term care facility in Shawnee County Kansas about a possible outbreak of gastrointestinal illnesses among staff and residents. An outbreak investigation was initiated by Shawnee County Health Agency (SCHA), BEPHI-KDHE, and the long term care facility to determine the cause and extent of illnesses as well as to recommend prevention and control measures in order to stop transmission in the facility. The investigation revealed that 11 (41%) residents had become ill with gastrointestinal symptoms, ten (91%) had diarrhea, seven (67%) had vomiting and nausea, two (18%) had a fever, and one (9%) had abdominal cramps. Onset of illness occurred from November 17 to November 22. All residents have recovered. Illnesses lasted from one to four days. Six stool specimens were collected and tested. Three were positive for norovirus, two were positive for norovirus and *Clostridium difficile*, and one was positive for *C. difficile*. Four staff members also reported gastrointestinal illness during the same time frame. The facility closed to new admissions and stopped all transfers from the facility, all symptomatic patients were limited to one wing at the facility with designated nursing staff, visitation was limited, and environmental cleaning was increased. All staff members were notified about this outbreak and were encouraged to stay home if ill. With the rapid implementation of these recommendations, the transmission of norovirus within the facility was limited.

On November 22, Johnson County Health Department (JCHD) was alerted to a potential outbreak of gastrointestinal illness at a long term care facility. The investigation revealed thirty three cases (23%) of vomiting and/or diarrhea among residents and staff. Among the ill, thirty two (97%) had diarrhea, thirty two (97%) had abdominal cramps, seven (21%) had vomiting, four had nausea (12%), four had fever (12%), three had chills (9%), and one had headache (3%). Onset of illness occurred from November 11 to November 26. All residents have recovered. Two stool specimens were obtained and tested positive for norovirus. All symptomatic patients were limited to the affected wings at the facility with designated nursing staff and in-room meal service, visitation was limited, and environmental cleaning was increased. All staff members were notified about this outbreak and were encouraged to stay home if ill. Johnson County Environmental Department and the JCHD worked with the facility to ensure proper cleaning and control methods were being utilized, which interrupted the transmission of the disease.

On December 12, Seward County Health Department (SCHD) was alerted to a potential outbreak of gastrointestinal illness at a long term care facility. The investigation revealed nine cases (12%) among the residents. Among those ill, eight (89%) had vomiting, 6 (67%) had diarrhea, and one (11%) had a fever. Onset of illness occurred from December 9 to December 12. All residents have recovered. All symptomatic patients were limited to one wing at the facility with designated nursing staff and in-room meal service, visitation was limited, and environmental cleaning was increased. All staff members were notified about this outbreak and were encouraged to stay home if ill. Three stool specimens were obtained and tested positive for norovirus. SCHD and KDHE worked with the facility to ensure proper cleaning and control methods were being utilized, which interrupted the transmission of the disease. The illness was limited to only one unit in the facility and no staff became ill.

This is a report of three norovirus outbreaks associated with long term care facilities in Shawnee, Johnson, and Seward Counties. Rapidly identifying the outbreaks and quickly implementing effective infection control measures was crucial to preventing the further spread of norovirus and limited the number of individuals affected.

Breakdown of the 562 Cases* in KS-EDSS by Disease	December 2012	Average 09-11
Amebiasis (Entamoeba	1	0
Animal Bite, Potential Rabies Exposure	2	0
Babesiosis	1	0
Brucellosis (Brucella spp.)	1	0
Calicivirus/Norwalk-like virus (Norovirus)	8	18
Campylobacter Infection (Campylobacter spp.)	46	23
Cryptosporidiosis (Cryptosporidium parvum)	6	5
Ehrlichiosis; Ehrlichia chaffeensis	1	1
Enterohemorrhagic Eschericia coli shiga toxin positive (not serogrouped	3	2
Enterohemorrhagic Eschericia coli shiga toxin positive (serogrouped non-0157)	3	0
Giardiasis (Giardia lamblia)	17	10
Haemophilus influenza; invasive	5	2
Hepatitis A	47	28
Hepatitis B, acute	4	6
Hepatitis B, chronic	39	36
Hepatitis C virus infection; past or present	139	148
Influenza; A & B	2	0
Legionellosis	2	1
Lyme Disease (Borrelia burgdorferi)	12	10
Malaria (Plasmodium spp.)	1	1
Measles (Rubeola)	1	1
Meningitis, other bacterial	1	1
Meningococcal Disease (Neisseria meningitdis)	1	2
Mumps	3	6
Non-Reportable Condition	4	0
Pertussis (Bordetella pertussis)(Whooping cough)	78	53
Q-Fever (Coxiella burnetti); Acute	3	1
Rabies; Animal	1	4
Rubella (German measles)	4	1
Salmonellosis (Salmonella spp.)	25	26
Shigellosis (Shigella spp.)	13	24
Spotted Fever Rickettsiosis (RMSF)	4	6
St. Louis arbovirus; encephalitis/meningitis	1	0
St. Louis arbovirus; non-neuroinvasive	1	0
Streptococcal Disease; Invasive, Group A (Streptococcus pyogenes)	2	3
Streptococcus pnemoniae; invasive	11	9
Varicella (Chickenpox)	62	66
West Nile; non-neurological (Includes WN Fever)	4	2

** Cases reported include cases with the case classifications of Confirmed, Probable, Suspect, and Not a Case.*

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KDHE Mission:

To Protect and Improve the Health and Environment of all Kansans

Our Vision

Healthy Kansans living in safe and sustainable environments.

KS-EDSS Data Quality Indicators

KDHE BEPHI emailed local health department users and administrators their county level quality indicator data this month. The Bioterrorism Regional Coordinators also received a copy of the regional breakdown of the quality indicators. At this time the report included the county's preliminary data for the previous month. We hope to improve this process by adding a second report that will compare preliminary month data with final data. For example, for August local health departments would receive one report that includes preliminary numbers for July data and a second report with June preliminary completion data side-by-side with June final data (We will pull a June report August 1st with the assumption that all June cases should have the basic quality indicator fields completed at this point.) Please email vbarnes@kdheks.gov if you received an incorrect report, have questions, or believe you should have received a report but did not.

Fields in **bold blue** have improved since the previous month. Frequency of completion has declined in *italic brown* fields. All other fields in have not changed since the previous month.- Virginia Barnes

*Calculations do not include Hepatitis B, chronic or Hepatitis C, chronic (denominator: 384 cases).

** Out-of-state cases not included in this calculation.

Animal rabies not included in this calculation (den: 561 cases).

† Unknown considered incomplete.

†† Only diseases with supplemental forms included in this calculation

December 2011	State's Total Case = 562	
KS-EDSS Indicator	Field Completed:	Percent Complete:
Address Street	476	85% **, #
Address City	**549**	**98% ****
Address County	560	100% **
Address Zip	536	96% **
Date of Birth	557	99% #
Died	**314**	**56% †**
Ethnicity	**360**	**64%, #,†**
Hospitalized	**309**	**55%, #, †**
Imported	*156*	*28%*
Onset Date	**189**	**36% *, #**
Race	**385**	**69%, #, †**
Sex	562	100%, #, †
Supplemental Form Complete	*214*	*54% ††*
Supplemental Form Partial	*133*	*33% ††*