IOWA SURVEILLANCE OF NOTIFIABLE AND OTHER DISEASES

Division of Acute Disease Prevention and Emergency Response & Environmental Health

Annual Report 2017

IOWA DEPARTMENT OF PUBLIC HEALTH

Promoting and Improving the Health of Iowans

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Introduction

This report provides a snapshot of notifiable and other diseases that occur in Iowa. When possible, details of each disease are provided, including information on serotypes, strains, and groups, and outbreaks. Comparisons to national rates are also provided whenever possible. Aggregated county-level data are in a table at the end of the report.

At the Iowa Department of Public Health (IDPH), the Center for Acute Disease Epidemiology (CADE) conducts surveillance for common and emerging infectious diseases, agents of bioterrorism, disease outbreaks, and rare and unusual acute diseases.

Although, this report provides an overview of disease investigations, it represents only a fraction of the work accomplished by IDPH staff each year. The time invested in each disease varies greatly by specific disease and nature of the reports received. Some reports require a quick database query and update of an electronic file. Others require hours of staff time in contact tracing, assisting other health investigators, and communication, education, and implementation of interventions.

Support for the initiatives of the Division of Acute Disease Prevention, Emergency Response & Environmental Health (ADPER & EH) comes from a variety of federal and state allocations and grants.

Methods

Disease reports are submitted to IDPH via phone, fax, mail, or a secure electronic reporting system. Reporters include health care providers, hospitals, local public health agencies, laboratories, and the public. Reports of diseases or exposures occurring outside of Iowa are reported by other states and the Centers for Disease Control and Prevention (CDC) to IDPH via the *Epi-X* system. CADE tracks diseases in Iowa residents; however, acquisition/exposure to these disease causing pathogens may have occurred in Iowa, another state, or outside of the United States.

The State Hygienic Laboratory (SHL) is Iowa's environmental and public health laboratory and has developed and maintained effective and productive collaborations with the Iowa Department of Public Health (IDPH) and several other state agencies. SHL laboratorians provide public health officials and healthcare providers guidance on specimen collection, submission, testing, and result interpretation. SHL communicates with sentinel laboratories via the Iowa Laboratory Response Network (ILRN) to disseminate LRN related updates and sponsor training exercises, workshops, webinars and regional meetings.

Reports received by CADE are tracked in the secure web-based Iowa Disease Surveillance System (IDSS). De-identified data (data with personal identifying information taken out) is electronically exchanged between IDSS and CDC.

The Iowa Department of Public Health is nearing full implementation of statewide electronic laboratory reporting (ELR). ELR from the SHL has been in place since March 2010. The national/regional reference labs (ARUP, Center for Disease Detection, LabCorp, MAYO, Planned Parenthood Laboratory Services Corporation, QUEST-via AIMS Platform, and Tamarac) are all sending laboratory results by ELR. In total, 47 ELR production connections (a smaller number than last year due to consolidation) have been established, all of which represent over 231 (more than last year) different laboratory or hospital locations in Iowa,

Minnesota, Montana, Nebraska, South Dakota, Wisconsin and many other states. There remain a handful of connections that still need to transition to production representing about 10 Iowa facilities. In addition, IDPH efforts to implement ELR with other state public health jurisdictions are ongoing; Iowa has live connections with Michigan, Nebraska, South Dakota and Wisconsin. There are open projects with Illinois, Kansas. ELR dramatically improves public health response time by taking 3 to 9 days off of the lag time that occurs with mail, fax and manual web entry reporting methods.

Reports of acute infectious diseases are typically referred to local public health agencies for patient investigations and interviews. These local agencies typically use IDSS to report information back to IDPH. Local public health agencies are also critical in conducting outbreak investigations at the city and county level.

CADE uses the most recent Council of State and Territorial Epidemiologists (CSTE)/CDC case definitions found at https://wwwn.cdc.gov/nndss/conditions/notifiable/2018/. CSTE/CDC definitions are used to classify each case as confirmed, probable, suspect, not a case, or awaiting more information. Only confirmed and probable cases of disease meeting the CSTE/CDC definitions are included in this report.

Influenza surveillance data was collected from multiple sources, including sentinel outpatient health care providers, sentinel hospitals, public health departments, clinical laboratories, and schools. Laboratory-confirmed influenza cases were based on real-time polymerase chain reaction (RT-PCR) test results sent from SHL. SHL also surveyed clinical and reference labs throughout the state for the weekly number of rapid influenza tests performed and number of positives. Influenza-associated hospitalizations were reported from the sentinel hospitals that participated in the Iowa Influenza Surveillance Network (IISN).

Respiratory syncytial virus (RSV) rapid antigen test data are used to determine the weekly positive predictive value of the rapid antigen tests in Iowa. SHL surveyed clinical and reference labs throughout the state for the number of rapid-antigen RSV tests performed and number positive weekly, and sent the survey results to IDPH.

Most disease-specific data are transmitted to CDC electronically on a routine basis after being de-identified. Some other disease information is communicated at the special request of CDC. The statistics reported by ADPER & EH programs to CDC are used to develop a composite picture of disease burden in the US.

A few diseases require a unique reporting system used by IDPH for transmitting de-identified data to program-specific staff at CDC. These diseases include influenza and West Nile virus. Additionally, the National Outbreak Reporting System (NORS) is a CDC-sponsored system used by IDPH to report outbreaks.

Disease case counts and Iowa-specific case demographics were retrieved from IDSS, which is maintained within CADE. The specific file used for this report was created in April 2017. Case reports and additional information received after this date were not included in this report. In addition, the data file was generated using CDC's MMWR (Morbidity Mortality Weekly Report) year 2017. Therefore, case counts in this report may vary slightly from counts generated using the calendar year of 2017.

Rates of specific diseases were calculated using the 2010 census population for the State of Iowa or the appropriate estimated census year. The enteric disease five-year averages were calculated by taking the average of the number of cases in the previous five years for each disease. Race and ethnicity data is self-

reported and a large percentage of that information is missing from our data sets, thus caution must be used when drawing conclusions from reported race and ethnicity. Calculations were performed with Tableau® 2018.3, and Microsoft® Excel. Maps were generated using Tableau® 2018.3.

Iowa 2010 Population by Age Group, Gender, Race and Ethnicity

	Number	Percent
Total Population	3,046,355	100.0
Under 5 years	202,123	6.6
5 to 9 years	200,646	6.6
10 to 14 years	200,904	6.6
15 to 19 years	216,837	7.1
20 to 24 years	213,350	7.0
25 to 29 years	197,843	6.5
30 to 34 years	184,740	6.1
35 to 39 years	177,148	5.8
40 to 44 years	187,400	6.2
45 to 49 years	216,482	7.1
50 to 54 years	223,244	7.3
55 to 59 years	204,393	6.7
60 to 64 years	168,357	5.5
65 to 69 years	124,365	4.1
70 to 74 years	100,291	3.3
75 to 79 years	83,387	2.7
80 to 84 years	70,187	2.3
85 years and over	74,658	2.5

Gender	
Female	1,538,036
Male	1,508,319
Race	
White	2,781,561
Black	89,148
Asian	53,094
Other	122,552
Ethnicity	
Non-Hispanic	2,894,811
Hispanic	151,544

Iowa County Boundaries

Section 1

TABLES OF SELECT REPORTABLE DISEASES AND CONDITIONS

Table 1. Common reportable diseases by county – Iowa 2017

	Anaplasmosis / Ehrlichioses	Brucellosis	Campylobacteriosis	Chikungunya	CRE	Cryptosporidiosis	Cyclosporiasis	Dengue	E. coli (STEC)	Giardiasis	Haemophilis influenzae type B	Hemolytic Uremic Syndrome (HUS)	Hepatitis A	Hepatitis B (acute)	Hepatitis B (chronic)	Hepatitis D	Legionellosis	Listeriosis	Lyme disease	Meningococcal invasive disease	Mumps	Pertussis	Q Fever (acute)	Q Fever (chronic)	Rocky Mountain spotted fever	Salmonellosis	Shigellosis	Tularemia	West Nile virus	Total
Adair			2			1																2				3	1			9
Adams						1																								1
Allamakee	3		12			10			1	3									2							9			1	41
Appanoose			8		1	4			1						2							5			1	3				25
Audubon			4			3			1																	2				10
Benton	1		17		1	10			4						1		1		9		6					5	1			56
Black Hawk			6	1		4			2	9					16	1	2		7	1	12	14				31	1			107
Boone		1	13		1	3	1		3	4	1	1							2			2				11				43
Bremer			3						1	2					1				1		3	1				2				14
Buchanan			9			4			2	5	1										1					11				33
Buena Vista			20			7			1			1			4				1							4	7		1	46
Butler			1			1				1							2				1			1		1				8
Calhoun			15				1		2																1	5	1			25
Carroll			10			4			5	2												3				9				33
Cass			4						2	1				1								2				4				14
Cedar			6			6			4										4			1				7	1			29
Cerro Gordo	1		17			4			3	2					4		1	1	2			1				7				43
Cherokee			2			1			4						1			1	1							9				19
Chickasaw			6			1			1								1		1							3				13
Clarke			9			2				1													1			4	1			18
Clay			4			3			2						1											1				11
Clayton	1		11			11	1		3			1			1		1		16		6		1			5				58
Clinton			24		1	3			2	1					5		2				1					16				55
Crawford			10			2			4	1											1					1	1			20
Dallas	1		25		4	23		1	4	7				1	5				3			7			2	23	6			112
Davis			1			1							1													3				6
Decatur			1			2																					1	1		5
Delaware			15		1	8			4	2									3		6	1				7				47
Des Moines	1		10			9			5				2		1				1							11	2			42
Dickinson			7			7			1	1					1				1				1			3				22
Dubuque	1		44		2	28	1		18	11					4		2		36		15	2	1		1	23	3			192

	Anaplasmosis / Ehrlichioses	Campylobacteriosis	CRE	Cryptosporidiosis	Cyclosporiasis	E. coli (STEC)	Giardiasis	Hemolytic Uremic Syndrome (HUS)	Hepatitis A	Hepatitis B (acute)	Hepatitis B (chronic)	Hepatitis D	Lacrosse encephalitis	Legionellosis	Listeriosis	Lyme disease	Malaria	Mumps	Pertussis	Q Fever (acute)	Rocky Mountain spotted fever	Salmonellosis	Shigellosis	Tetanus	Tularemia	West Nile virus	Total
Emmet		1		2		1	1							1		1					1						8
Fayette		2	3	1		1	3				3					3						5					21
Floyd		15					1				1					2	1					5					25
Franklin		3					1											1				1	2				8
Fremont		2																			1		1				4
Greene		9		2		5	2	1														2					21
Grundy																2		2				5					9
Guthrie		8		1		4	1											2				4					20
Hamilton		4		2		3	1				1							1		1		4	1				18
Hancock		4		2		1																4					11
Hardin	1	17				1	1									1						3					24
Harrison	1	4				4	1				1						1	1			1	1					15
Henry		5					1													1		5					12
Howard		6		4						1						1						1		1			14
Humboldt		4		1			1															2					8
Ida		1		1																						1	3
Iowa	1	8		2		3	1													1		2					18
Jackson		14	2	6		4	3									7			2			7					45
Jasper		19		4		4	2		1		2			1		2	1				1	10	1				48
Jefferson	1	4		4	1		3				2					1						1					17
Johnson	1	43	1	12	4	13	17				20			2		43	4	7	22			36	2				227
Jones		13		5		5	3				1			1		4		1				2					35
Keokuk		6	1	5												1					1	4					18
Kossuth		5		2		3	2				1											2					15
Lee	1	4	12	5		2	2															4	3				33
Linn	1	61		40	1	12	24				23					33	1	11	6			55	5			1	274
Louisa		3					1				2											1					7
Lucas	1	10		3		6	1						1							1							23
Lyon		6		6		6	1	1														9				2	31
Madison		15		7		4	2															1			1		30
Mahaska		11		2	2	1	2							1								8					27
Marion		8		8							1					1			3			7					28
Marshall	1	9	1	1	3	3	2				6	1		1	1	2		1				8	1				41
Mills		3		3		3								1								4	3				17
Mitchell		14		10		10	4															2					40

	Anaplasmosis / Ehrlichioses	Babesiosis	Brucellosis	Campylobacteriosis	Chikungunya	CRE	Cryptosporidiosis	Cyclosporiasis	Dengue	E. coli (STEC)	Giardiasis	Haemophilis influenzae type B	Hansen's disease (Leprosy)	Hemolytic Uremic Syndrome (HUS)	Hepatitis A	Hepatitis B (acute)	Hepatitis B (chronic)	Hepatitis D	Hepatitis E	Lacrosse encephalitis	Legionellosis	Listeriosis	Lyme disease	Malaria	Meningococcal invasive disease	Mumps	Pertussis	Q Fever (acute)	Q Fever (chronic)	Rocky Mountain spotted fever	Salmonellosis	Shigellosis	Tetanus	Tularemia	West Nile virus	Total
Monona				1							1																				3					5
Monroe				3		1	4			1																	2				2					13
Montgomery				3		2											1																			6
Muscatine				15		1	3	1	1	13	3				1	1	3		1		1		2				1				8	24				79
O'Brien				9			1			1	2																				7					20
Osceola				3			1																								1				1	6
Page				6			1			2	1																				5					15
Palo Alto				9						2							1														1					13
Plymouth				7			9			5	4						1									1					1					28
Pocahontas				8			2			3				1																4					18
Polk				160		2	58	6		21	54				3	4	98	4			3		21	7		7	35	1		3	105	27		1	1	621
Pottawattamie	1			22		2	3	1	1	6	8						8				4		3				3			1	18	9			1	91
Poweshiek				6			1														1							1		1	3				1	14
Ringgold				2			3																1													6
Sac				12			5				3																	1			4					25
Scott				35		2	9	1		11	15	1			1	2	13				4		14		1	1	36				26	48				220
Shelby				9			7			4				1		1	1											1			9					33
Sioux				26			34	2		2	9						1						1					1			19	2				97
Story	2	1		37		1	17	2		3	14						8				1		5	3		13		1			20	6			1	135
Tama				3		1	4			1													2			2					8	3				24
Taylor							1			1				1																						3
Union				9			6			4	1						1				1										2					24
Van Buren				7		1	3			1																	1				1					14
Wapello				21			4			2							7	1						1			2	1			3					42
Warren		1		18			8			1	10						2									4	1			1	16	1		1		64
Washington				9			2			2	1																3				4					21
Wayne				1														1													2					4
Webster				8			6		1	1	3												2			1		1			9					32
Winnebago	2			3			3																1								2					11
Winneshiek				15			16	1		1									1				8			11					6	1				60
Woodbury	1			17		3	17		1	5	7		1			1	14						1				3			1	17	4			1	94
Worth				5			5			3																										13
Wright				8			1			1																					4	4				18
Total	24	2	1	1,154	1	47	538	29	5	276	273	3	1	8	9	12	270	8	2	1	35	3	255	19	2	119	161	16	1	17	738	174	1	4	12	4,221

Table 2. Confirmed and probable cases and incidence rate (Per 100,000 Population) of reportable diseases/conditions, Iowa 2013-2017

Reportable Disease/Conditions	2013		2014		2015		2016		2017	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Acute flaccid myelitis	-	-	-	-	-	-	-	-	1	-
Babesiosis	-	-	-	-	-	-	1	-	2	-
Botulism - Infant	3	-	0	-	2	-	0	-	0	-
Brucellosis	2	-	0	-	1	-	1	-	1	-
Campylobacteriosis	610	20.0	571	18.7	769	25.2	1053	34.6	1154	37.9
Chikungunya							2	-	1	-
Cholera	1	-	0	-	0	-	1	-	0	-
Cryptosporidiosis	1505	49.4	264	8.7	373	12.2	753	24.7	538	17.7
Cyclosporiasis	148	4.9	0	-	4	-	14	-	29	1.0
Dengue fever	3	-	4	-	4	-	11	-	5	-
E. coli (shiga toxin producing)	171	5.6	224	7.4	164	5.4	298	9.8	276	9.1
Ehrlichiosis /Anaplasmosis	8	-	17	-	11	-	14	-	24	0.8
Giardiasis	275	9.0	205	6.7	213	7.0	260	8.5	273	9.0
Haemophilis influenzae type b	1	-	4	-	2	-	0	-	3	-
Hansen's disease (leprosy)	1	-	0	-	0	-	1	-	1	-
Hantavirus	0	-	2	-	0	-	1	-	0	-
Hemolytic Uremic Syndrome (HUS)	6	-	6	-	5	-	6	-	8	-
Hepatitis A	17	-	12	-	16	-	16	-	9	-
Hepatitis B (acute)	11	-	9	-	16	-	10	-	12	-
Hepatitis B (chronic)	276	9.1	283	9.3	266	8.7	340	11.2	270	8.9
Hepatitis D / E	1/0	-	0/0	-	0/0	-	2/3	-	8/2	-
Legionellosis	11	-	33	1.1	36	1.2	33	1.1	35	1.2
Listeriosis	2	-	7	-	3	-	3	-	3	-
Lyme disease	247	8.1	194	6.4	318	10.4	232	7.6	255	8.4
Malaria	12	-	17	-	17	-	22	0.7	19	-
Meningococcal invasive disease	1	-	2	-	5	-	3	-	2	-
Mumps	3	-	10	-	411	13.5	732	24.0	119	3.9
Pertussis	308	10.1	222	7.3	173	5.7	161	5.3	161	5.3
Q Fever (acute)	4	-	7	-	1	-	6	-	17	-
Rocky Mountain spotted fever	8	-	10	-	8	-	11	-	17	-
Salmonellosis	575	18.9	527	17.3	618	20.3	776	25.5	738	24.2
Shigellosis	342	11.2	208	6.8	683	22.4	425	14.0	174	5.7
Tetanus	1	-	0	-	0	-	2	-	1	-
Tularemia	4	-	1	-	0	-	3	-	4	-
Typhoid fever	1	-	1	-	7	-	2	-	0	-
West Nile virus	44	1.4	15	-	14	-	37	1.2	12	-
Zika virus	0	-	0	-	0	-	28		1	-

Table 3. Reportable diseases by year – Iowa, 1997-2017

Notifiable Disease	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Acute flaccid myelitis																					1
Babesiosis																				1	2
Botulism			1					1		1	1	1							2		
Brucellosis	4	1	6		2	1			1	2		2	2		1		2		1	1	1
Campylobacteriosis	425	455	467	499	467	427	458	559	537	449	524	591	552	751	747	534	610	571	769	1053	1154
Chikungunya																				2	1
Cholera			1														1			1	
CRE																				1	47
Cryptosporidiosis	71	66	56	77	82	49	122	90	122	230	610	284	232	397	364	328	1505	264	373	753	538
Cyclosporiasis	1	3			1								1		1		148		4	14	29
Dengue Fever									1	1	6	5	2	2	5	2	3	4	4	11	5
Ehrlichioses / Anaplasmosis						1	1		4	7	7	7	8	2	8	6	8	17	11	14	24
Encephalitis (arboviral, except WNV)	3	3	3	4	3	3		2		1	1										1
E. coli	114	93	114	180	81	122	103	124	108	161	185	208	163	173	189	181	171	224	164	298	276
Hemolytic uremic syndrome															13	10	6	6	5	6	8
Giardiasis	358	429	377	420	345	315	277	301	280	302	301	326	291	284	270	251	275	205	213	260	273
Haemophilus influenzae Type b	6	5	2					1		2	1	2	1	1	3		1	4	2		3
Hansen's disease (Leprosy)		1		2	1				1	1		1		1			1			1	1
Hantavirus	2	1	2				1					1			1	1				1	
Hepatitis A	490	400	161	67	41	72	40	50	22	13	48	109	38	11	8	7	17	12	16	16	9
Hepatitis B acute /chronic	44/X	54/X	44/X	38/X	24/X	20/X	27/X	17/X	32/X	21/ 35	26/ 269	24/ 226	37/ 293	15/ 183	15/ 182	13/ 227	11/ 276	9/ 283	16/ 266	10/ 340	12/ 270
Hepatitis D																				2	8
Hepatitis E																				3	2
Legionellosis	12	11	17	15	8	13	12	8	8	13	12	21	24	16	11	13	11	33	36	33	35
Listeriosis		2	6	2	3	5		3	7	6	8	1	4	3	5	3	2	7	3	3	3
Lyme disease	8	27	24	34	36	42	58	56	91	97	124	109	108	87	100	165	247	194	318	232	255

Notifiable Disease	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Malaria	10	8	11	2	9	4	6	5	9	2	3	12	10	14	22	6	12	17	17	22	19
Measles (Rubeola)								3					1		1						
Meningococcal invasive disease	47	46	42	37	32	29	28	17	19	20	15	19	16	10	14	2	1	2	5	3	2
Mumps	10	11	8	8	1	1	2	2	6	1.963	27	24	15	38	8	6	3	10	411	732	119
Pertussis	207	78	111	67	167	230	182	1066	1106	342	150	257	235	705	232	1736	308	222	173	161	161
Plague																					
Poliomyelitis																					
Psittacosis					3				1												
Q fever Acute/Chronic																				6/1	16/1
Rabies, animal	160	153	159	81	83	74	105	100	108	57	31	29	35	27	25	31	12	15			
Rabies, human							1														
Rocky Mountain Spotted Fever	2	2	1	2	5	7	3	2	7	5	17	8	5	5	7	8	8	10	8	11	17
Rubella (German Measles)			30		1																
Salmonellosis	296	375	260	373	339	509	413	435	410	475	477	425	408	530	448	622	575	527	618	776	738
Shigellosis	90	69	74	569	367	122	93	64	103	134	109	214	53	57	18	91	342	208	683	425	174
Tetanus	1	1		1		1			1					1			1			2	1
Tularemia													1		3	1	4			3	4
Typhoid fever	1		1				2				1	6		3	4	3	1	1	7	2	
West Nile virus						52	147	23	37	37	30	5	5	9	9	31	44	15	14	37	12
VISA																				1	
Yellow Fever													2								
Zika virus																				28	1

Table 4: Confirmed and probable cases and incidence rate (Per 100,000 Population) of reportable diseases/conditions by gender, Iowa 2017

	Female		Male		Unk	Total	
	Cases	Rate	Cases	Rate	Unk	Cases	Rate
Babesiosis	2	-	-	-	-	2	-
Brucellosis	1	-	-	-	-	1	-
Campylobacteriosis	545	35.4	609	40.4	-	1154	37.9
Chikungunya	1	-	-	-	-	1	-
CRE	29	1.9	18	-	-	47	1.54
Crytpospridiosis	297	19.3	241	16.0	-	538	17.7
Cyclosporiasis	13	-	16	-	-	29	1.0
Dengue fever	1	-	4	-	-	5	-
E. coli and other shiga-toxin producing	138	9.0	138	9.2	-	276	9.1
Ehrlichiosis/Anaplasmosis	10	-	14	-	-	24	0.8
Giardiasis	119	7.7	154	10.2	-	273	9.0
Hemolytic uremic syndrome	4	-	4	-	-	8	-
Hepatitis A	5	-	4	-	-	9	-
Hepaitis B, acute	4	-	8	-	-	12	-
Hepatitis B, chronic	106	6.9	163	10.8	1	270	8.9
Hepatitis D	1	-	7	-	-	8	-
Hepatitis E	1	-	1	-	-	2	-
Legionellosis	12	-	23	1.5	-	35	1.2
Listeriosis	-	-	3	-	-	3	-
Lyme disease	95	6.2	160	10.6	-	255	8.37
Malaria	6	-	13	-	-	19	-
Meningococcal invasive disease	-	-	2	-	-	2	-
Mumps	59	3.8	60	4.0	-	119	3.9
Perussis (whooping cough)	87	5.7	74	4.9	-	161	5.3
Q fever (Acute and Chronic)	2	-	15	-	-	17	-
Rocky Mountain spotted fever	4	-	13	-	-	17	-
Salmonellosis	382	24.8	356	23.6	-	738	24.2
Shigellosis	106	6.9	68	4.5	-	174	5.7
Tetanus	-	-	1	-	-	1	-
Tularemia	1	-	3	-	-	4	-
Typhoid fever	-	-	-	-	-	-	-
VISA	-	-	-	-	-	-	-
West Nile virus	3	-	9	-	-	12	-

(-) Not applicable. Rates calculated for less than 20 cases are unreliable and therefore are not included in this table.

Table 5. Reportable disease cases and rates per 100,000 population by age group – Iowa, 2017

	0-4		5 to 19		20 to 29		30 to 39		40 to 64		>64		Total	
	Cases	**Rate**	**Cases**	**Rate**	**Cases**	**Rate**	**Cases**	**Rate**	**Cases**	**Rate**	**Cases**	**Rate**	**Cases**	**Rate**
Babesiosis	-	-	-	-	-	-	-	-	1	-	1	-	2	-
Brucellosis	-	-	-	-	-	-	1	-	-	-	-	-	1	-
Campylobacter	131	64.8	174	86.6	155	37.7	129	35.6	375	37.5	190	42.0	1154	37.9
Chikungunya	-	-	-	-	1	-	-	-	-	-	-	-	1	-
CRE	-	-	-	-	1	-	5	-	18	-	23	5.1	47	1.54
Cryptosporidiosis	82	40.6	142	23.0	94	22.9	74	20.4	94	9.4	52	11.5	538	17.7
Cyclospora	-	-	3	-	7	-	9	-	6	-	4	-	29	1.0
Dengue fever	-	-	1	-	1	-	2	-	1	-	-	-	5	-
E. coli (shiga-toxin producing)	81	40.1	83	13.4	36	8.8	28	7.7	24	2.4	24	5.3	276	9.1
Ehrlichiosis / Anaplasmosis	-	-	3	-	-	-	2	-	11	-	8	-	24	0.8
Giardiasis	40	19.8	48	7.8	29	7.1	37	10.2	89	8.9	30	6.6	273	9.0
Hansen's disease (leprosy)	-	-	-	-	-	-	-	-	1	-	-	-	1	-
Hemolytic Uremic Syndrome (HUS)	7	-	1	-	-	-	-	-	-	-	-	-	8	-
Hepatitis A	-	-	1	-	1	-	1	-	3	-	3	-	9	-
Hepatitis B (acute)	-	-	-	-	1	-	2	-	8	-	1	-	12	-
Hepatitis B (chronic)	-	-	12	-	61	14.8	90	24.9	98	9.8	9	-	270	8.9
Hepatitis D	-	-	-	-	2	-	2	-	4	-	-	-	8	-
Hepatitis E	-	-	-	-	-	-	-	-	2	-	-	-	2	-
Legionellosis	-	-	-	-	1	-	3	-	19	-	12	-	35	1.2
Listeriosis	-	-	-	-	-	-	-	-	-	-	3	-	3	-
Lyme disease	12	-	58	9.4	31	7.5	27	7.5	87	8.7	40	8.8	255	8.4
Malaria	1	-	3	-	6	-	3	-	6	-	-	-	19	-
Meningococcal invasive disease	-	-	-	-	-	-	1	-	1	-	-	-	2	-
Mumps	-	-	50	8.1	33	8.0	16	-	16	-	4	-	119	3.9
Pertussis	42	20.8	88	4.2	9	-	7	-	12	-	3	-	161	5.3
Q fever (acute and chronic)	-	-	-	-	1	-	3	-	8	-	5	-	17	-
Rocky Mountain spotted fever	-	-	1	-	2	-	5	-	5	-	4	-	17	-

	0-4		5 to 19		20 to 29		30 to 39		40 to 64		>64		Total	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Cases	Rate	Cases	Rate	Cases	Rate	Cases
Salmonellosis	98	48.5	93	15.0	102	24.8	90	24.9	228	22.8	127	28.0	738	24.2
Shigellosis	33	16.3	49	7.9	21	5.1	16	-	38	-	17	-	174	5.7
Tetanus	-	-	1	-	-	-	-	-	-	-	-	-	1	-
Tularemia	-	-	1	-	-	-	-	-	2	-	1	-	4	-
West Nile virus	-	-	-	-	1	-	-	-	8	-	3	-	12	

(-) Not applicable. Rates calculated for less than 20 cases are unreliable and therefore are not included in this table.

Section 2

TABLES OF REPORTED OUTBREAK INVESTIGATIONS

Table 6. Foodborne outbreaks

#	Mode of Transmission	Nature of Episode	Event/Place	County	Month	Number Affected	Number Exposed (if known)	Agent Involved
1	Foodborne	Gastrointestinal	Restaurant	Polk	January	2	2	Norovirus GII
2	Foodborne	Gastrointestinal	Restaurant	Cerro Gordo	January	5	6	Norovirus GII
3	Foodborne	Gastrointestinal	Restaurant	Johnson	February	11	14	*Clostridium perfringens*
4	Foodborne	Gastrointestinal	Restaurant	Polk	May	4	5	*Clostridium perfringens*
5	Foodborne	Gastrointestinal	Hotel	Polk	July	3	12	Norovirus GII
6	Foodborne	Gastrointestinal	Restaurant	Polk	July	3	7	*Clostridium perfringens*
7	Foodborne	Gastrointestinal	Restaurant	Story	August	7	16	*Clostridium perfringens*
8	Foodborne	Gastrointestinal	Community Event	Johnson	August	30	150	*Clostridium perfringens*
9	Foodborne	Gastrointestinal	Restaurant	Wapello	August	3	7	Unidentified
10	Foodborne	Gastrointestinal	Community Event	Johnson	August	14	75	*Clostridium perfrignens*
11	Foodborne	Gastrointestinal	Community Event	Cerro Gordo	October	11	28	Norovirus GII
12	Foodborne	Gastrointestinal	Community Event	Linn	October	5	15	Unidentified

Table 7. Animal-related outbreaks

#	Mode of Transmission	Nature of Episode	Event/Place	County	Month	Number Affected	Number Exposed (if known)	Agent Involved
1	Animal	Gastrointestinal	School	Sioux	March	7	65	*Cryptosporidiosis parvum*

Table 8. Non-foodborne person-to-person outbreaks

#	Mode of transmission	Type of Outbreak (GI, Respiratory, VPD, otherUnk)	Facility	County	Month	# of Cases	# exposed	Confirmed/Supect Pathogen
1	Person-to-Person	Respiratory	Long-term Care	Lee	January	13	79	Influenza A
2	Person-to-Person	Respiratory	Long-term Care	Dallas	January	30	100	Influenza A
3	Person-to-Person	Respiratory	Long-term Care	Lee	January	18	166	Influenza A
4	Person-to-Person	Respiratory	Long-term Care	Humboldt	January	15	54	Influenza A
5	Person-to-Person	Respiratory	Long-term Care	Wapello	January	21	336	Influenza A
6	Person-to-Person	Gastrointestinal	School	Chickasaw	January	14	137	Norovirus GII_4_untypeable
7	Person-to-Person	Respiratory	Long-term Care	Madison	January	10	67	Influenza Rapid A/B
8	Person-to-Person	Gastrointestinal	Long-term Care	Linn	January	28	51	Norovirus GII (1)
9	Person-to-Person	Respiratory	Long-term Care	Chickasaw	January	31	177	Influenza A
10	Person-to-Person	Gastrointestinal	Long-term Care	Black Hawk	January	92	141	Norovirus GII_4_untypeable
11	Person-to-Person	Gastrointestinal	Long-term Care	Emmet	January	45	202	Norovirus GI_4A_Winchester_GB97

#	Mode of transmission	Type of Outbreak (GI, Respiratory, VPD, otherUnk)	Facility	County	Month	# of Cases	# exposed	Confirmed/Supect Pathogen
12	Person-to-Person	Respiratory	Long-Term Care	Calhoun	January	6	90	Human coronavirus 0C43
13	Person-to-Person	Respiratory	Long-term Care	Polk	January	7	91	Influenza A H3
14	Person-to-Person	Gastrointestinal	Long-term Care	Muscatine	January	3	17	Norovirus GII
15	Person-to-Person	Gastrointestinal	Long-term Care	Black Hawk	January	61	186	Norovirus GI_3B_Potsdam_DE00
16	Person-to-Person	Gastrointestinal	School	Hardin	January	26	315	Norovirus GII
17	Person-to-Person	Respiratory	Community Living Center	Polk	January	9	84	Influenza A
18	Person-to-Person	Respiratory	Long-term Care	Page	January	10	83	Influenza A H3
19	Person-to-Person	Respiratory	Long-term Care	Dubuque	January	21	305	Influenza A H3
20	Person-to-Person	Gastrointestinal	Hospital	Polk	January	17	42	Norovirus GII
21	Person-to-Person	Respiratory	Long-term Care	Cerro Gordo	January	6	125	Influenza A H3
22	Person-to-Person	Other	Long-term Care	Bremer	November 2016	26	38	Scabies
23	Person-to-Person	Gastrointestinal	Swim Team	Poweshiek	January	19	56	Norovirus GII_4_untypeable
24	Person-to-Person	Gastrointestinal	Child Care Center	Dallas	January	37	Unk	Norovirus
25	Person-to-Person	Respiratory	Long-term Care	Marion	January	15	141	Influenza A H3
26	Person-to-Person	Respiratory	Long-term Care	Mills	December 2016	20	Unk	Influenza A H3
27	Person-to-Person	Respiratory	Hospital	Humboldt	January	7	Unk	Influenza A H3
28	Person-to-Person	Respiratory	Long-term Care	Dubuque	January	2	564	Influenza A H3
29	Person-to-Person	Gastrointestinal	Long-term Care	Carroll	January	27	40	Norovirus GII_4_untypeable
30	Person-to-Person	Gastrointestinal	Long-term Care	Clinton	January	9	69	Norovirus GII_untypeable
31	Person-to-Person	Gastrointestinal	Hospital	Pottawattamie	January	5	2	Norovirus GII_4_untypeable
32	Person-to-Person	Respiratory	Long-term Care	Delaware	January	27	136	Influenza A H3 / Parainfluenza 3
33	Person-to-Person	Respiratory	Long-term Care	Buchanan	February	15	84	Influenza A H3
34	Person-to-Person	Respiratory	Long-term Care	Carroll	February	7	304	Influenza A
35	Person-to-Person	Respiratory	Long-term Care	Pocahontas	January	13	81	Influenza A H3
36	Person-to-Person	Respiratory	Long-term Care	Dubuque	February	15	58	Influenza A H3
37	Person-to-Person	Respiratory	Long-term Care	Dickinson	January	30	117	Influenza A H3
38	Person-to-Person	Respiratory	Long-term Care	Jackson	February	6	55	Influenza A
39	Person-to-Person	Respiratory	Long-term Care	Butler	February	26	54	Influenza A H3
40	Person-to-Person	Respiratory	Long-term Care	Woodbury		9	162	Influenza A H3

#	Mode of transmission	Type of Outbreak (GI, Respiratory, VPD, otherUnk)	Facility	County	Month	# of Cases	# exposed	Confirmed/Supect Pathogen
41	Person-to-Person	Respiratory	Long-term Care	Lyon	February	9	120	Influenza A H3
42	Person-to-Person	Gastrointestinal	Long-term Care	Scott	February	58	64	Norovirus GII_untypeable
43	Person-to-Person	Respiratory	Long-term Care	Polk	February	14	60	Influenza Rapid A
44	Person-to-Person	Respiratory	Assisted Living	Polk	February	6	Unk	Influenza A H3
45	Person-to-Person	Respiratory	Senior Living	Polk		27	99	Influenza Rapid A
46	Person-to-Person	Respiratory	Long-term Care	Boone	February	14	245	Influenza A
47	Person-to-Person	Respiratory	Long-term Care	Benton	February	10	74	Influenza A H3
48	Person-to-Person	Respiratory	Long-term Care	Grundy	February	2	100	Influenza A H3
49	Person-to-Person	Respiratory	Long-term Care	Page	February	15	72	Influenza A H3
50	Person-to-Person	Respiratory	Long-term Care	Polk	February	13	137	Influenza A
51	Person-to-Person	Gastrointestinal	Long-term Care	Polk	February	28	87	Suspect Norovirus
52	Person-to-Person	Respiratory	Assisted Living	Decatur	February	5	34	Influenza A H3
53	Person-to-Person	Respiratory	Long-term Care	Shelby	January	11	Unk	Influenza A
54	Person-to-Person	Respiratory	Long-term Care	Calhoun	February	14	27	Influenza A
55	Person-to-Person	Respiratory	Long-term Care	Lee	February	2	199	Influenza A / B
56	Person-to-Person	Respiratory	Long-term Care	Carroll	February	16	Unk	Influenza A H3
57	Person-to-Person	Respiratory	Long-term Care	Delaware	February	25	279	Influenza A H3
58	Person-to-Person	Respiratory	Long-term Care	Lyon	February	19	91	Influenza A H3
59	Person-to-Person	Gastrointestinal	Community Event	Guthrie	March	8	100	Norovirus GII_1_Ascension208_US10 / Untypeable
60	Person-to-Person	Respiratory	Long-term Care	Dickinson	March	8	192	Influenza A H
61	Person-to-Person	Respiratory	Long-term Care	Lee	March	5	224	Influenza A H3
62	Person-to-Person	Respiratory	Long-term Care	Washington	March	8	70	Influenza A H3
63	Person-to-Person	Respiratory	Long-term Care	Hardin	March	9	30	Influenza A H3
64	Person-to-Person	Respiratory	Long-term Care	Lyon	March	4	89	Influenza B Yamagata
65	Person-to-Person	Gastrointestinal	Long-term Care	O'Brien	March	19	49	Norovirus GI
66	Person-to-Person	Respiratory	Long-term Care	Jasper	March	10	64	Influenza A H3
67	Person-to-Person	Respiratory	Long-term Care	Poweshiek	March	7	182	Influenza A H3
68	Person-to-Person	Respiratory	Long-term Care	Guthrie	February	6	164	Influenza A Rapid
69	Person-to-Person	Respiratory	Long-term Care	Pottawattamie	March	14	95	Influenza B Rapid
70	Person-to-Person	Gastrointestinal	School	Iowa	March	19	25	Suspect Norovirus

#	Mode of transmission	Type of Outbreak (GI, Respiratory, VPD, otherUnk)	Facility	County	Month	# of Cases	# exposed	Confirmed/Supect Pathogen
71	Person-to-Person	Other	Child Care Center	Fayette	March	2	27	Rash Illness
72	Person-to-Person	Respiratory	Long-term Care	Boone	March	2	245	Influenza A H3
73	Person-to-Person	Respiratory	Long-term Care	Polk	March	4	Unk	Influenza A
74	Person-to-Person	Respiratory	Business	Cerro Gordo	March	4	50	Suspect Legionella
75	Person-to-Person	Gastrointestinal	Church	Sioux	April	33	200	Norovirus GII
76	Person-to-Person	Other	Long-term Care	Palo Alto	March	6	107	Suspect Scabies
77	Person-to-Person	Respiratory	Long-term Care	Calhoun	April	8	16	Influenza A (H3)
78	Person-to-Person	Gastrointestinal	Long-term Care	Warren	April	17	219	Unidentified
79	Person-to-Person	Respiratory	Long-term Care	Jasper	April	7	49	Influenza B
80	Person-to-Person	Gastrointestinal	School	Linn	May	50	990	Norovirus GII_2-Vaals_NL05
81	Person-to-Person	Gastrointestinal	Child Care Center	Linn	May	12	20	Noroviru GII_1_Ascension208_US10
82	Person-to-Person	Respiratory	Long-term Care	Buchanan	May	34	39	Rhinovirus
83	Person-to-Person	Gastrointestinal	School	Story	June	33	350	Norovirus GII_2_Vaals_NL05
84	Person-to-Person	Gastrointestinal	School	Linn	June	3	Unk	Unidentified
85	Person-to-Person	Gastrointestinal	Daycare	Mitchell	June	6	6	E.coli 015:H7
86	Person-to-Person	Vaccine Preventable	Daycare	Muscatine	May	4	8	Suspect Varicella
87	Person-to-Person	Other	Long-term Care	Black Hawk	July	10	Unk	Scabies
88	Person-to-Person	Gastrointestinal	Camp	Boone	July	20	218	Norovirus GI.P7_LillaEdetS5b_JN603251; GI 7_Winchester_AJ277609
89	Person-to-Person	Gastrointestinal	Camp	Dubuque	July	31	812	Norovirus GII.P16_OH16002_LC153121; GII.2_Vaals_AB281090
90	Person-to-Person	Gastrointestinal	Daycare	Muscatine	August	15	125	*Shigella sonnei*
91	Person-to-Person	Gastrointestinal	Restaurant	Dickinson	August	0	13	Unidentified
92	Person-to-Person	Respiratory	Long-term Care	Delaware	September	17	123	Rhinovirus
93	Person-to-Person	Gastrointestinal	Daycare	Sioux	September	3	Unk	Cryptosporidiosis
94	Person-to-Person	Gastrointestinal	Daycare	Calhoun	September	5	11	E.coli O157:H7
95	Person-to-Person	Gastrointestinal	Community Event	Keokuk	October	6	100	Norovirus GII
96	Person-to-Person	Gastrointestinal	Daycare/Family Event	Benton	October	7	7	Norovirus GII
97	Person-to-Person	Respiratory	School	Woodbury	November	8	24	Influenza A H3
98	Person-to-Person	Gastrointestinal	School	Johnson	November	80	380	Norovirus GII
99	Person-to-Person	Respiratory	Long-term Care	Black Hawk	November	8	86	hMPV Rapid

#	Mode of transmission	Type of Outbreak (GI, Respiratory, VPD, otherUnk)	Facility	County	Month	# of Cases	# exposed	Confirmed/Supect Pathogen
100	Person-to-Person	Gastrointestinal	Long-term Care	Muscatine	November	35	120	Norovirus GI
101	Person-to-Person	Gastrointestinal	Long-term Care	Chickasaw	November	16	80	Norovirus GI.P4_Groningen_LN854563; GI.4_Koblenz433_AF394960
102	Person-to-Person	Respiratory	Long-term Care	Des Moines	December	10	99	Influenza A H3
103	Person-to-Person	Gastrointestinal	School	Iowa	December	42	284	Suspect Norovirus
104	Person-to-Person	Respiratory	Long-term Care	Iowa	December	13	108	Influenza A H3
105	Person-to-Person	Respiratory	Long-term Care	Des Moines	December	8	40	Influenza AH3
106	Person-to-Person	Respiratory	Long-term Care	Harrison	December	6	191	Influenza A H3
107	Person-to-Person	Respiratory	Long-term Care	Des Moines	December	5	52	Influenza A
108	Person-to-Person	Respiratory	Long-term Care	Emmet	December	14	205	Influenza A H3
109	Person-to-Person	Respiratory	Long-term Care	Des Moines	December	3	16	Influenza
110	Person-to-Person	Respiratory	Daycare	Fayette	December	10	74	Influenza A
111	Person-to-Person	Respiratory	Long-term Care	Montgomery	December	22	200	Influenza A H3
112	Person-to-Person	Respiratory	Long-term Care	Pottawattamie	December	8	121	Influenza A H3
113	Person-to-Person	Respiratory	Long-term Care	Delaware	December	3	111	Influenza A H3
114	Person-to-Person	Gastrointestinal	Assisted Living	Marion	December	19	40	Norovirus GII
115	Person-to-Person	Gastrointestinal	Long-term Care	Howard	December	35	111	Norovirus GII.P7_Gwynedd273_AF414409; GII.6_Shizuika8913_HM633213
116	Person-to-Person	Respiratory	Long-term Care	Jefferson	December	4	83	Influenza
117	Person-to-Person	Gastrointestinal	Long-term Care	Linn	December	31	33	Norovirus GI/GII
118	Person-to-Person	Respiratory	Long-term Care	Warren	December	9	175	Influenza A/B
119	Person-to-Person	Respiratory	Long-term Care	Marion	December	3	38	Influenza
120	Person-to-Person	Respiratory	Long-term Care	Lee	December	3	85	Influenza
121	Person-to-Person	Respiratory	Long-term Care	Marion	December	11	124	Influenza
122	Person-to-Person	Respiratory	Long-term Care	Davis	December	5	69	Influenza A H3
123	Person-to-Person	Respiratory	Long-term Care	Henry	December	7	93	Influenza A
124	Person-to-Person	Respiratory	Long-term Care	Marion	December	4	60	Influenza A H3
125	Person-to-Person	Respiratory	Long-term Care	Winneshiek	December	15	121	Influenza A H3
126	Person-to-Person	Gastrointestinal	Long-term Care	Black Hawk	December	35	Unk	Norovirus GI.P6_BS5(Hesse)_AF0938; GI.6_VA497_AF5386
127	Person-to-Person	Respiratory	Long-term Care	Polk	December	7	97	Influenza A
128	Person-to-Person	Respiratory	Long-term Care	Lee	December	2	67	Influenza A H3

#	Mode of transmission	Type of Outbreak (GI, Respiratory, VPD, otherUnk)	Facility	County	Month	# of Cases	# exposed	Confirmed/Supect Pathogen
129	Person-to-Person	Respiratory	Long-term Care	Montgomery	December	33	93	Influenza
130	Person-to-Person	Respiratory	Long-term Care	Floyd	December	5	28	Influenza A H3
131	Person-to-Person	Respiratory	Long-term Care	Hardin	December	7	115	Influenza
132	Person-to-Person	Respiratory	Long-term Care	Clinton	December	24	141	Influenza
133	Person-to-Person	Respiratory	Long-term Care	Carroll	December	30	177	Influenza

Table 9. Outbreaks with unknown modes of transmission

#	Mode of Transmission	Nature of Episode	Event/Place	County	Month	Number Affected	Number Exposed (if known)	Agent Involved
1	Unknown	Gastrointestinal	Restaurant	Bremer	Dec 2016	3	5	Unknown
2	Unknown	Gastrointestinal	Restaurant	Polk	January	2	2	Unknown
3	Unknown	Gastrointestinal	Restaurant	Polk	January	3	3	Unknown
4	Unknown	Other	School	Webster	Dec 2016	5	27	Suspect scabies
5	Unknown	Gastrointestinal	Restaurant	Polk	January	3	3	Suspect Norovirus
6	Unknown	Gastrointestinal	Restaurant	Polk	January	3	3	Norovirus GI
7	Unknown	Gastrointestinal	Restaurant	Linn	January	3	3	Suspect Norovirus
8	Unknown	Gastrointestinal	Restaurant	Polk	January	5	5	Unknown
9	Unknown	Gastrointestinal	School	Linn	February	152	495	Norovirus GI
10	Unknown	Gastrointestinal	Restaurant	Polk	February	2	6	Unknown
11	Unknown	Gastrointestinal	Restaurant	Scott	March	4	4	Suspect norovirus
12	Unknown	Gastrointestinal	Restaurant	Johnson	March	2	2	Unknown
13	Unknown	Gastrointestinal	Trip out of country	Carroll	March	24	27	Unknown
14	Unknown	Gastrointestinal	Restaurant	Polk	April	2	2	Unknown
15	Unknown	Gastrointestinal	Restaurant	Story	May	3	3	Unknown
16	Unknown	Gastrointestinal	Restaurant	Polk	May	2	4	Unknown
17	Unknown	Gastrointestinal	Restaurant	Woodbury	May	2	6	Unknown
18	Unknown	Gastrointestinal	Community Event	Guthrie	May	22	75	*Clostridium perfringens* toxin and *Salmonella*
19	Unknown	Gastrointestinal	Restaurant	Grundy	July	5	7	Unknown
20	Unknown	Gastrointestinal	Restaurant	Story	July	4	4	Unknown

#	Mode of Transmission	Nature of Episode	Event/Place	County	Month	Number Affected	Number Exposed (if known)	Agent Involved
21	Unknown	Gastrointestinal	Buisiness	Polk	July	3	3	Unknown
22	Unknown	Gastrointestinal	Child Care	Boone	July	3	8	Unknown
23	Unknown	Gastrointestinal	Restaurant	Linn	August	9	22	Norovirus GII
24	Unknown	Gastrointestinal	Restaurant	Polk	August	2	2	Unknown
25	Unknown	Gastrointestinal	Restaurant	Bremer	August	2	2	Unknown
26	Unknown	Gastrointestinal	School	Story	Sept	3	4	Unknown
27	Unknown	Gastrointestinal	Restaurant	Polk	Sept	4	4	Unknown
28	Unknown	Gastrointestinal	Private home	Polk	Sept	8	180	Unknown
29	Unknown	Gastrointestinal	Restaurant	Woodbury	Sept	1	3	Enteric
30	Unknown	Gastrointestinal	Restaurant	Polk	October	3	4	Unknown
31	Unknown	Gastrointestinal	Business	Polk	Nov	2	2	Unknown
32	Unknown	Gastrointestinal	Restaurant	Black Hawk	Nov	5	9	Norovirus GII
33	Unknown	Gastrointestinal	Daycare	Clayton	October	8	109	*Cryptosporidium*
34	Unknown	Gastrointestinal	Restaurant	Dubuque	Nov	2	3	Unknown
35	Unknown	Gastrointestinal	Family Event	Mexico	Nov	10	60	E. coli (1,PCR), Salmonella (1)
36	Unknown	Gastrointestinal	Restaurant	Polk	Dec	2	2	Unknown
37	Unknown	Gastrointestinal	Restaurant	Scott	Nov	9	18	Unknown
38	Unknown	Gastrointestinal	Restaurant	Polk	Dec	2	4	*Campylobacter*
39	Unknown	Gastrointestinal	Restaurant	Polk	Dec	2	2	Norovirus GI
40	Unknown	Gastrointestinal	Restaurant	Scott	Dec	3	3	Unknown

Section 3

DISEASE-SPECIFIC SUMMARIES OF SELECT REPORTABLE DISEASES

Campylobacteriosis

Cause: *Campylobacter* bacteria

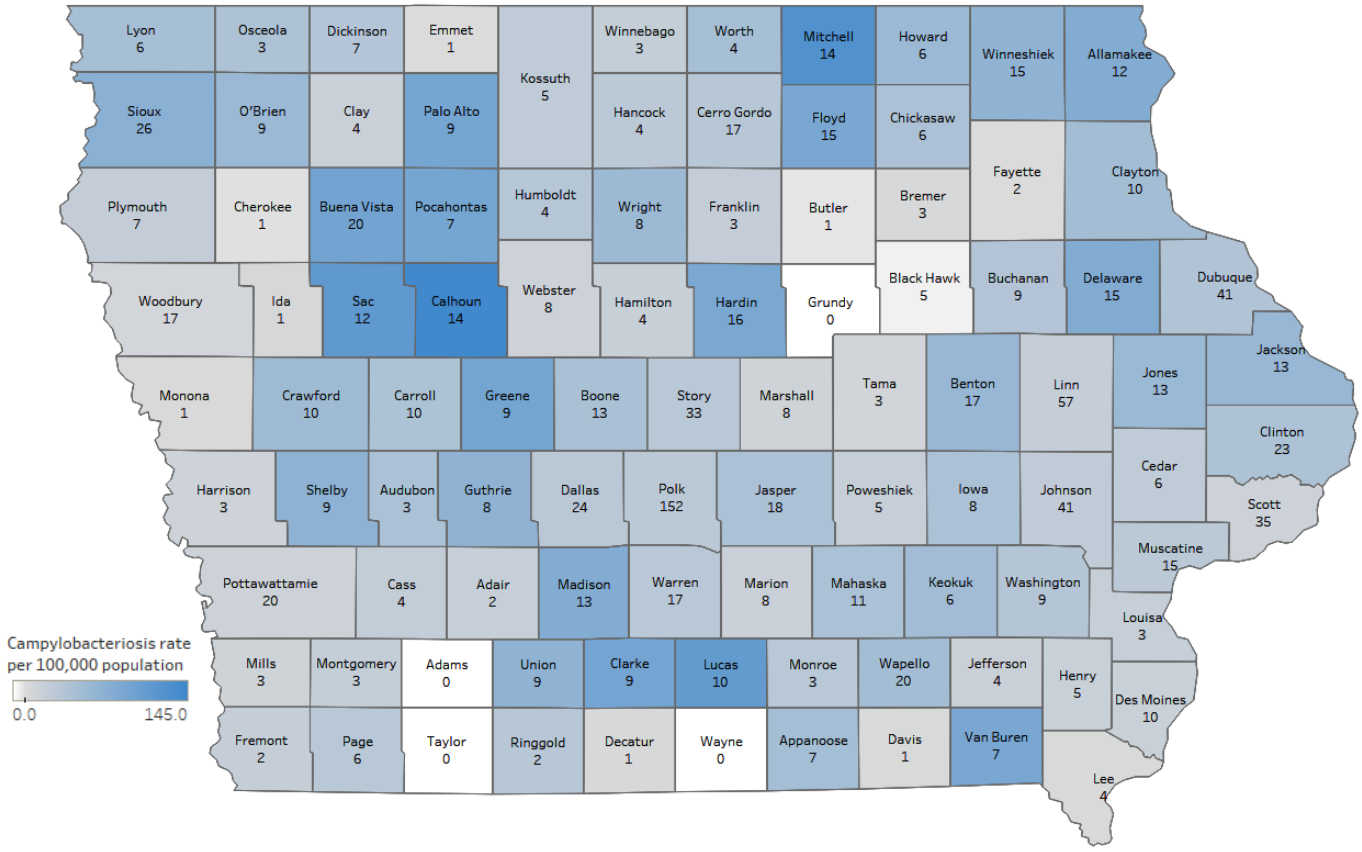
Clinical Features: Diarrhea, abdominal pain, fever, malaise, and nausea

Transmission: Transmitted through ingestion of organisms in under-cooked meat, unpasteurized dairy products, or other contaminated food or water, or from direct contact with infected animals. *Campylobacter* can be found in fecally contaminated water. As few as 500 organisms can cause illness.

Comments: The use of culture-independent diagnostic testing for *Campylobacter* has increased significantly in recent years. In 2015, CSTE changed the case definition to include culture independent diagnostic tests (CIDT) results in the probable case definition.

Summary of 2017 Campylobacteriosis cases	
Number of cases	1154
Incidence rate (per 100,000 population)	37.9
Change from 5-year average incidence	63.1%

Reported Campylobacteriosis cases (confirmed and probable) and incidence rates per 100,000 population by county of residence, Iowa, 2017 (N = 1154)



Campylobacteriosis case demographics

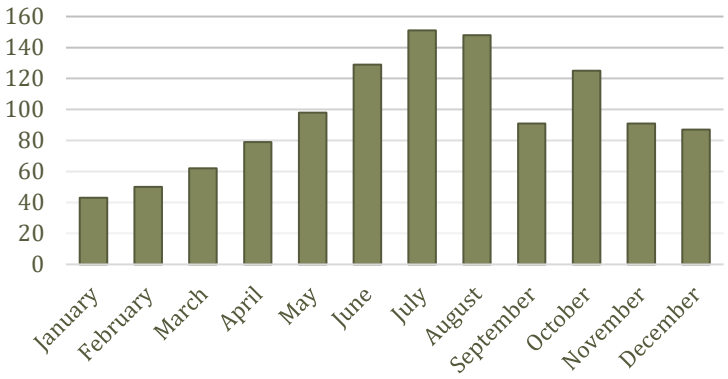
Age (years)	
Mean	38.9
Median	39.1
Min-Max	0.1 – 94.8

Gender			
	Cases	Percent	Rate
Female	545	47.2	35.4
Male	609	52.8	40.4

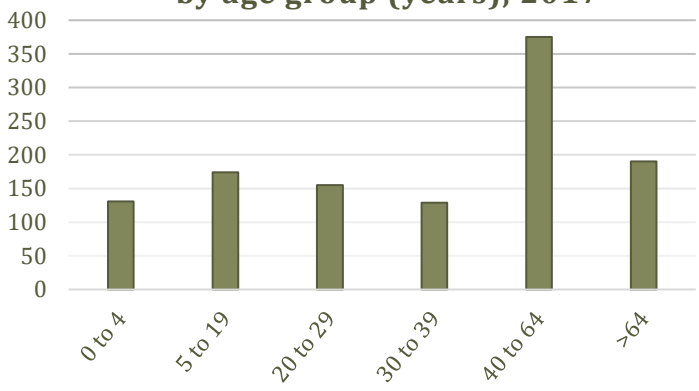
Race			
	Cases	Percent	Rate
White	733	63.5	26.4
Black	27	2.4	30.3
Other/Unknown	17/377	34.1	-

Ethnicity			
	Cases	Percent	Rate
Non-Hispanic	719	62.3	24.8
Hispanic	34	2.9	22.4
Unknown	401	-	-

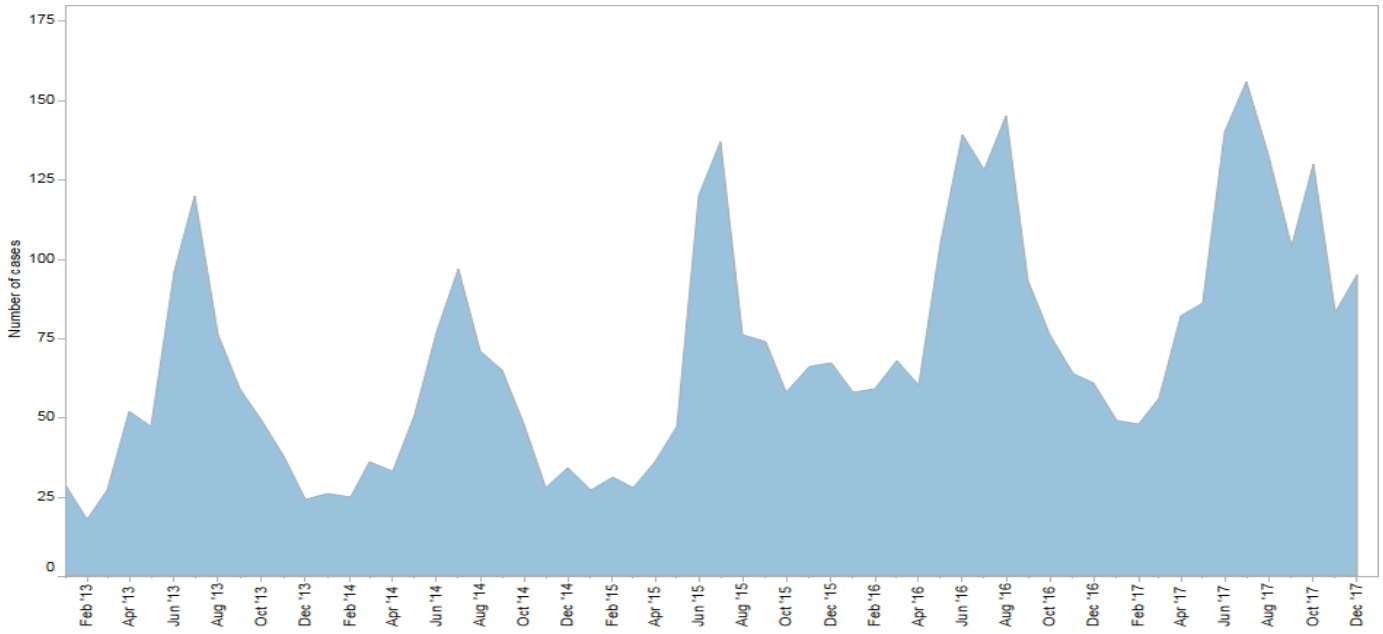
Number of campylobacteriosis cases by month, 2017



Number of campylobacteriosis cases by age group (years), 2017



Campylobacteriosis cases by month and year - Iowa, 2013-2017



Cryptosporidiosis

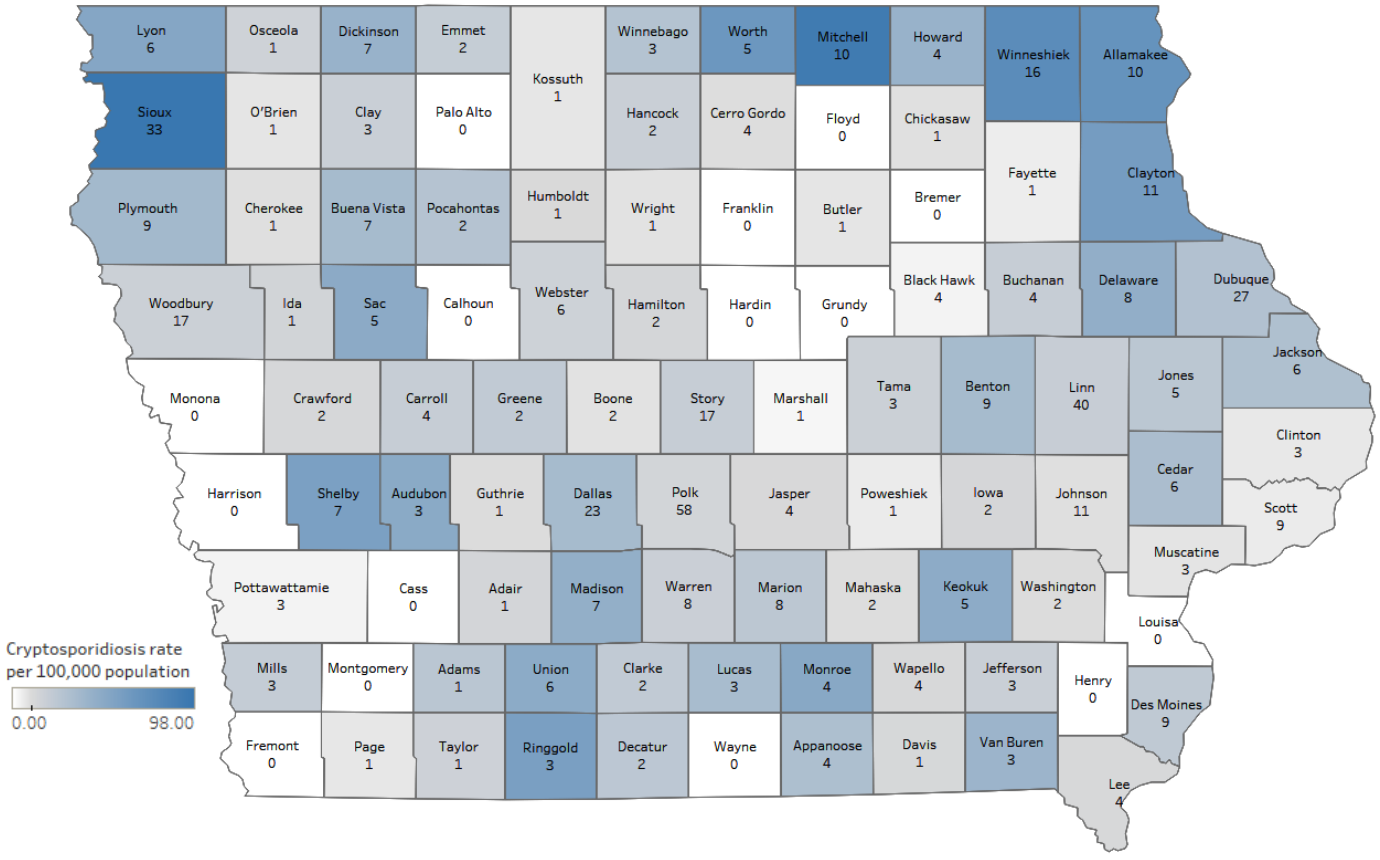
Cause: Cryptosporidium protazoan

Clinical Features: Watery diarrhea, abdominal cramps, nausea, vomiting, and low-grade fever

Transmission: Fecal-oral, which includes person-to-person, animal-to-person, waterborne and foodborne transmission. Localized outbreaks may occur from fecally contaminated water, such as streams, lakes and swimming pools open to contamination by human and animal feces. Outbreaks have resulted from eating food contaminated by animal feces (e.g., unpasteurized apple cider). An infected food worker can be a source of foodborne transmission.

Summary of 2017 cryptosporidiosis cases	
Number of cases	538
Incidence rate (per 100,000 population)	17.6
Change from 5-year average incidence	-16.5%

Reported cryptosporidiosis cases (confirmed and probable) and incidence rates per 100,000 population by county of residence - Iowa, 2017 (N=538)



Cryptosporidiosis case demographics

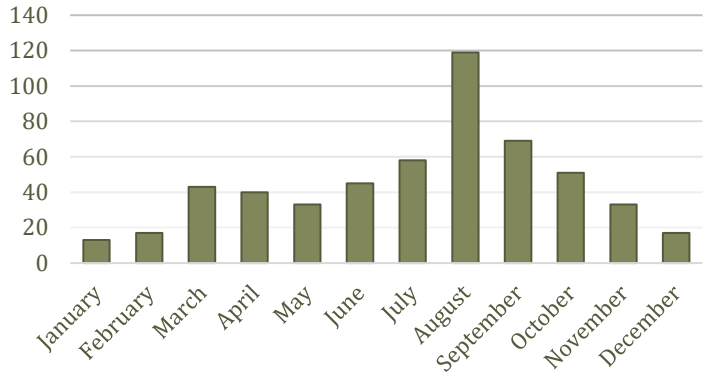
Age (years)	
Mean	29.3
Median	25.7
Min-Max	0.7 – 90.1

Gender			
	Cases	Percent	Rate
Female	297	55.2	19.3
Male	241	44.8	16.0

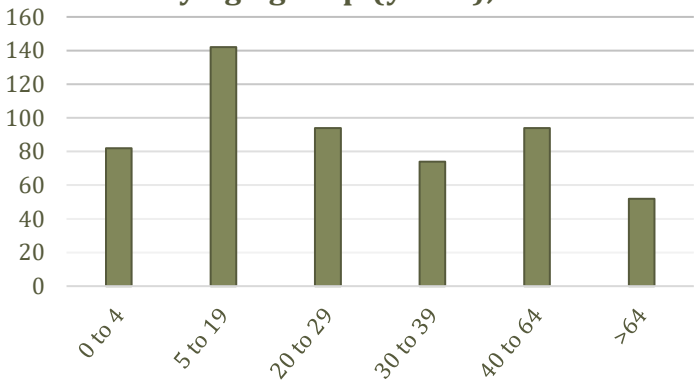
Race			
	Cases	Percent	Rate
White	406	75.5	14.6
Black	12	2.2	-
Other/ Unknown	13/ 107	22.3	-

Ethnicity			
	Cases	Percent	Rate
Non-Hispanic	409	76.0	14.1
Hispanic	20	3.7	13.2
Unknown	109	20.3	-

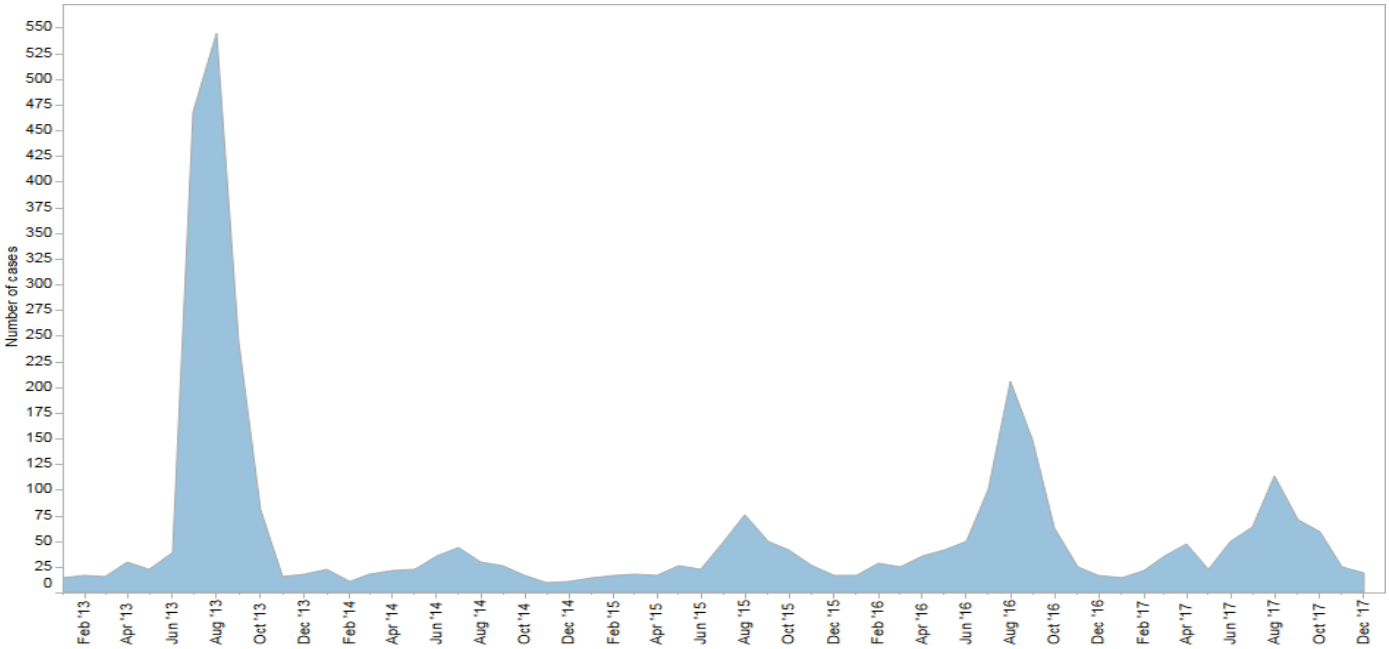
Number of cryptosporidiosis cases by month, 2017



Number of cryptosporidiosis cases by age group (years), 2017



Cryptosporidiosis cases by month and year - Iowa, 2013-2017



E. coli 0157:H7 and other shiga-toxin producing strains (STEC)

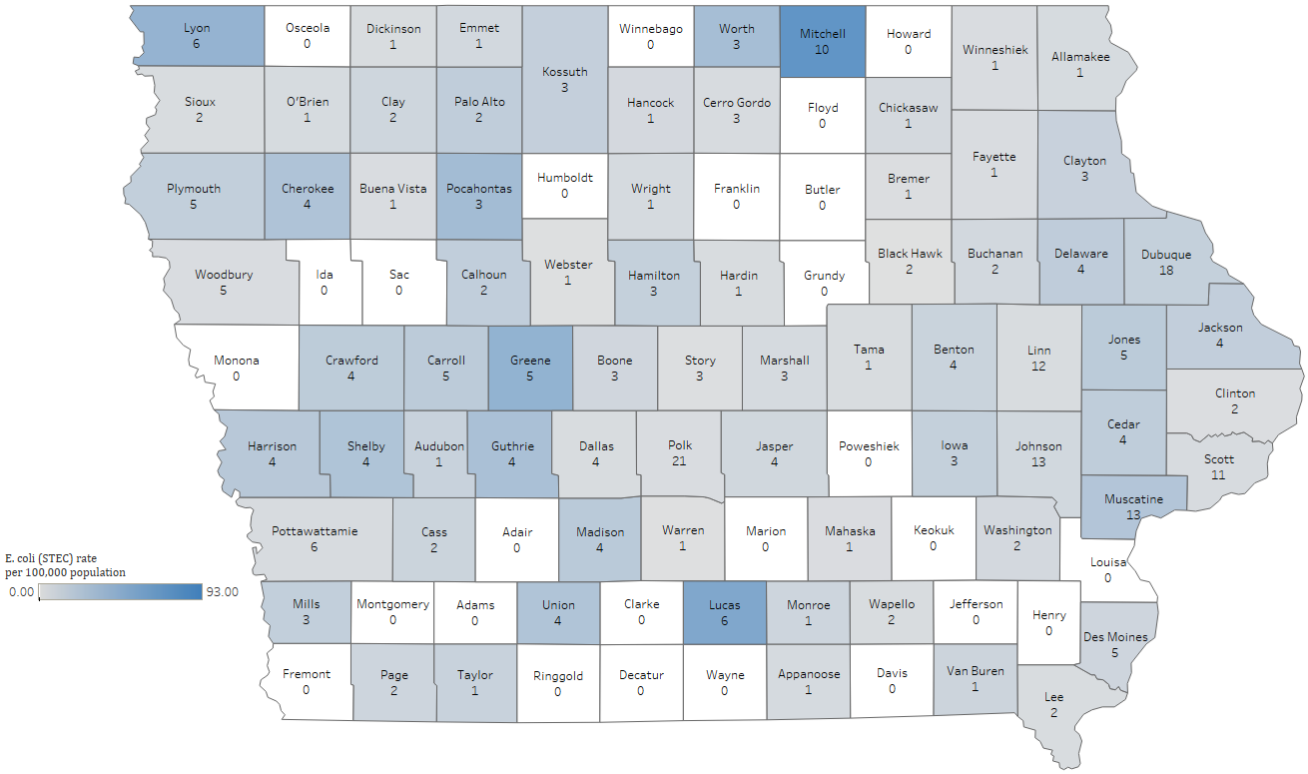
Cause: Shiga toxin-producing *Escherichia coli* bacteria (STEC) that produce cytotoxins called Shiga toxin 1 and 2.

Clinical Features: An individual may be asymptomatic, have mild non-bloody diarrhea, or have grossly bloody diarrhea. Most diagnosed cases develop bloody diarrhea 6 to 48 hours after the onset of non-bloody diarrhea. Abdominal cramps, nausea and vomiting may also be present.

Transmission: STEC transmission occurs fecal-orally via contaminated food, drinking water or recreational water. Transmission may also occur directly from person-to-person; and can include certain types of sexual contact. The infectious dose for *E. coli* O157:H7 is very low (about 100 organisms). *E. coli* O157:H7 has been associated with the consumption of undercooked contaminated ground beef, unpasteurized apple juice and cider, unpasteurized milk and other dairy products, raw fruits and vegetables, and salami.

Summary of 2017 shiga-toxin producing *E. coli* cases	
Number of cases	276
Incidence rate (per 100,000 population)	9.1
Change from 5-year average incidence	32.9%

Reported shiga-toxin producing *E. coli* cases (confirmed and probable) and incidence rates per 100,000 population by county of residence - Iowa, 2017 (N=276)



Shiga-toxin producing *E. coli* case demographics

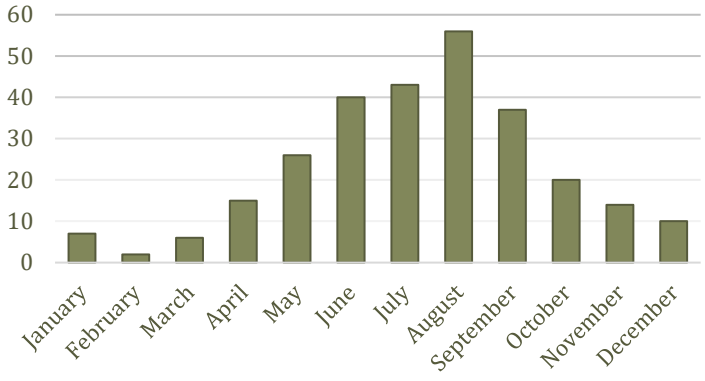
Age (years)	
Mean	22.2
Median	16.9
Min-Max	0.2 – 93.6

Gender			
	Cases	Percent	Rate
Female	138	50.0	9.0
Male	138	50.0	9.2

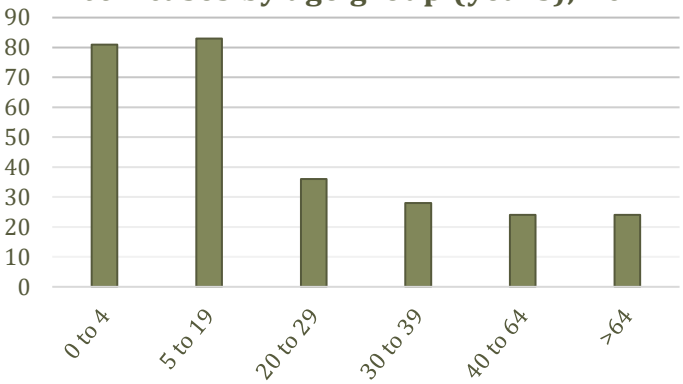
Race			
	Cases	Percent	Rate
White	186	67.4	6.7
Black	10	3.6	-
Other/ Unknown	77/3	29.0	-

Ethnicity			
	Cases	Percent	Rate
Non-Hispanic	205	74.3	7.1
Hispanic	9	3.2	-
Unknown	62	22.5	-

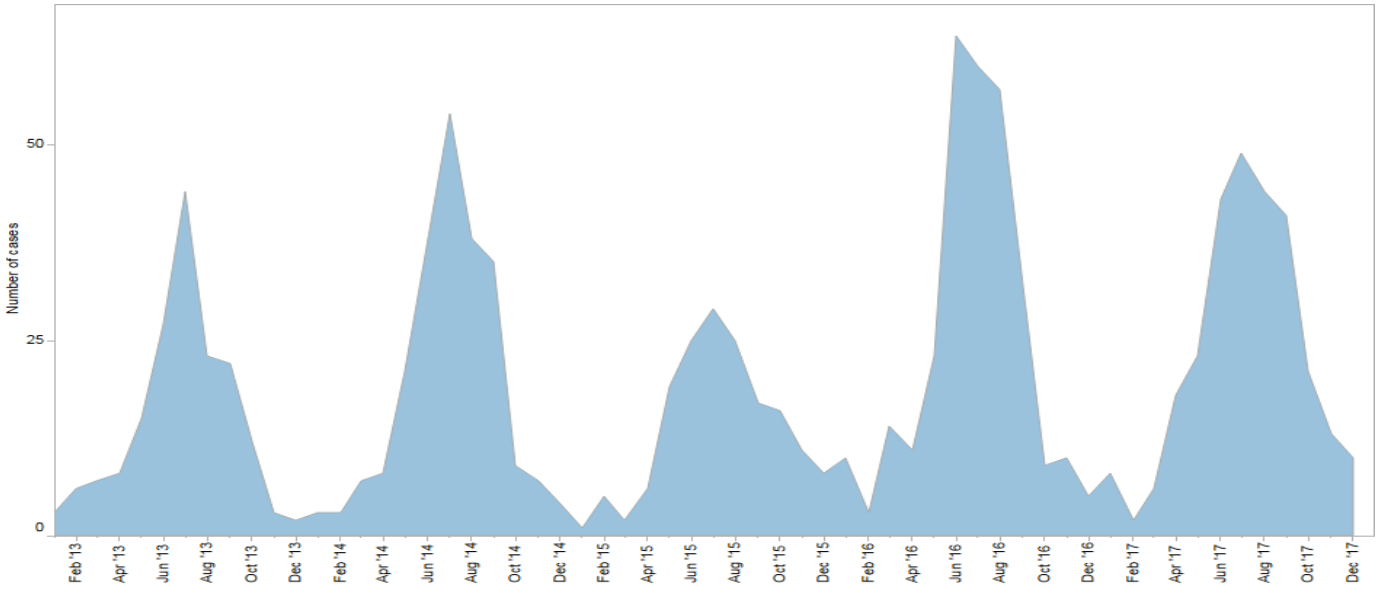
Number of shiga-toxin producing *E. coli* cases by month, 2017



Number of shiga-toxin producing *E. coli* cases by age group (years), 2017



Shiga-toxin producing *E. coli* cases by month and year - Iowa, 2013-2017



Giardiasis

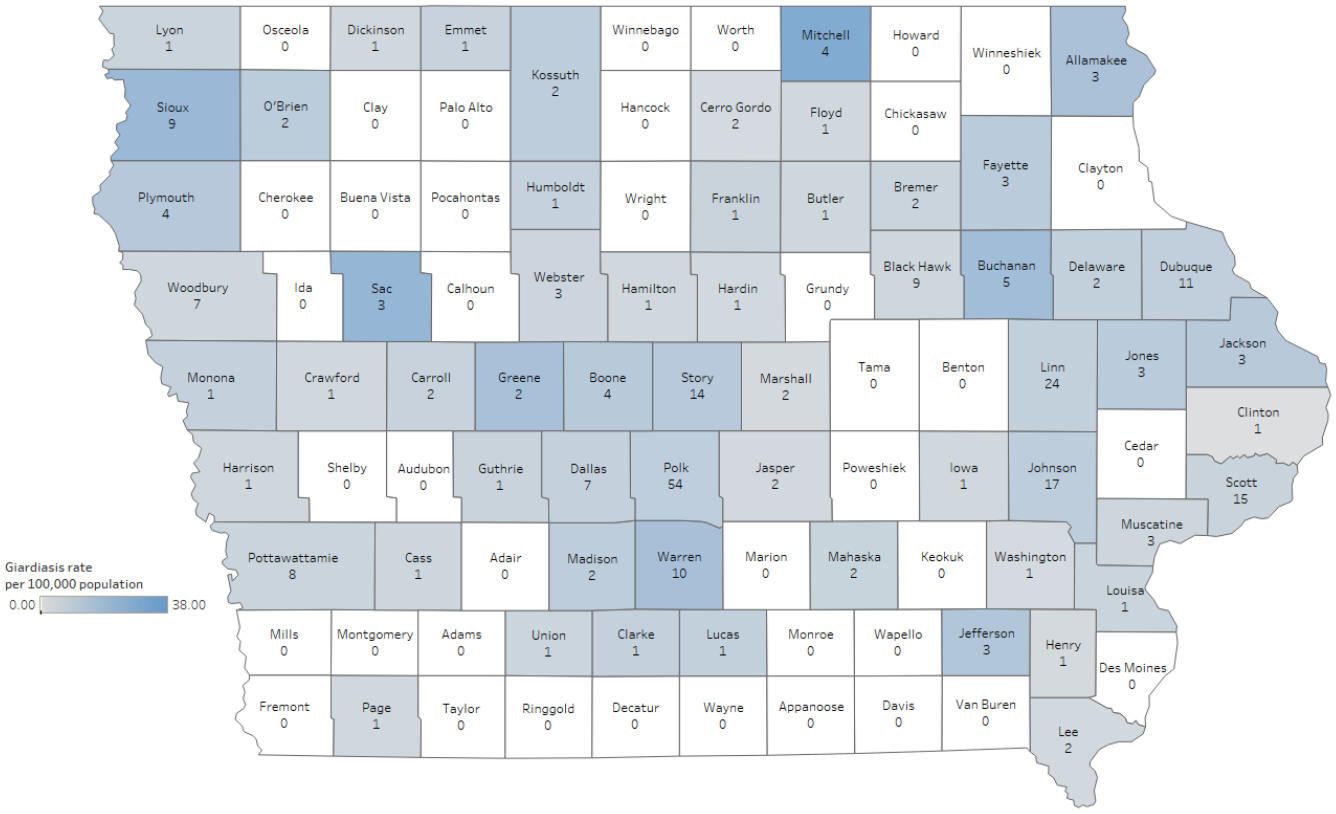
Cause: Giardia lamblia protazoan

Clinical Features: Symptoms can include soft, non-bloody, foul-smelling diarrhea. Abdominal cramps and a "bloated" feeling with excess gas often accompany the diarrhea. The diarrhea can be chronic or intermittent and it can be accompanied by fatigue and steatorrhea (fatty stools). Appetite loss combined with malabsorption can lead to significant weight loss, failure to thrive and anemia.

Transmission: Giardia is principally spread person-to-person. Persons become infected by fecal-oral transfer of cysts from the feces of an infected individual, especially in institutions and child care centers. Transmission can also occur through certain types of sexual contact (e.g. fecal-oral contact). As few as 10 cysts can cause illness. Localized outbreaks may occur from fecally contaminated water, such as stream and lake waters and swimming pools that are contaminated by human and animal feces.

Summary of 2017 giardiasis cases	
Number of cases	273
Incidence rate (per 100,000 population)	9.0
Change from 5-year average incidence	13.4%

Reported giardiasis cases (confirmed and probable) and incidence rates per 100,000 population by county of residence - Iowa, 2017 (N=273)



Giardiasis case demographics

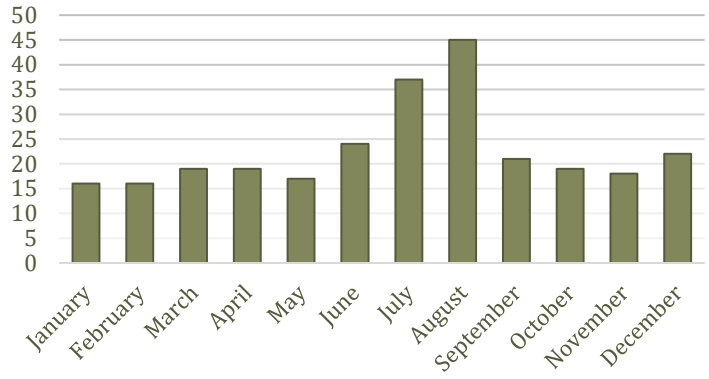
Age (years)	
Mean	34.7
Median	35.1
Min-Max	0.3 – 92.6

Gender			
	Cases	Percent	Rate
Female	119	43.6	7.7
Male	154	56.4	10.2

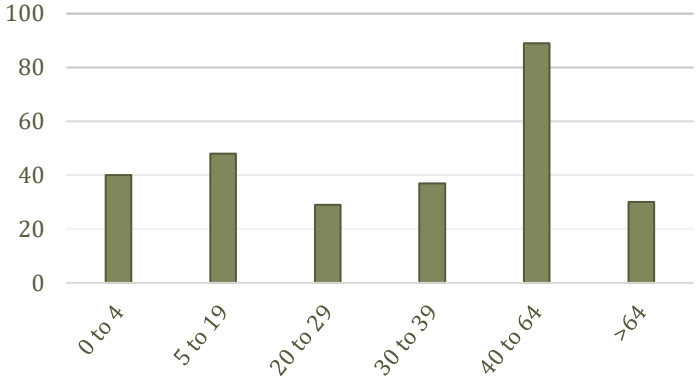
Race			
	Cases	Percent	Rate
White	202	74.0	7.3
Black	28	10.3	31.4
Other/ Unknown	33/10	15.7	-

Ethnicity			
	Cases	Percent	Rate
Non-Hispanic	223	81.7	7.7
Hispanic	13	4.8	-
Unknown	37	13.5	-

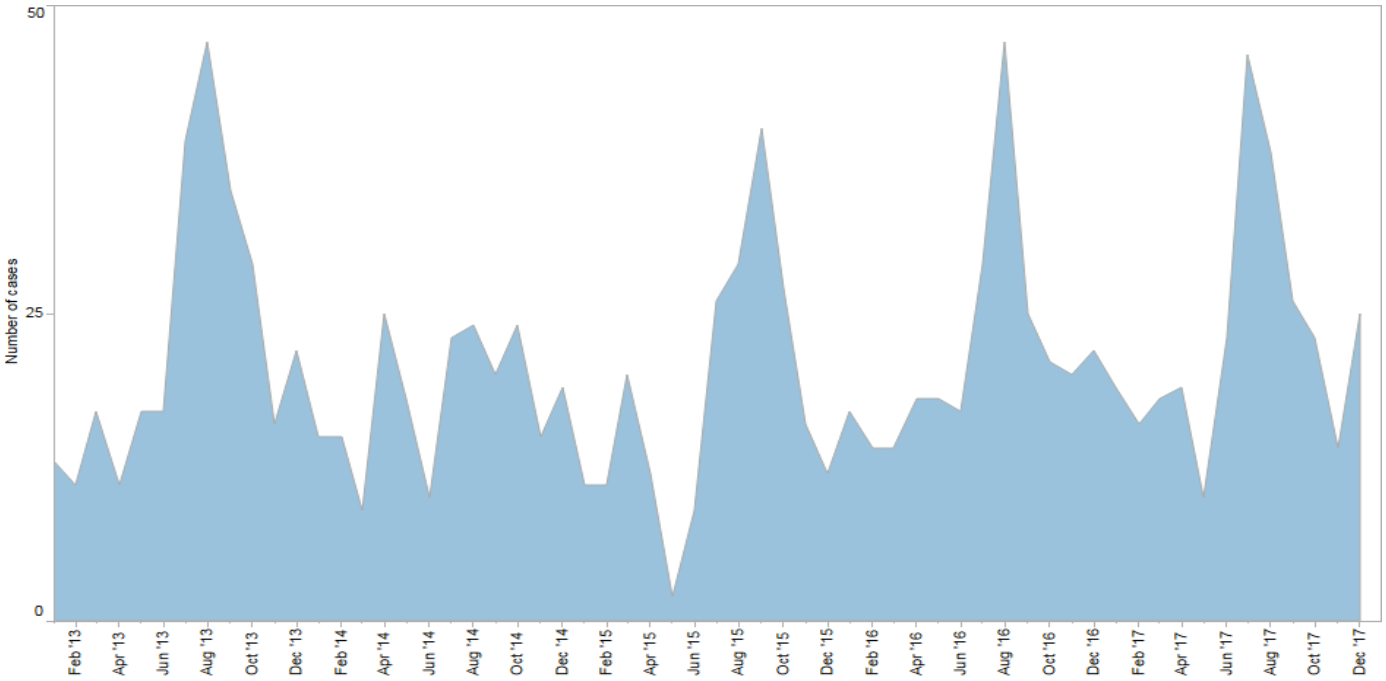
Number of giardiasis cases by month, 2017



Number of giardiasis cases by age group (years), 2017



Giardiasis cases by month and year - Iowa, 2013-2017



Lyme Disease

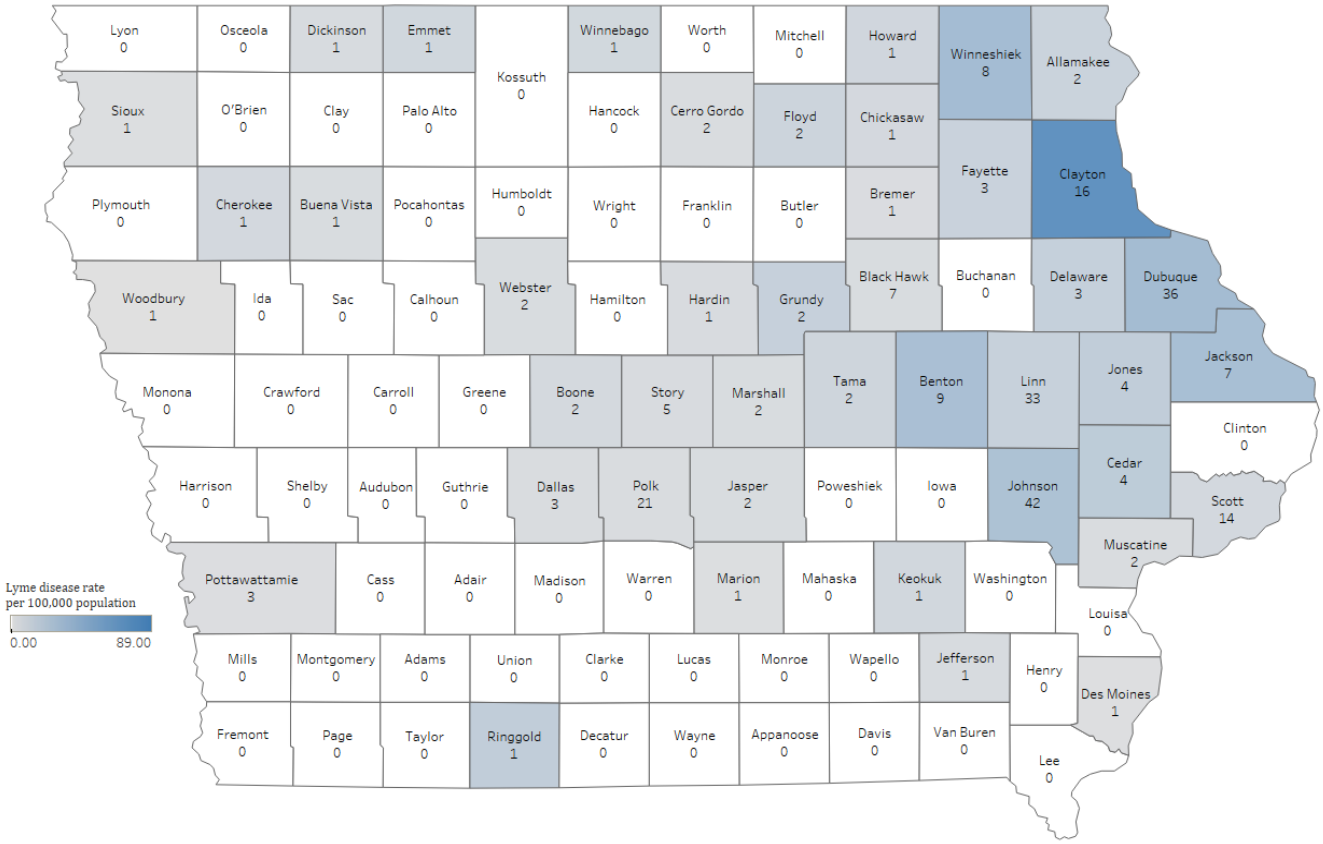
Cause: Borrelia burgdorferi bacteria

Clinical Features: Lyme disease is a systemic, tick-borne disease with a variety of manifestations, including dermatologic, rheumatologic, neurologic, and cardiac abnormalities. The best clinical marker for the disease is erythema migrans (EM), the initial skin lesion that occurs in 60%-80% of patients.

Transmission: Lyme disease is acquired from a tick bite. Laboratory data suggests that the tick must usually remain attached from 24 to 48 hours before transmission can occur.

Summary of 2017 Lyme disease cases	
Number of cases	255
Incidence rate (per 100,000 population)	8.4
Change from 5-year average incidence	10.3%

Reported Lyme disease cases (confirmed and probable) and incidence rates per 100,000 population by county of residence - Iowa, 2017 (N=255)



Lyme disease case demographics

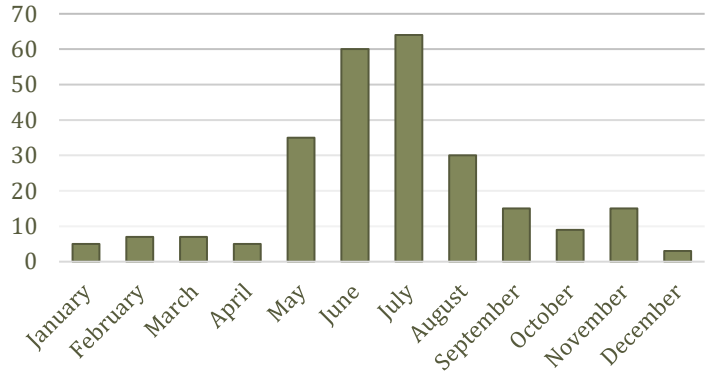
Age (years)	
Mean	39.5
Median	40.1
Min-Max	0.2 – 83.9

Gender			
	Cases	Percent	Rate
Female	95	37.3	6.2
Male	160	62.3	10.6

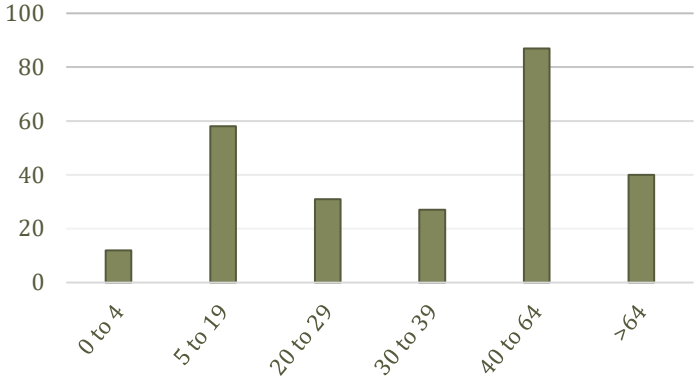
Race			
	Cases	Percent	Rate
White	205	80.4	7.4
Black	3	1.2	-
Other/ Unknown	2/45	18.4	-

Ethnicity			
	Cases	Percent	Rate
Non-Hispanic	212	83.1	7.3
Hispanic	2	0.8	-
Unknown	41	16.1	-

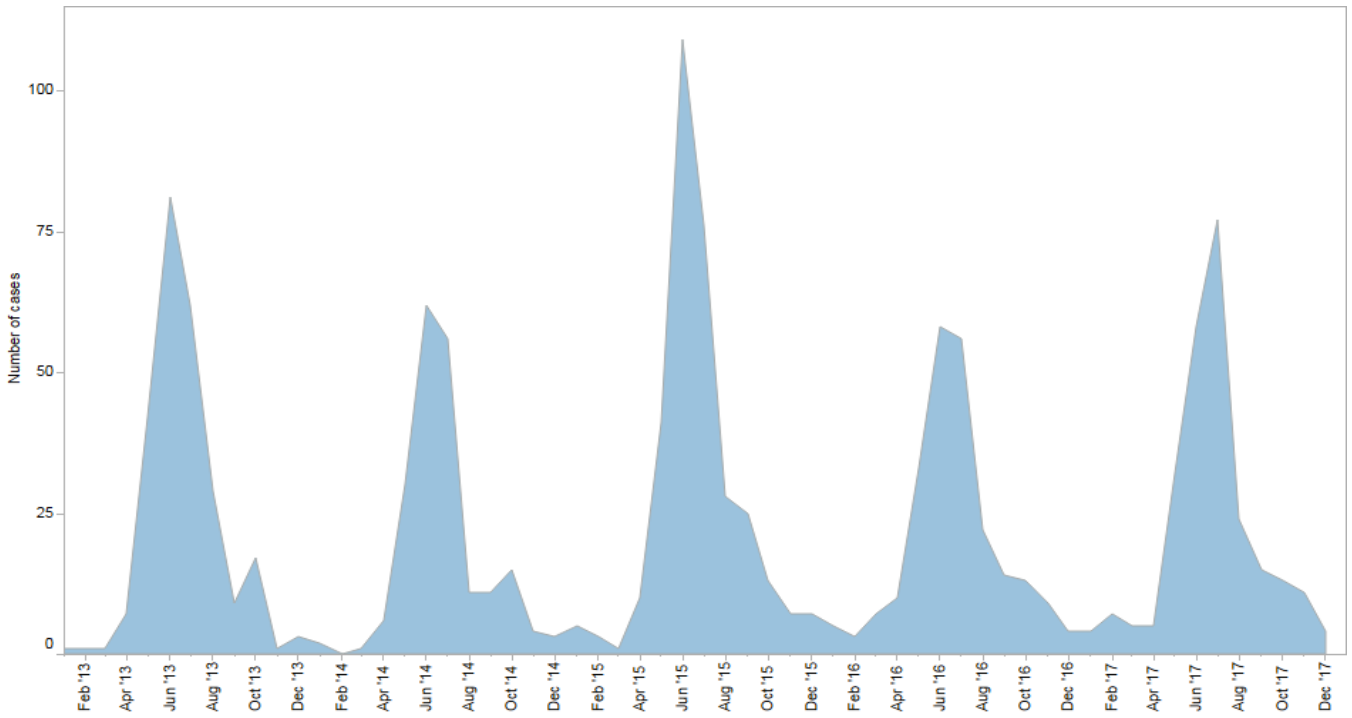
Number of lyme disease cases by month, 2017



Number of lyme disease cases by age group (years), 2017



Lyme disease cases by month and year - Iowa, 2013-2017



Mumps

Cause: Paramyxovirus

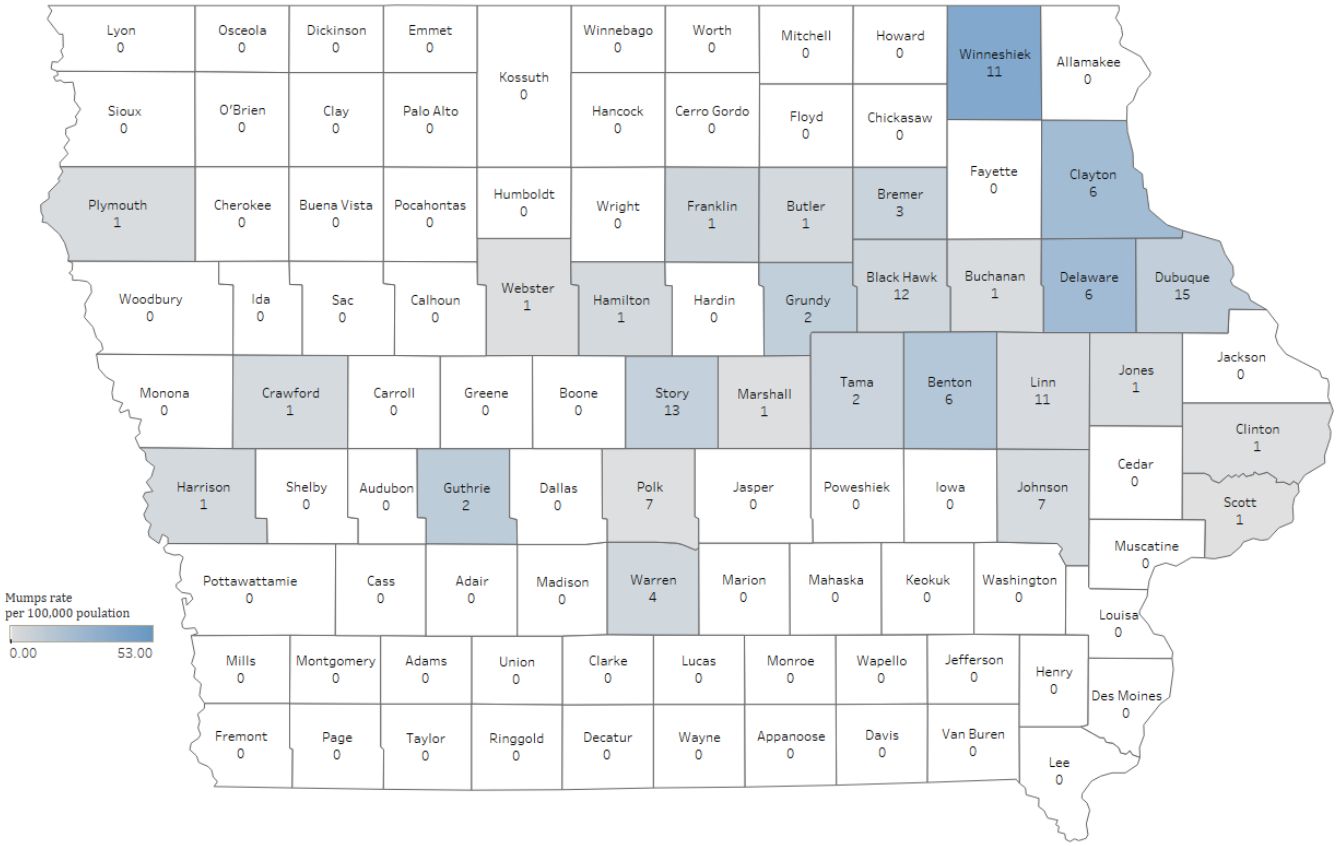
Clinical Features: Mumps is an acute viral disease characterized by fever, swelling, or tenderness of one or more of the salivary glands that lasts several days. Parotitis may be unilateral or bilateral. Respiratory symptoms are common. Infection in adulthood is likely to produce a more severe disease, including mastitis in women and orchitis in men.

Transmission: Mumps is transmitted by droplet or direct contact with nasopharyngeal secretions of an infected person, and by the airborne route.

Comments: A mumps outbreak in Iowa began in July of 2015 and persisted through 2017. By the end of 2016, public health identified 1,143 cases since the start of the outbreak.

Summary of 2017 mumps cases	
Number of cases	119
Incidence rate (per 100,000 population)	3.9
Change from 5-year average incidence	-48.8%

Reported Mumps cases (confirmed and probable) and incidence rates per 100,000 population by county of residence - Iowa, 2017 (N=119)



Mumps case demographics

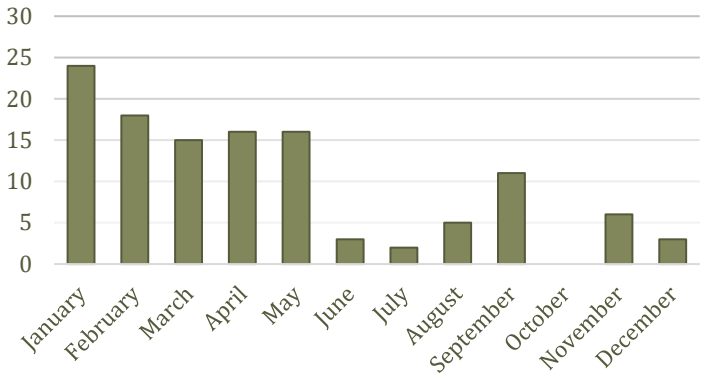
Age (years)	
Mean	26.8
Median	21.3
Min-Max	5.4 – 85.4

Gender			
	Cases	Percent	Rate
Female	59	49.6	3.8
Male	60	50.4	4.0

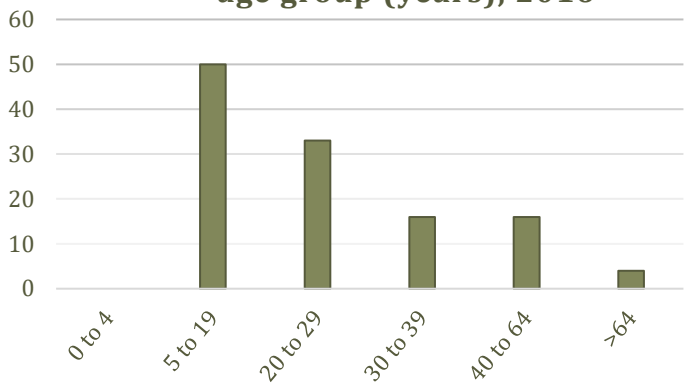
Race			
	Cases	Percent	Rate
White	66	55.5	2.4
Black	7	5.9	-
Other/ Unknown	14/ 32	38.6	-

Ethnicity			
	Cases	Percent	Rate
Non-Hispanic	76	63.9	2.6
Hispanic	5	4.2	-
Unknown	38	31.9	-

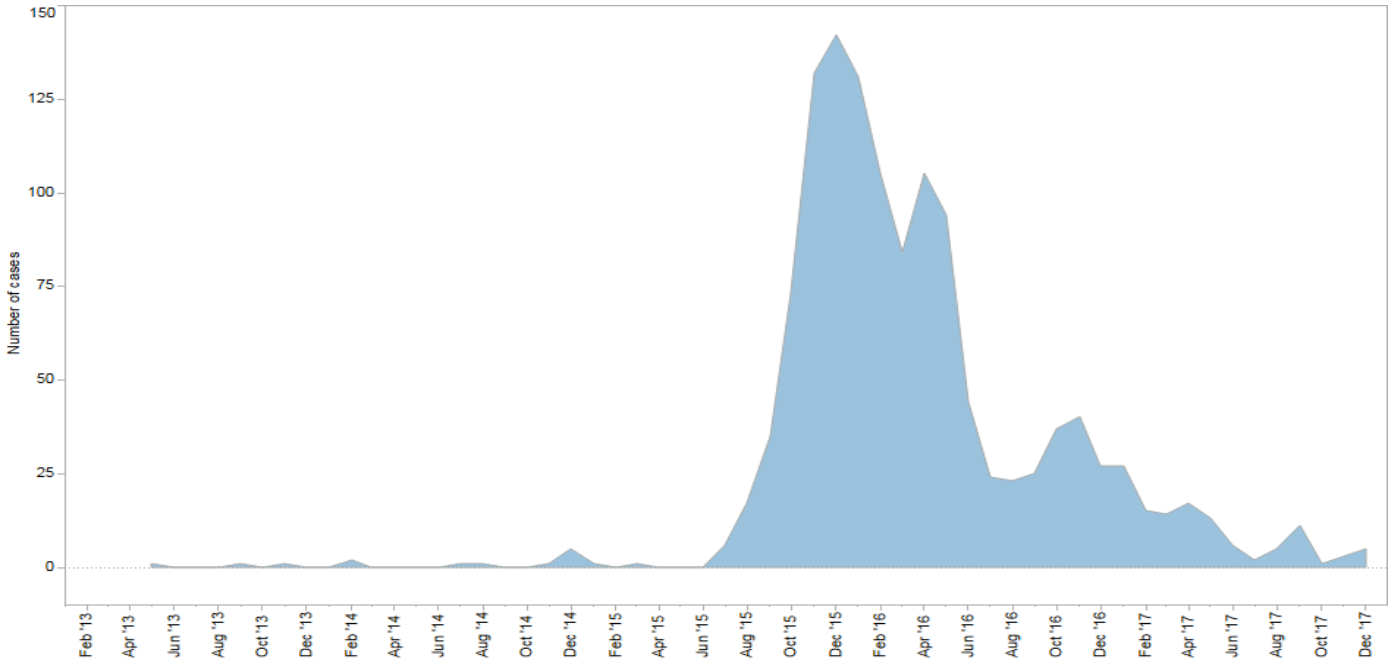
Number of mumps cases by month, 2017



Number of mumps cases by age group (years), 2016



Mumps cases by month and year - Iowa, 2013-2017



Pertussis

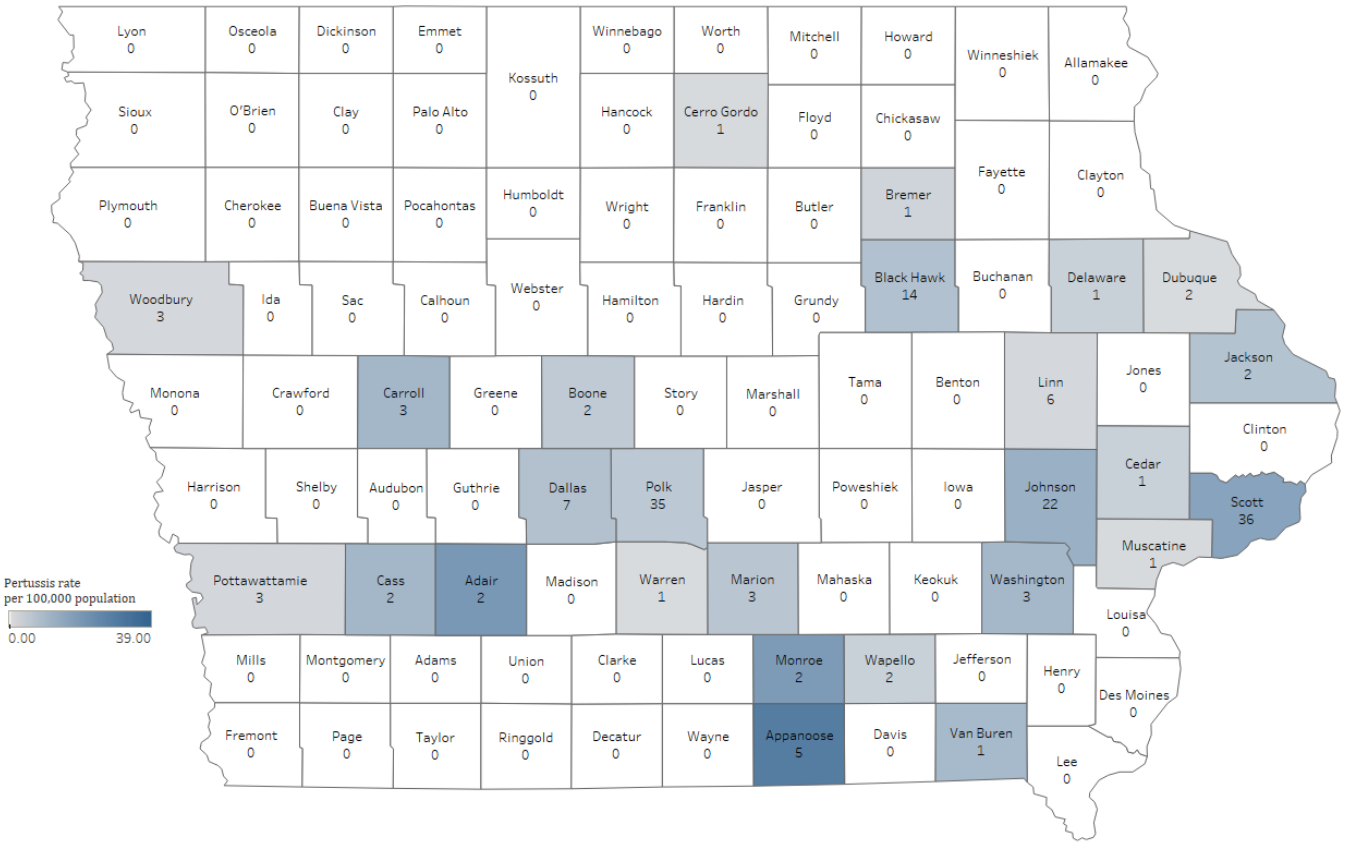
Cause: Bordetella pertussis bacteria

Clinical Features: An acute bacterial infection of the respiratory tract classically characterized by a paroxysmal cough and inspiratory whoop. The initial (catarrhal) stage consists of an insidious onset of upper respiratory infection with an irritating cough. Over the course of 1-2 weeks, paroxysms develop (paroxysmal phase) and increase in frequency and intensity before gradually improving after 1-2 months. Disease presentation can vary with age and history of previous exposure or vaccination. Adults and adolescents with some immunity may exhibit only mild symptoms.

Transmission: Pertussis is most commonly spread by contact with respiratory droplets or by contact with airborne droplets of respiratory secretions. It occurs rarely by contact with an infected persons contaminated objects.

Summary of 2017 pertussis cases	
Number of cases	161
Incidence rate (per 100,000 population)	5.3
Change from 5-year average incidence	-69.0%

Reported pertussis cases (confirmed and probable) and incidence rates per 100,000 population by county of residence - Iowa, 2017 (N=161)



Pertussis case demographics

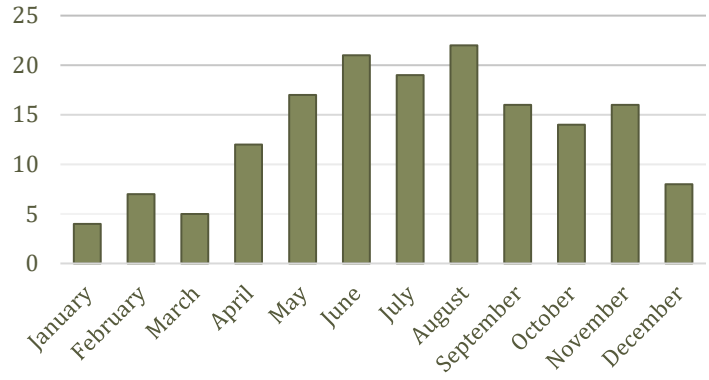
Age (years)	
Mean	15.5
Median	12.2
Min-Max	0.1 – 71.0

Gender			
	Cases	Percent	Rate
Female	87	54.0	5.7
Male	74	46.0	4.9

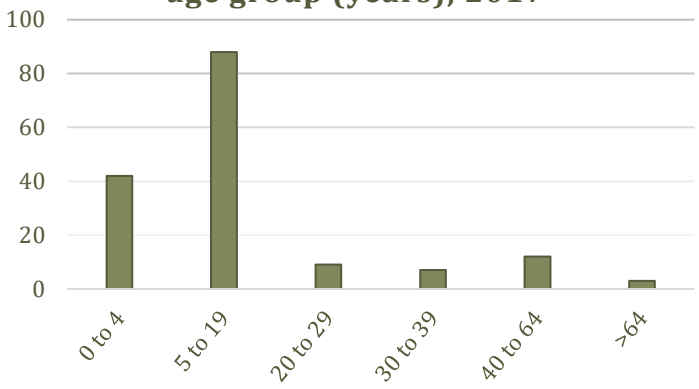
Race			
	Cases	Percent	Rate
White	117	72.7	4.2
Black	4	2.5	-
Other/ Unknown	10/30	24.8	-

Ethnicity			
	Cases	Percent	Rate
Non-Hispanic	108	67.1	3.7
Hispanic	11	6.8	-
Unknown	42	26.1	-

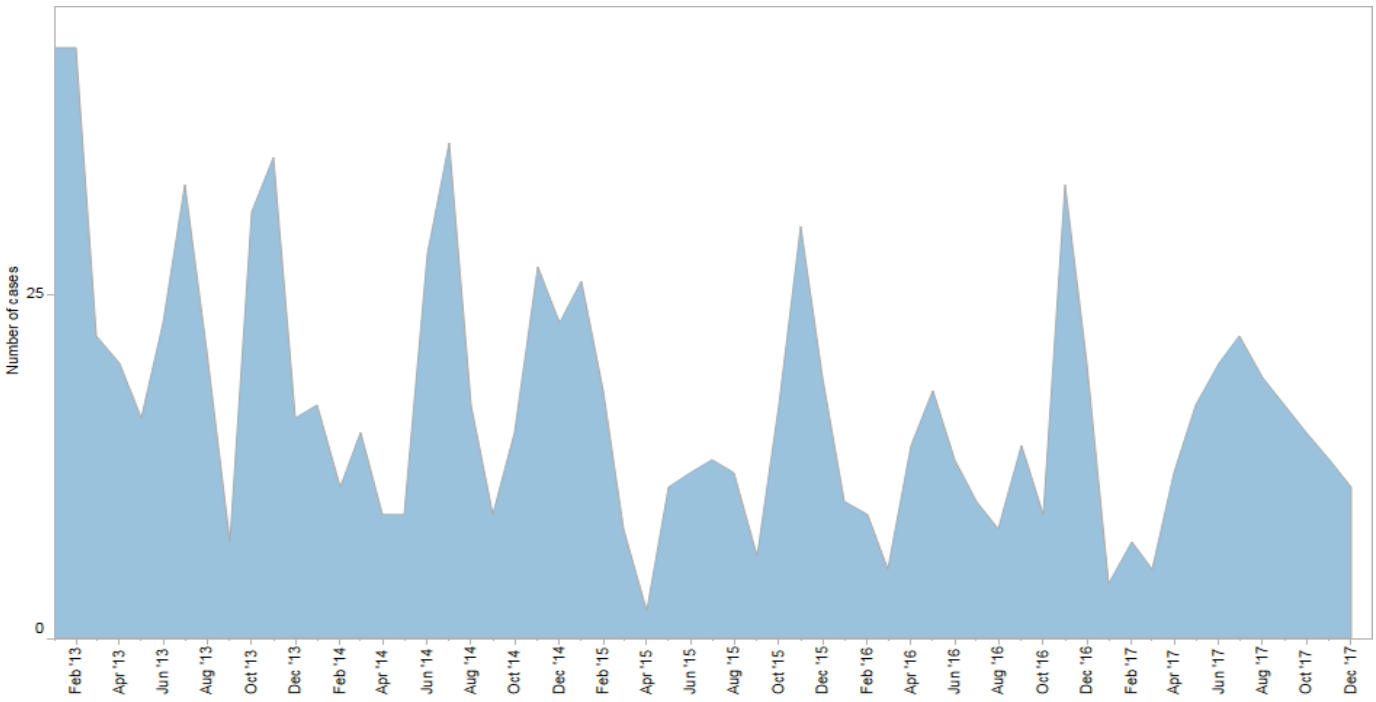
Number of pertussis cases by month, 2017



Number of pertussis cases by age group (years), 2017



Pertussis cases by month and year - Iowa, 2013-2017



Salmonellosis

Cause: Salmonella bacteria

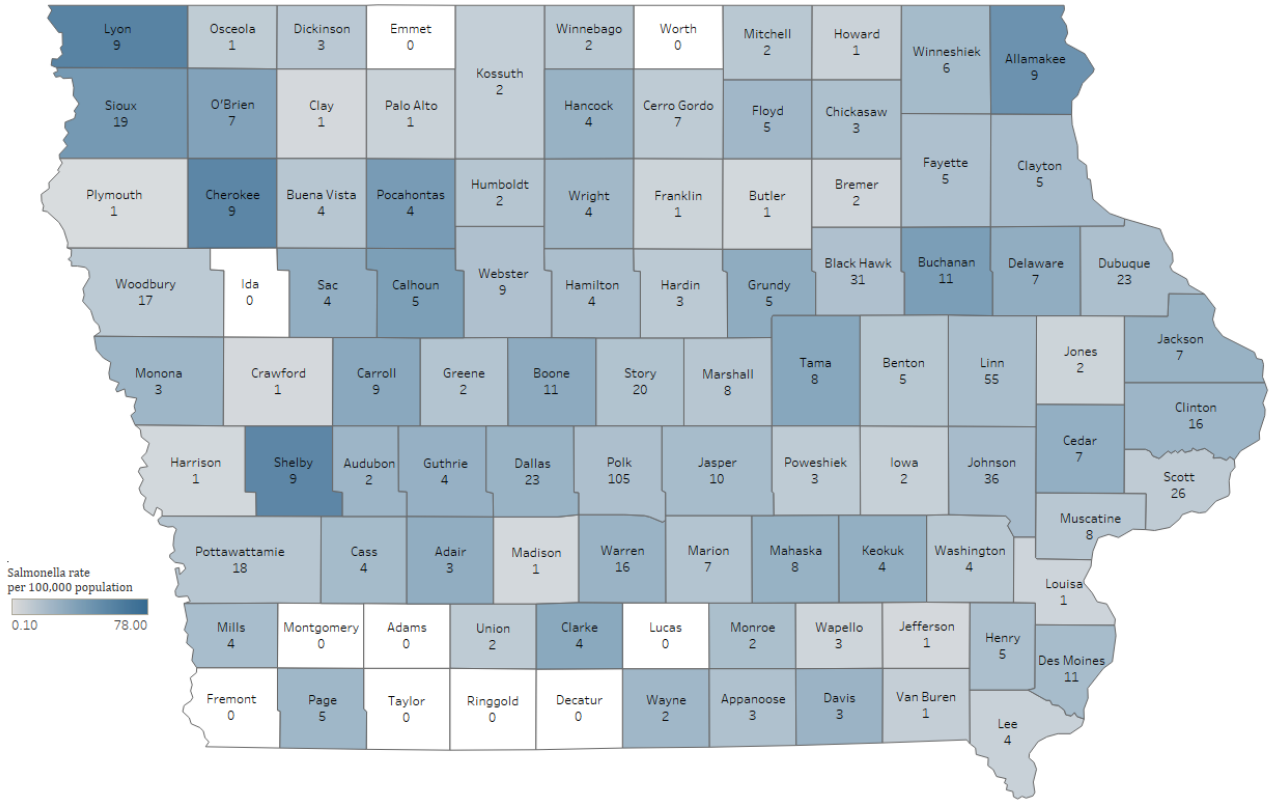
Clinical Features: Diarrhea (sometimes bloody), headache, stomach cramps, fever, nausea, and sometimes vomiting. The infection may also appear as septicemia, an abscess, arthritis or cholecystitis.

Transmission: The most common mode of transmission is ingestion of food or water that has been contaminated with animal feces. Reptiles such as iguanas, snakes and lizards are often chronic carriers of these bacteria and can also be sources of infection.

Person-to-person spread can occur when an infected food handler contaminates food. Most often, person-to-person spread occurs among household contacts, children in child care, and the elderly and developmentally disabled living in residential facilities. Transmission can also occur person-to-person through certain types of sexual contact (e.g. fecal - oral contact).

Summary of 2017 salmonellosis cases	
Number of cases	738
Incidence rate (per 100,000 population)	24.2
Change from 5-year average incidence	%

Reported salmonellosis cases (confirmed and probable) and incidence rates per 100,000 population by county of residence - Iowa, 2017 (N=738)



Salmonellosis case demographics

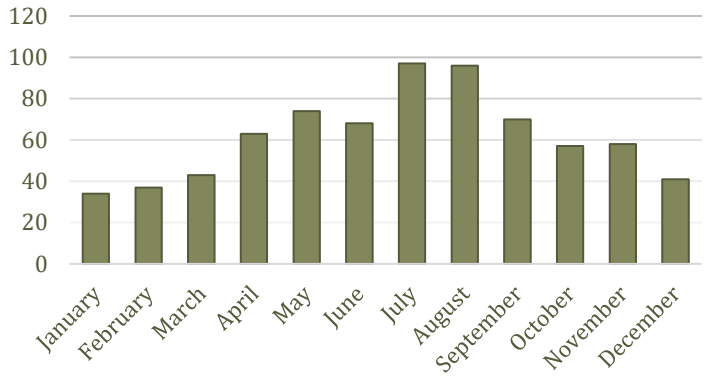
Age (years)	
Mean	39.0
Median	38.4
Min-Max	0 – 98.8

Gender			
	Cases	Percent	Rate
Female	382	51.8	24.8
Male	356	48.2	23.6

Race			
	Cases	Percent	Rate
White	540	73.2	19.4
Black	25	3.4	28.0
Other/ Unknown	26/147	23.4	-

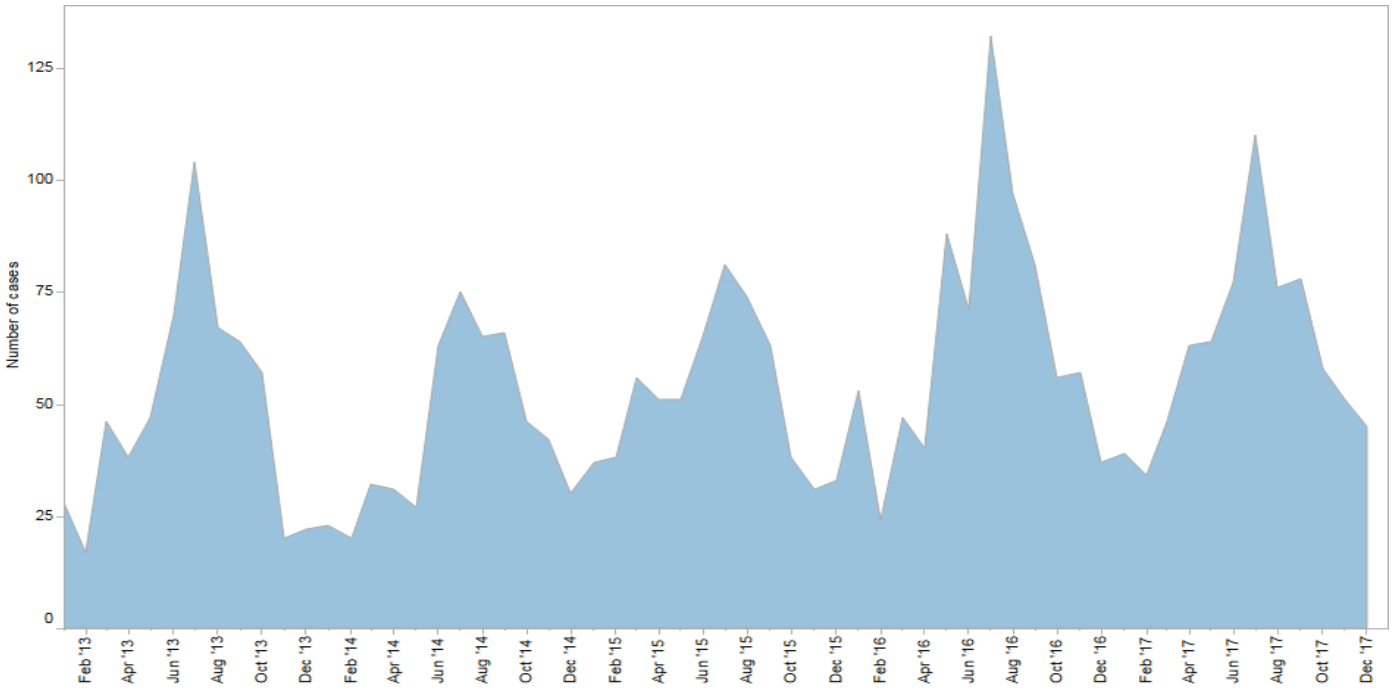
Ethnicity			
	Cases	Percent	Rate
Non-Hispanic	574	77.8	19.8
Hispanic	33	4.5	21.8
Unknown	131	17.7	-

Number of salmonellosis cases by month, 2017



Number of salmonellosis cases by age group (years), 2017

Salmonellosis cases by month and year - Iowa, 2013-2017



Shigellosis

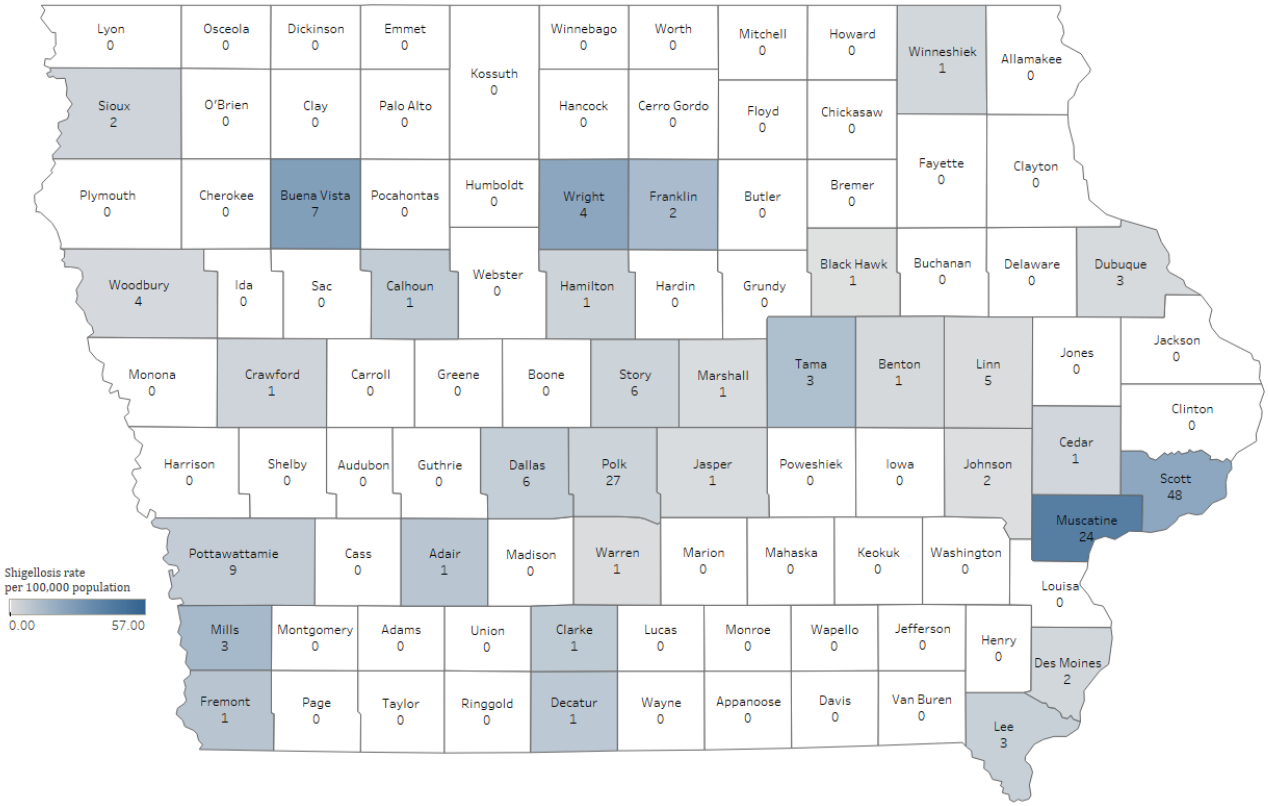
Cause: Shigella bacteria

Clinical Features: Diarrhea accompanied by fever, nausea and sometimes, vomiting, cramps and tenesmus (painful, ineffectual straining to defecate).

Transmission: Transmitted via the fecal-oral route. People shedding bacteria may contaminate food by failing to properly wash their hands before food handling, potentially causing large numbers of people to become ill. A very small dose of *Shigella* is needed to cause illness (maybe as few as 10 – 100 organisms); thus, it can be easily spread. Person-to-person spread typically occurs among household contacts, pre-school children in child care, and the elderly and developmentally disabled living in residential facilities. Secondary attack rate in households can be as high as 40%. Transmission can also occur person-to-person through certain types of sexual contact (*e.g.,* fecal-oral contact).

Summary of 2017 shigellosis cases	
Number of cases	174
Incidence rate (per 100,000 population)	5.7
Change from 5-year average incidence	-50.4%

Reported shigellosis cases (confirmed and probable) and incidence rates per 100,000 population by county of residence - Iowa, 2017 (N=174)



Shigellosis case demographics

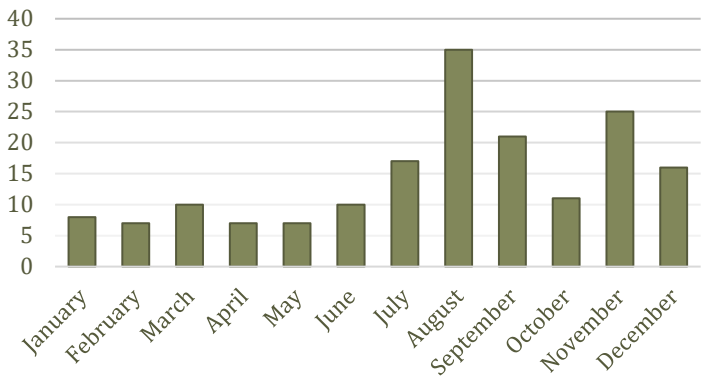
Age (years)	
Mean	28.0
Median	24.5
Min-Max	0.7 - 89.6

Gender			
	Cases	Percent	Rate
Female	106	60.9	6.9
Male	68	39.1	4.5

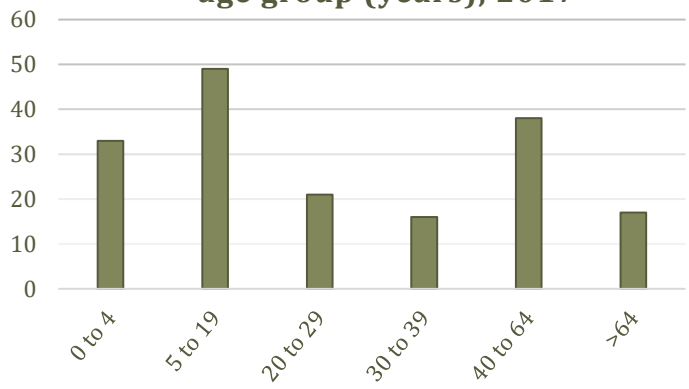
Race			
	Cases	Percent	Rate
White	107	61.5	3.9
Black	15	8.6	16.8
Other/ Unknown	5/47	29.9	-

Ethnicity			
	Cases	Percent	Rate
Non-Hispanic	110	63.2	3.8
Hispanic	24	13.8	15.8
Unknown	40	23.0	-

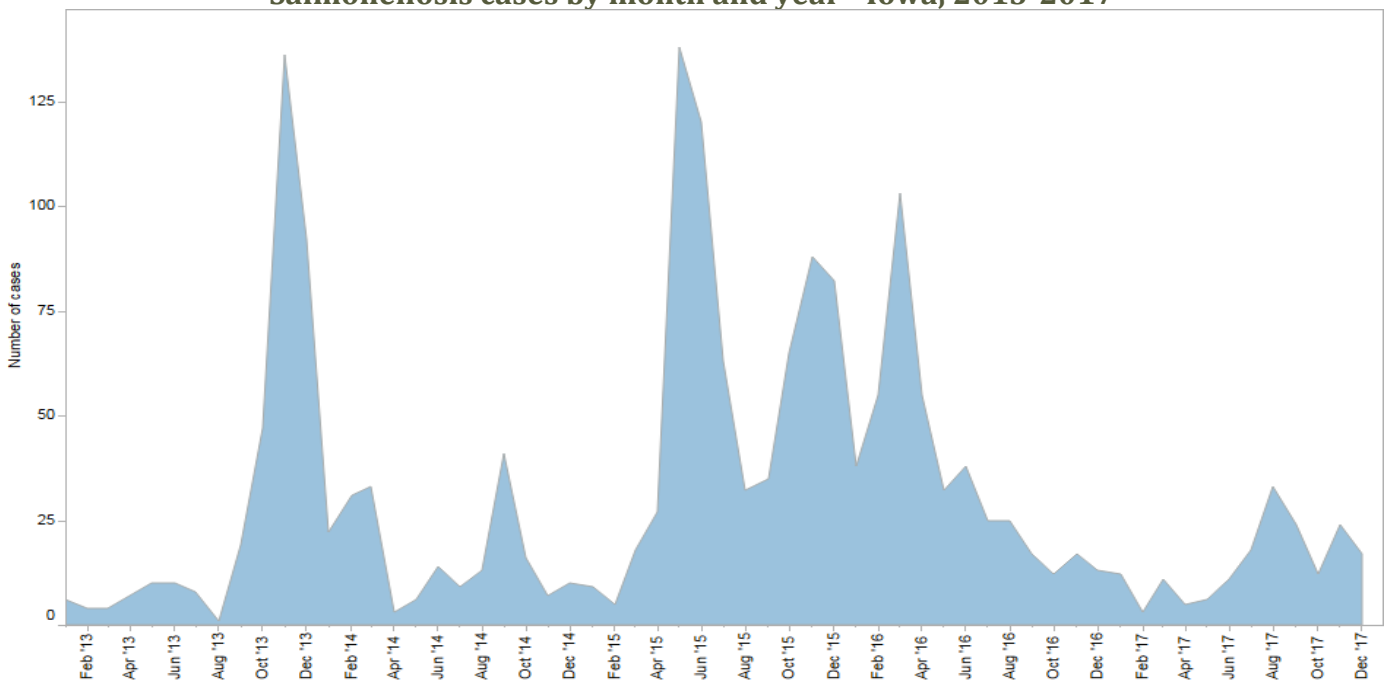
Number of shigellosis cases by month, 2017



Number of shigellosis cases by age group (years), 2017



Salmonellosis cases by month and year - Iowa, 2013-2017



Section 4

2017 VECTOR-BORNE DISEASE

West Nile Virus (WNV)

WNV is endemic in Iowa and activity usually peaks in late summer and early fall. IDPH works in collaboration with Local Public Health (LPH) and other partners to investigate all reported cases.

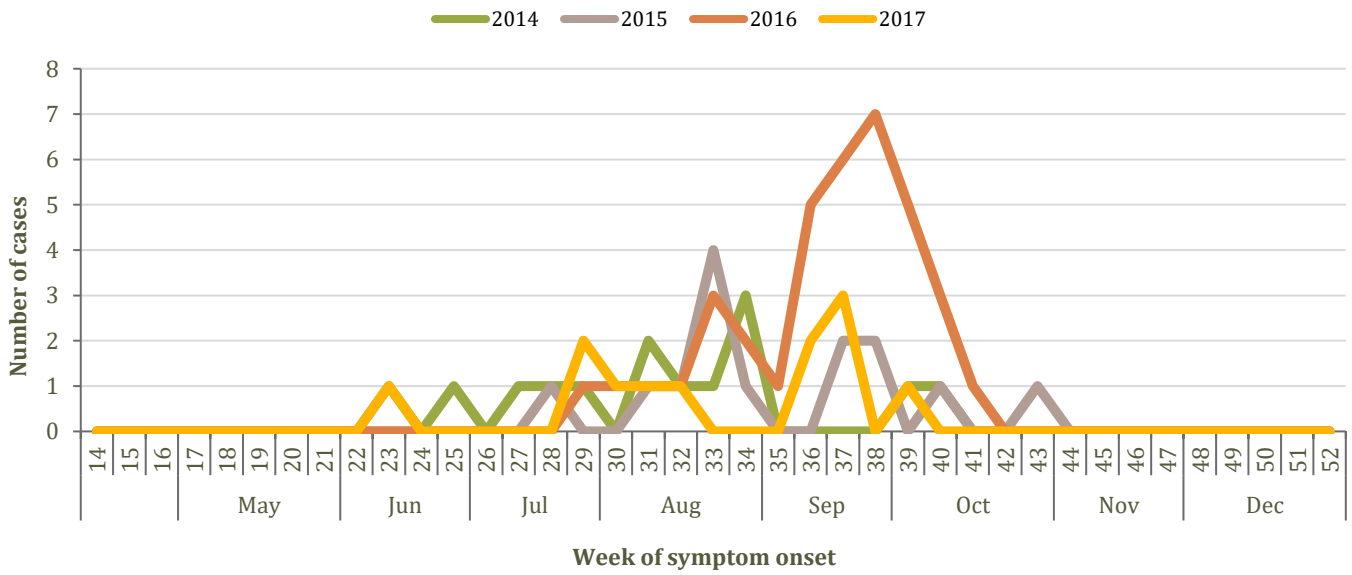
During the 2016 surveillance season, 37 human cases of WNV were reported in 19 Iowa counties. In 2017, 12 human cases of WNV, two WNV-related deaths and five presumptive viremic blood donors were identified. Two horses, one bird and 88 mosquito samples also tested positive for WNV [Table 10].

Table 10: 2017 WNV cases and positive mosquito pools

				Mosquito Pools					
County	Human	Blood Donor	Horses	*Aedes japonicus*	*Culex erraticus*	*Culex pipiens*	*Culex pipiens* Group	*Culex restuans*	*Culex salinarius*
Allamakee	1	0	0	0	0	0	0	0	0
Blackhawk	0	0	0	0	0	0	9	0	0
Buena Vista	1	0	0	0	0	0	0	0	0
Des Moines	0	2	0	0	0	0	0	0	0
Dickinson	0	0	0	0	0	0	0	0	1
Fayette	0	1	0	0	0	0	0	0	0
Ida	1	0	1	0	0	0	0	0	0
Linn	1	0	0	0	0	0	0	0	0
Lyon	2	1	0	0	0	0	0	0	0
Marshall	0	1	0	0	0	0	0	0	0
Monona	0	0	0	0	0	0	2	0	0
O'Brien	0	0	0	0	1	0	1	1	0
Osceola	1	0	0	0	0	0	0	0	0
Polk	1	0	0	0	9	0	18	0	0
Pottawattamie	1	0	0	0	4	3	16	1	0
Poweshiek	1	0	0	0	0	0	0	0	0
Sioux	0	0	0	1	0	0	0	0	0
Story	1	0	0	0	3	0	7	1	0
Woodbury	1	0	0	0	4	0	6	0	1
Worth	0	0	1	0	0	0	0	0	0
Total	**12**	**5**	**2**	**1**	**21**	**3**	**59**	**3**	**2**

*IDPH does not routinely test horses or birds for West Nile virus, but positive horses and birds are reported to IDPH.

Figure 1. WNV disease cases reported to IDPH by week of onset – Iowa, 2017



Mosquito Surveillance

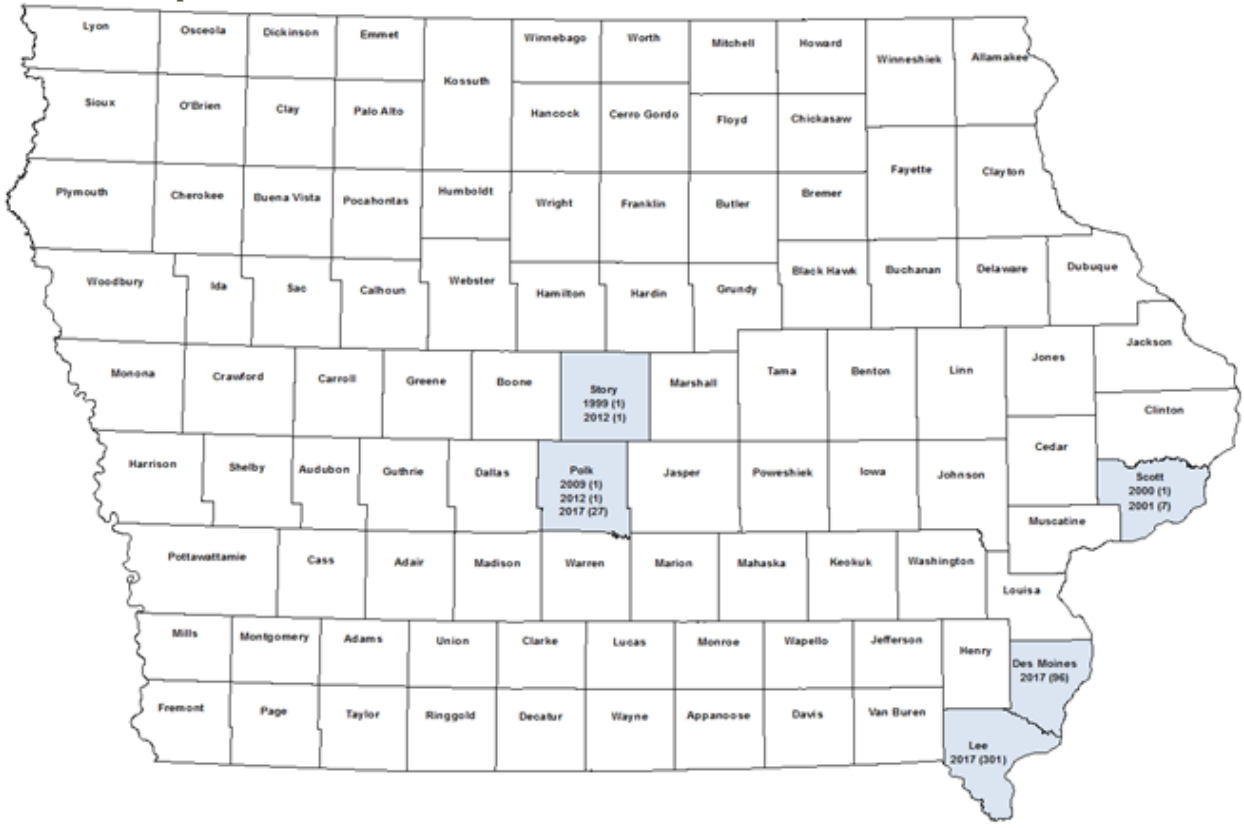
IDPH in collaboration with the State Hygienic Laboratory (SHL), Iowa State University (ISU), and local public environmental health partners conducted ecological surveillance in 25 counties across the state by monitoring mosquitoes and testing for WNV infected populations.

Table 11. 2017 mosquitoes tested for West Nile virus

Species	# of Samples Tested	WNV Negative	WNV Positive
Cx. pipiens	322	301	21
Cx. pipiens group	170	167	3
Cx. tarsalis	94	92	2
Cx. restuans	569	510	59
Cx. territans	10	10	0
Cx. erraticus	53	53	0
Cx. salinarius	113	110	3
Ae. japonicus	120	120	0
An. punctipennis	0	0	0
Ae. atropalpus	0	0	0
Ae. sticticus	1	1	0
Ae. triseriatus	1	1	0
Total	1453	1365	88

In addition to viral testing for WNV, the population of mosquitoes in Iowa is monitored through trapping activities. All trapped mosquitoes are sorted by species. One species that has rarely been found in Iowa is *Aedes albopictus*. The figure [Figure 2] below shows where and when each detection occurred.

Figure 2. *Aedes albopictus* identified in Iowa



La Crosse encephalitis (LACV)
La Crosse encephalitis virus (LACV) is passed to humans through the bite of an infected *Aedes triseriatus* mosquito. These mosquitoes are most active during the daytime, especially in or near infested woods.

In 2017, one case of LACV was reported in Iowa. The last case of LACV identified in the Iowa was in 2007.

Dengue Fever
Dengue is a disease caused by any one of four related viruses, which are passed by the bite of an infected *Aedes aegypti* or *Aedes albopictus* mosquito. Infection with one of the four viruses does not protect against the others and consecutive infections put people at greater risk of developing dengue hemorrhagic fever (DHF).

Dengue is not found in Iowa. Cases are in travelers and immigrants returning from parts of the world where dengue transmission occurs. Four cases of Dengue fever were reported in Iowa in 2017. In 2016, eight cases of Dengue fever were reported to IDPH.

Chikungunya
Chikungunya is a viral disease that is spread to people by the bite of an infected *Aedes aegypti* and *Aedes albopictus* mosquito. Mosquitoes become infected when they feed on a person already infected with this virus. These species of mosquitoes are not sustained in Iowa.

In 2016, two imported cases of chikungunya virus disease were reported in Iowa. Cases occurring in Iowa are in travelers returning from parts of the world where Chikungunya transmission occurs. In 2017, one case of chikungunya was reported in Iowa.

Malaria
Malaria is a serious and sometimes fatal disease caused by a parasite that commonly infects *Anopheles* mosquitoes. Malaria is spread to humans by the bite of the infected female mosquito. Only *Anopheles* mosquitoes can transmit malaria and they must have been infected through a previous blood meal taken from an infected person.

Nineteen cases of malaria were reported in Iowa. Cases are in travelers and immigrants returning from parts of the world where malaria transmission occurs. In 2016, 22 cases of malaria were reported to IDPH.

Rocky Mountain spotted fever (RMSF)
American dog ticks are carriers of *Rickettsia rickettsii*, the bacteria that causes RMSF. The American dog tick is the most common species of tick in Iowa and can be found in every county in the state. The tick is most active late March through August.

Seventeen cases of RMSF were reported in Iowa. In 2016, 11 cases of RMSF were reported to IDPH.

Ehrlichiosis/Anaplasmosis
There are at least three species of bacteria responsible for ehrlichiosis/anaplasmosis in the United States: *Ehrlichia chaffeensis, Ehrlichia ewingii, and Anaplasma phagocytophilum*. Ehrlichiae are transmitted by the bite of an infected lone star tick (*Amblyomma americanum*) which is found in Iowa.

A. phagocytophilum is transmitted by the bite of an infected blacklegged tick (or deer tick, *Ixodes scapularis*) in Iowa. The clinical signs and symptoms of these infections are similar.

Twenty-four cases of ehrlichiosis/anaplasmosis were reported in Iowa. In 2016, 14 cases of ehrlichiosis/anaplasmosis were reported to IDPH.

Babesiosis

Babesiosis is caused by microscopic parasites that infect red blood cells. Most human cases in the United States are caused by the parasite *Babesia microti*. *Babesia microti* is spread by the blacklegged tick (or deer tick, *Ixodes scapularis*). The parasite typically is spread by the young nymph stage of the tick. They are most common during the warm months of spring and summer in areas with woods, brush, or grass.

Two cases of Babesiosis were reported in Iowa. In 2016, one case of Babesiosis was reported to IDPH.

Lyme

Lyme disease is caused by *Borrelia burgdorferi* and in Iowa is transmitted to humans by the bite of an infected tick, the blacklegged tick (or deer tick, *Ixodes scapularis*). Ticks are most likely to spread the Lyme disease bacterium during their pre-adult stage (nymph). They are most common between May and July and found in tall grasses and brush of wooded areas.

In 2017, 255 confirmed and probable cases of Lyme were reported in Iowa. In 2016, 232 cases of Lyme disease were reported to IDPH.

Section 5

2017 RABIES SUMMARY

Animal rabies in Iowa:

In 2017, 10 cases of animal rabies were reported in Iowa. Rabies was identified most frequently in wildlife species including 6 bats and 2 skunks. Two cases were also diagnosed in cats.

Table 12. Positive Rabies Cases 2007-2017

Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Bat	13	11	11	10	12	17	6	10	7	12	6	115
Skunk	5	7	13	13	7	9	4	2	1	1	2	64
Cat	7	9	3	1	3	1	0	1	1	1	2	29
Cow	0	1	5	1	3	4	2	2	0	1	0	19
Dog	5	1	2	1	0	0	0	0	3	3	0	15
Horse	1	0	0	0	0	0	0	0	0	1	0	2
Fox	0	0	0	1	0	0	0	0	0	0	0	1
Squirrel	0	0	1	0	0	0	0	0	0	0	0	1
Badger	0	0	0	0	0	0	0	0	0	0	0	0
Total	31	29	35	27	25	31	12	15	12	19	10	246

During 2017, 1360 animals in Iowa were tested for rabies and 10 were confirmed positive (0.74%). The percent positive varies greatly by species, see the Table 13 below. It is important to note that this data is greatly influenced by the number of animals tested. Many animals are tested because they have contact with humans or domestic animals and they exhibit unusual behavior or clinical signs making them more likely to be infected with the rabies virus. For these reasons, the percentages should not be considered representative of the true distribution of disease within the animal population in Iowa.

Table 13. Percent Positive by Species in 2017

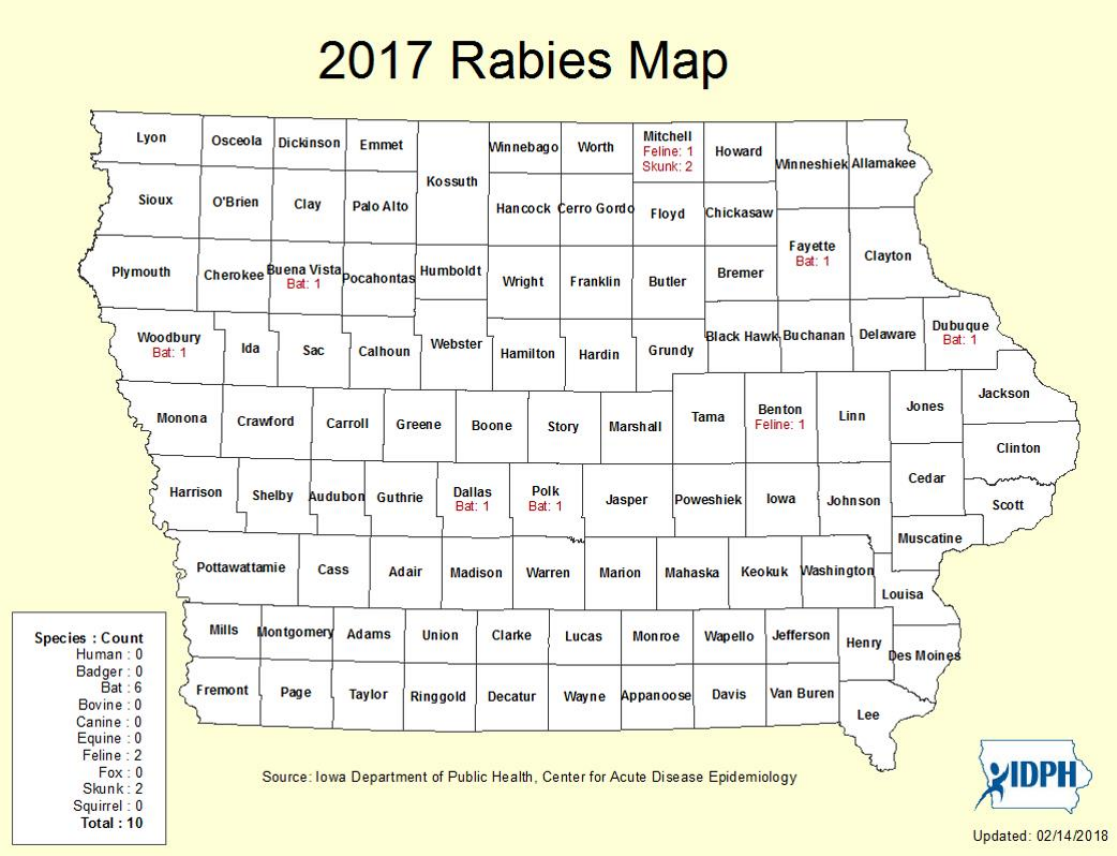
Species	Positive	Total Tested	% Positive
Skunk	2	11	18.2
Bat	6	523	1.1
Cat	2	345	0.6

In Iowa, the most common bat species submitted for testing are the Big Brown bat and Little Brown bat; however other bat species are occasionally tested.

Table 14. Bat Species Tested and Positive for Rabies Infection

Species	Positive	Total Tested
Eptesicus fuscus (Big Brown bat)	6	491
Myotis lucifugus (Little Brown bat)	0	13
Lasiurus borealis	0	3
Myotis septentrionalis	0	2
Nycticeius humeralis	0	1
Unknown	0	13
Total	6	523

Figure 3: 2017 Iowa Rabies Map



There are two laboratories that test animals for rabies in Iowa:

- State Hygienic Laboratory at the University of Iowa (tested 758 Iowa animals in 2017)
- Iowa State University Veterinary Diagnostic Laboratory (tested 602 Iowa animals in 2017)

Iowa animals are also periodically tested in out-of-state laboratories

Human rabies in Iowa:

Iowa's most recent human rabies case occurred in 2002, and was caused by the bat strain. Prior to that, the last reported case occurred in 1951.

While the exact number of people who receive rabies post exposure prophylaxis (PEP) each year in the United States is unknown, it is estimated to be about 40,000 people. Based upon Iowa's population approximately 390 Iowan's receiving PEP each year.

Section 6

2017 INFLUENZA SUMMARY

Summary of Iowa activity

The Iowa Influenza Surveillance Network (IISN) is a collaborative effort between the Iowa Department of Public Health (IDPH), the State Hygienic Laboratory and many partners, including the Centers for Disease Control and Prevention (CDC), Council of State and Territorial Epidemiologists (CSTE), local public health departments, clinical laboratories, hospitals, healthcare providers, clinics, medical examiners, and schools. Influenza surveillance tracks influenza activity, virus type and strain, age group impacted, outbreaks, and severity of the seasonal influenza viruses.

The 2017-2018 influenza season (October 1, 2017-May 19, 2018) in Iowa, similar to national activity, had higher levels of outpatient influenza-like illness (ILI), influenza-related hospitalizations, and influenza-associated deaths than in recent seasons. Influenza activity peaked on most measures in January 2018. Influenza A(H3N2) viruses were the most commonly identified through MMWR week 7 in February 2018 and were the predominant virus reported for the season for the second season in a row. Influenza B viruses, of which over 99 percent were identified as Yamagata lineage, began to increase in December 2017 and outnumbered influenza A viruses reported in February through May 2018. Iowa reported "widespread" statewide influenza activity to the CDC, which is the highest level of activity, for 10 consecutive weeks beginning with MMWR week 52 in December 2017 through week 9 at the end of February 2018.

Highlights of the Iowa 2017-2018 influenza season summary report for the period October 1, 2017 through May 19, 2018 include the following:

- 1,510 influenza positive specimens out of 2,426 specimens tested (62% positive) were confirmed by the State Hygienic Laboratory at the University of Iowa (SHL), with 962 (64%) specimens confirmed as influenza A (H3N2) and 477 (32%) specimens identified as influenza B (Yamagata lineage)
- 14,423 rapid influenza positive specimens reported by the state laboratory survey with 64 percent positive for influenza A
- 10,301 positive non-influenza respiratory specimens reported to IISN with rhinovirus/enterovirus and respiratory syncytial virus (RSV) accounting for 56 percent of the positive results
- over one million influenza vaccines were reported to Iowa's immunization tracking system
- 270 influenza-related deaths were reported which was more than during the same time period during 2015-16 and 2016-17 combined
- 1,889 (96 per 10,000 hospitalizations) hospitalizations were reported from sentinel sites which was more than a 50 percent increase compared to 2016-17 (1,078 and 63 per 10,000)
- weekly percentage of outpatient visits for ILI in Iowa was above the regional baseline of 1.9 percent for nine weeks in a row from week 52 in December 2017 through week eight in February 2018 and peaked MMWR week 4 in January 2018 at 3.7 percent
- 90 influenza outbreaks in long-term care facilities were investigated compared to 56 outbreaks during the same period in the 2016-17 season
- 229 schools reported over 10 percent absenteeism due to illness at least once during the year, with schools in 75 counties reporting 10 percent illness at least once
- percent of ill students at sentinel schools rose above the baseline 15 times and peaked at 4.5 percent in MMWR week 6 in February 2018

Laboratory surveillance program

SHL is the primary lab for influenza surveillance and reporting in Iowa. SHL reports the number of tests performed and the type and sub-type/lineage of positive tests to the influenza surveillance network several times every week.

SHL is the primary laboratory in Iowa characterizing specimens for influenza surveillance. SHL reports the number of tests performed and the type and subtype/lineage of positive tests to the influenza surveillance network daily. SHL also sends a portion of specimens to CDC for further characterization.

There were 2,426 specimens tested for influenza at SHL October 1, 2017-May 19, 2018, with 1,510 total positive specimens. The number of specimens testing positive for influenza peaked in MMWR week 2 in January with 133 positive specimens detected that week (Figure 4). The positive specimens included 1028 (71%) influenza A and 413 (29%) influenza B viruses. Among the 1,021 influenza A specimens subtyped, 962 (94%) were influenza A (H3N2), and 57 (6%) were influenza A(H1N1)pdm09. Iowa reported two human infections with novel influenza A during the 2017-2018 influenza season, one influenza A(H1N2) variant or A(H1N2)v and one influenza A(H3N2)v. Both infections were associated with exposure to swine. No human to human transmission was reported. Of the 479 influenza B positive specimens with lineage information available, 477 (>99%) were identified as B/Yamagata and two (<1%) as B/Victoria lineage (Table 15).

Of the 1,510 influenza-positive specimens tested, 684 (45%) were from persons over 64 years of age. Influenza A(H3N2), A(H1N1)pdm09, and B(Yamagata) viruses were identified in all age groups with A(H3N2) being predominant in all age groups, except for persons age 5-17 where A(H3N2) and B(Yamagata) both accounted for 47 percent of infections (Table 15).

Figure 4. Number of laboratory confirmed influenza specimens by influenza type and strain, October 1, 2017 - May 19, 2018

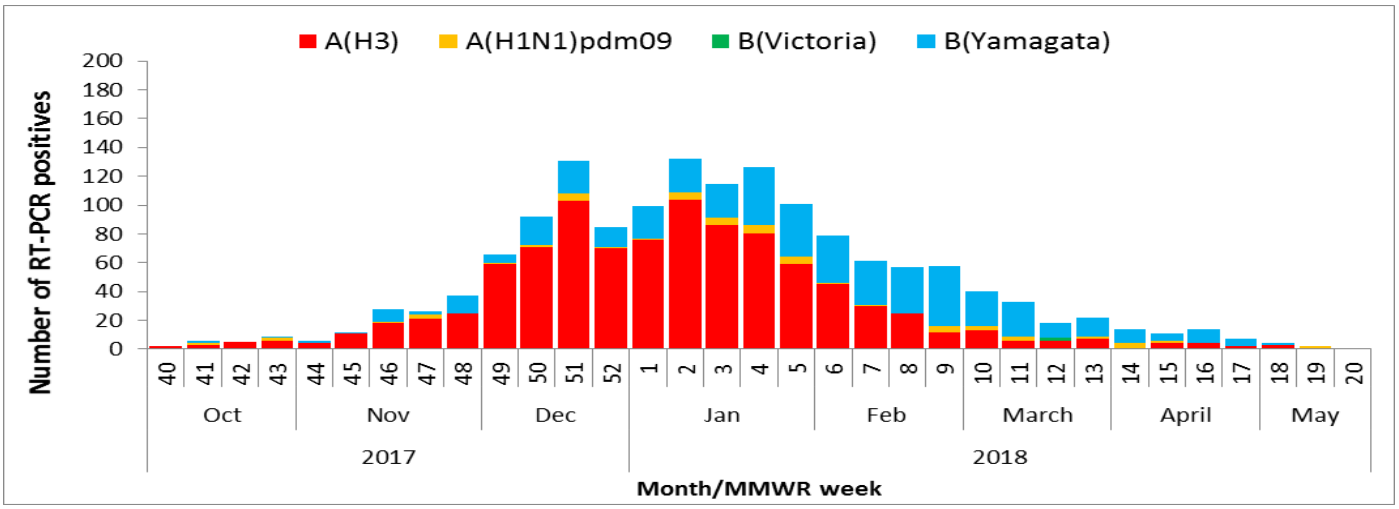


Table 15: Influenza A and B viruses detected by SHL by age group, October 1, 2017 – May 19, 2018

Age Group	Flu A					Flu B			
	A(H1N1)pdm09	A variants	A(H3)	Not subtyped	Total	Victoria Lineage	Yamagata Lineage	Unknown Lineage	Total
0-4	10	0	73	1	84 (8%)	0	22	1	**53 (5%)**
5-17	8	0	82	1	91 (9%)	0	83	1	**111 (11%)**
18-24	11	1	128	0	140 (14%)	1	54	0	**148 (14%)**
25-49	11	1	77	1	90 (9%)	1	60	0	**99 (10%)**
50-64	10	0	113	1	124 (12%)	0	73	1	**125 (12%)**
>64	7	0	489	3	499 (49%)	0	185	0	**497 (48%)**
Total	**57 (6%)**	**2 (0%)**	**962 (94%)**	**7 (1%)**	**1028**	**2 (0%)**	**477 (99%)**	**3 (1%)**	**1033**

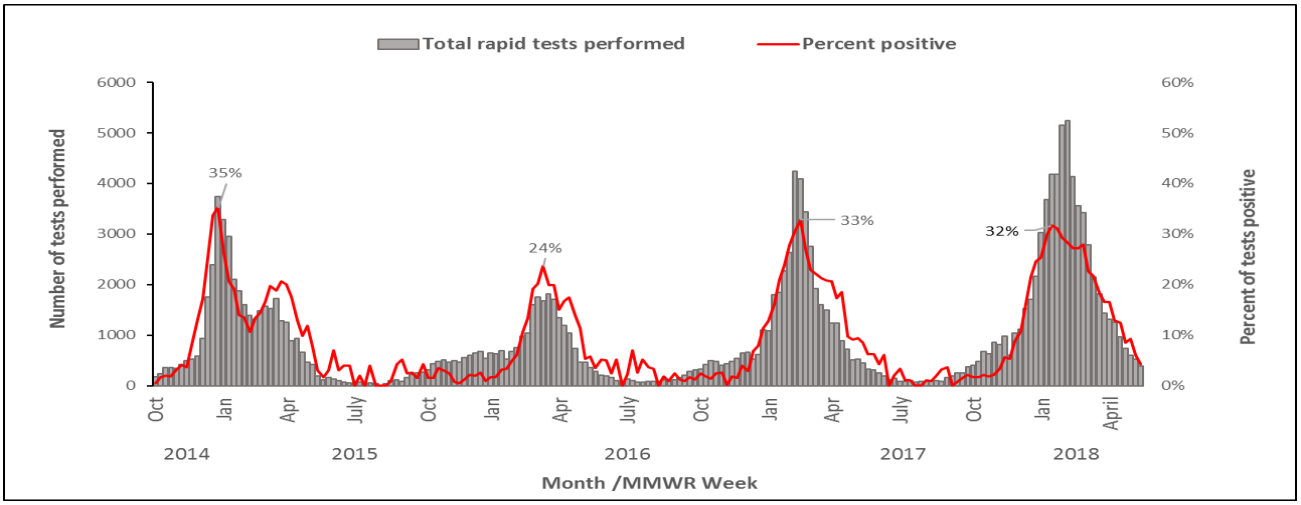
Notes: Only cases of Iowa residents are included. "Not subtyped" or "unknown lineage" columns are due to weak detections. This can be due to poor collection, timing of collection or stage of infection.

Rapid influenza and RSV test surveillance

SHL has a weekly web-based survey program where laboratorians in Iowa report the number of influenza and RSV rapid tests performed and the number of tests positive. Only the total number of patients tested and the number positive for influenza or RSV at each laboratory are reported, not individual results.

Figure 5 shows the percentage of positive rapid influenza tests and the number of tests performed September 28, 2014 (MMWR week 40) – May 19, 2018 (MMWR week 20). There were 63,572 specimens tested for influenza October 1, 2017-May 19, 2018, with 14,423 total positive specimens (23% positive total – 9161 influenza A and 5,262 influenza B). During the 2017-2018 influenza season, the percent of positive influenza rapid tests was above 10 percent for 20 consecutive weeks, from the first week in December 2017 through the third week in April. The positivity rate peaked at 32 percent in the third week in January 2018.

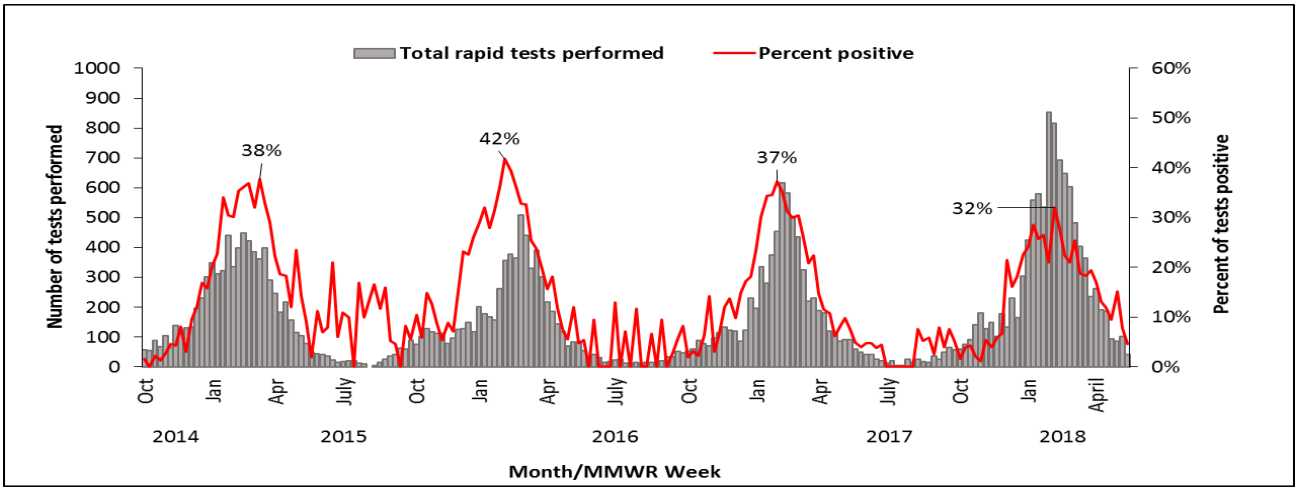
Figure 5. Percent of influenza rapid tests positive and number of tests performed, 2014-2018



Note: survey not collected MMWR week 53 in Dec 2014/Jan 15 and MMWR week 31 July/Aug 2015.

Figure 6 shows the percentage of positive rapid RSV tests and the number of tests performed September 28, 2014 (MMWR week 40) – May 29, 2018 (MMWR week 20). There were 10,115 specimens tested October 1, 2017-May 19, 2018, with 2,105 total positive specimens (21% positive total). The percent of positive RSV rapid tests increased dramatically the first week in December 2017, peaked at 32 percent the first week in February 2018, and did not drop below five percent until the week 19 in May 2018.

Figure 6. Percent of RSV rapid tests positive and number of tests performed, 2014-2018



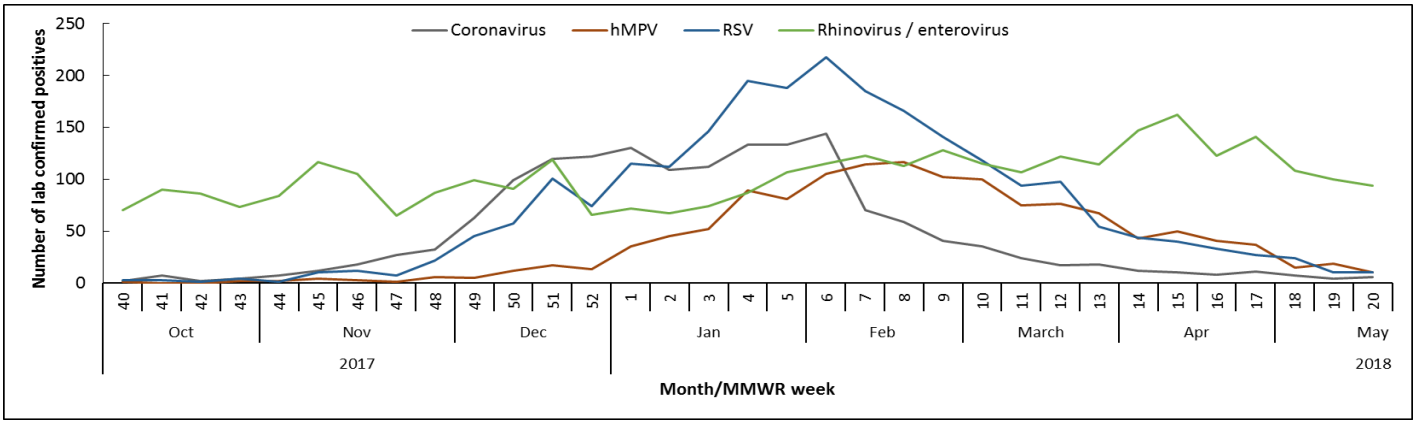
Note: survey not collected MMWR week 53 in Dec 2014/Jan 15 and MMWR week 31 July/Aug 2015.

Non-influenza respiratory viruses

SHL also collects information on non-influenza respiratory virus testing with their weekly web-based survey. This information is added to reports from the Dunes Medical Laboratories at Mercy Medical Center in Sioux City. Only the number of patients tested and the number positive for non-influenza viruses are reported, not individual results.

For the period covering October 1, 2017 through May 19, 2018, labs surveyed by SHL and by Dunes Medical Laboratories reported 10,301 positive results for non-influenza respiratory viruses, which more than doubled the number of positive results (4,572) from the same period in the 2016-17 season. Rhinovirus/Enterovirus and RSV accounted for the majority of positive results with 3371 (35%) and 2358 (21%) respectively. Different viruses peaked at different times from October through April (Figure 7 and Table 16).

Figure 7. Number of positive non-flu respiratory viruses by type, October 1, 2017 - May 19, 2018



Note: only viruses with at least 10 percent of total positive results were included.

Table 16: Number of positive results, percent of total, and month of peak for non-influenza respiratory virus collected by SHL and Mercy Dunes in Sioux City, October 1, 2017 – May 19, 2018

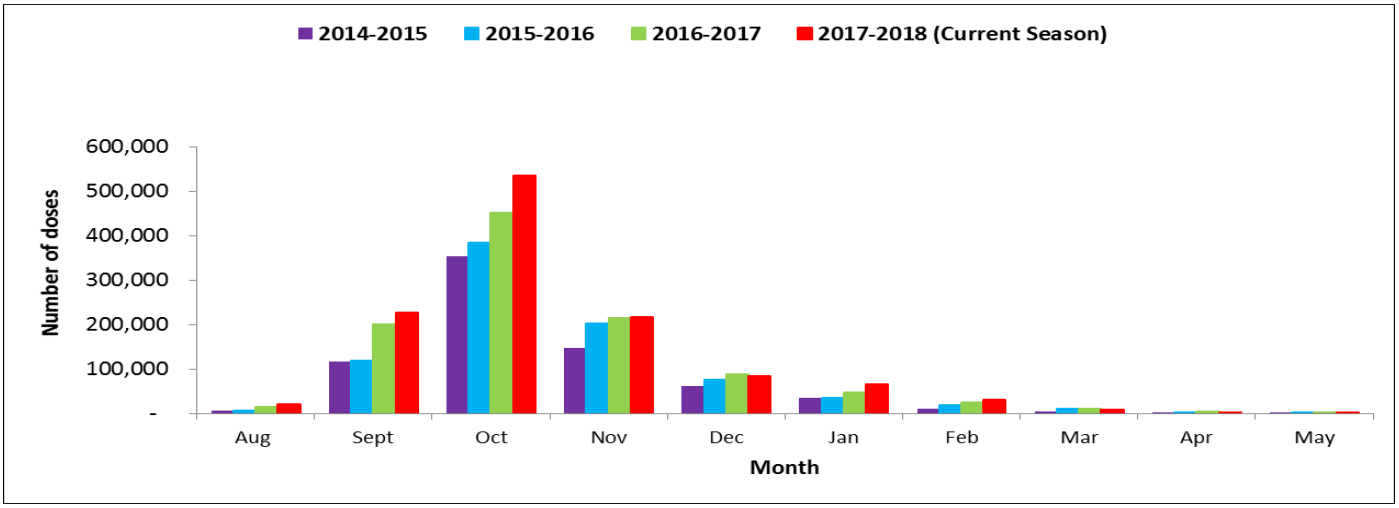
Viruses	Number	Percent	Month of Peak
Adenovirus	732	7	February 2018
Parainfluenza Virus Type 1	488	4	October 2017
Parainfluenza Virus Type 2	11	<1	
Parainfluenza Virus Type 3	333	5	May 2018
Parainfluenza Virus Type 4	71	<1	
Rhinovirus/Enterovirus	3371	35	April 2018
Respiratory syncytial virus (RSV)	2358	21	February 2018
Human metapneumovirus (hMPV)	1339	12	February 2018
Coronavirus	1598	14	February 2018
Total	10301		

Seasonal influenza vaccination

Seasonal influenza vaccination data in Iowa is based on doses reported to the Iowa Immunization Registry Information System (IRIS). IRIS is a confidential, computerized, population-based system that tracks immunizations for children, adolescents and adults who are seen in a variety of public and private healthcare provider sites throughout the state of Iowa. For more information on the immunization data, contact Kim Tichy, IRIS coordinator at 515-281-4288 or kimberly.tichy@idph.iowa.gov.

The number of seasonal influenza vaccine doses reported to IRIS during the 2017-18 season was 1,190,026, which is higher than in each of the two previous seasons (1,059,742 in 2016-17 and 858,872 in 2015-16). Over 90 percent of doses were administered August through December 2017 (Figure 8).

Figure 8. Doses of seasonal influenza vaccine reported to IRIS by month for influenza seasons, 2014-2018



Mortality surveillance

Influenza-related mortality data primarily comes from the Iowa Bureau of Health Statistics as well as reports from the Iowa Office of the State Medical Examiner if they detect unusual clusters of deaths

attributed to infectious disease. Reports may also come from influenza-related pediatric deaths (under age 18 years) which are reportable in Iowa. Deaths are counted as influenza-related if the death report lists influenza as a possible contributor to the cause of death, but not necessarily the primary cause.

There were a total of 270 influenza-related deaths in Iowa for the time period from October 1, 2017 through May 19, 2018, with 161 (60%) being in persons aged 81 years and over. The number of deaths in 2017-18 was more than during the same time period during 2015-16 and 2016-17 combined (Table 17). Influenza-related deaths peaked in MMWR week 4 in January, with 114 deaths reported that month. Eighty-nine of the 135 influenza-related deaths (over 65%) occurred in February and March. Of the 270 deaths, 213 (79%) were among persons with a reported underlying health conditions.

Table 17: Number of influenza-related deaths per season and percent by age group – weeks 40-20

Ages	2014-15 (n=175)	2015-16 (n=44)	2016-17 (n=135)	2017-18 (n=270)
0-60	11	18	14	28
61-80	30	15	32	81
81 and over	134	11	89	161
Total	**175**	**44**	**135**	**270**

Note: only deaths that occurred during weeks 40 through 20 of each season were included

Influenza-associated hospitalizations

Sentinel hospitals track and report the number of influenza-associated hospitalizations and the total number of inpatients each week. Twenty-four sentinel hospitals participated in the influenza hospitalization surveillance in the 2017-18 influenza season. These hospitals tracked and reported the number of influenza-associated hospitalizations by age group (0-4, 5-24, 25-49, 50-64, and over 64 years) and the total number of inpatients hospitalized for any reason.

Both number and rate of hospitalizations peaked in January with 203 hospitalizations in week 1 and a rate of 363 influenza-associated hospitalizations per 10,000 total hospitalizations in week 2 (Figure 9). The number and rate of influenza-associated hospitalizations was higher in 2017-18 (1,889 and 96 per 10,000) compared to 2016-17 (1,078 and 63 per 10,000, see Table 18).

Figure 9. Influenza-associated hospitalizations by age group, 2014 – 2018

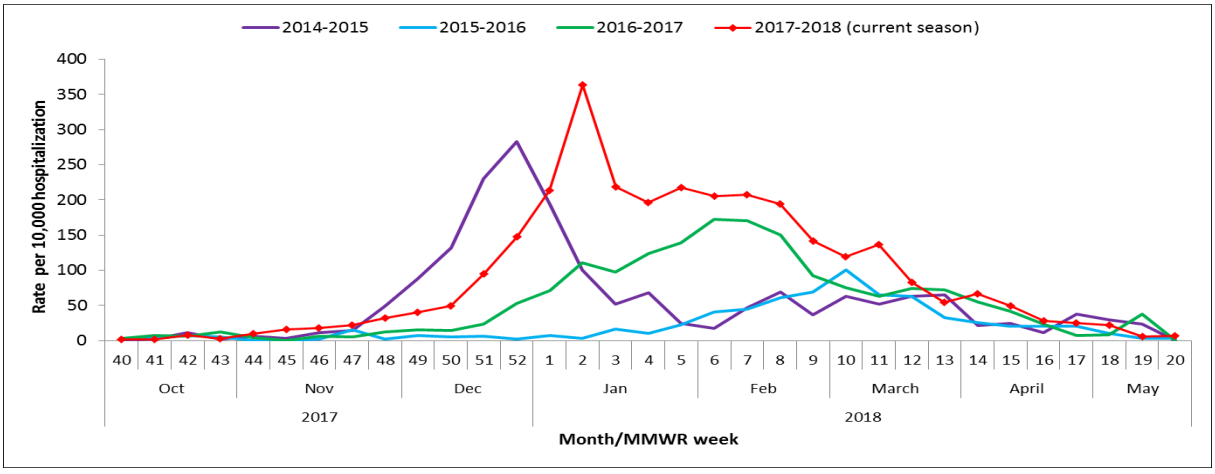


Table 18: Number of influenza-associated hospitalization and percent reported by age group, October 1, 2017 – May 19, 2018

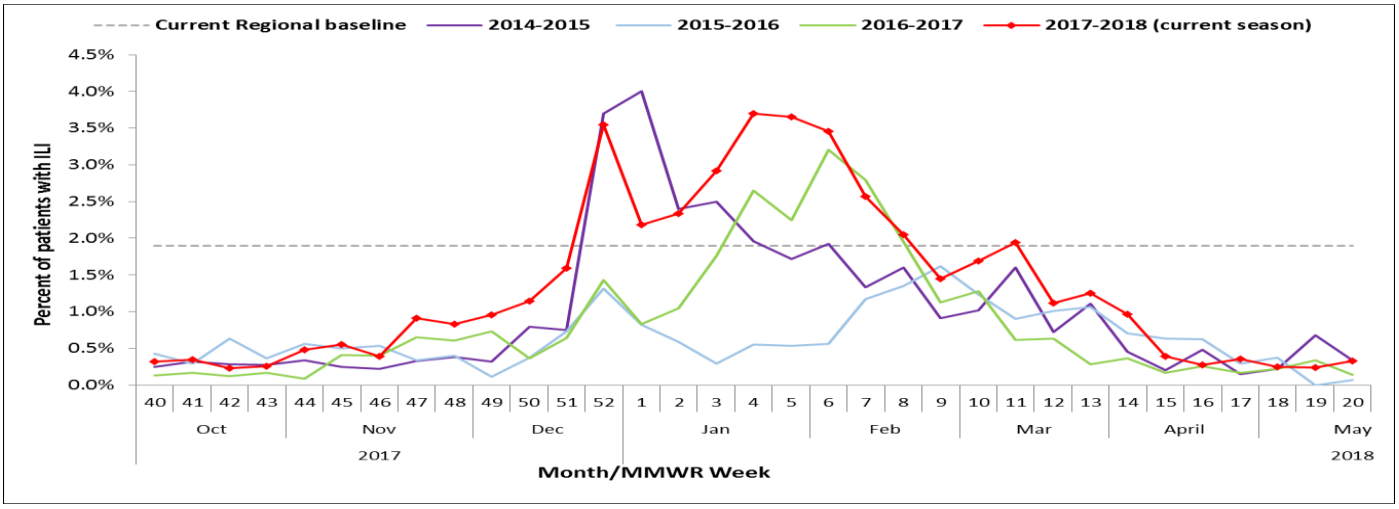
AGE	Number Hospitalizations	Percent of Total
Age 0-4	124	7
Age 5-24	99	5
Age 25-49	169	9
Age 50-64	344	18
Age >64	1153	61
Total	**1889**	**100**

Outpatient health care provider surveillance program (ILINet)

Sentinel outpatient health care providers participating in the ILINet national influenza surveillance program report the number of patients seen with influenza-like illness and the total number of patient visits each week. This system is a key part of Iowa's influenza surveillance. Across the state, providers, ranging from family medicine to student health centers, participate weekly in the ILINet program. Influenza-Like Illness is defined as a fever of at least 100°F plus either a cough or a sore throat.

Sixteen sentinel surveillance sites participated in ILINet during the 2017-2018 season. During the 2017-18 influenza season, the weekly percentage of outpatient visits for ILI in Iowa was above the regional baseline of 1.9 percent for nine weeks in a row from week 52 in December 2017 through week eight in February 2018. As shown in Figure 7, ILI percentage peaked MMWR week 4 in January at 3.7 percent.

Figure 10. Percent of outpatient visits for influenza-like illness reported by ILINet providers, 2014-2018



Long-term care outbreaks

Influenza outbreaks in long-term care facilities are reported to IDPH directly or through local public health providers. Long-term care facilities are defined as institutions, such as nursing homes and skilled nursing facilities that provide health care to people (including children) who are unable to manage independently in the community. A long-term care influenza outbreak should be suspected if there is one

laboratory-confirmed influenza positive case along with other cases of respiratory infection in a unit of a long-term care facility.

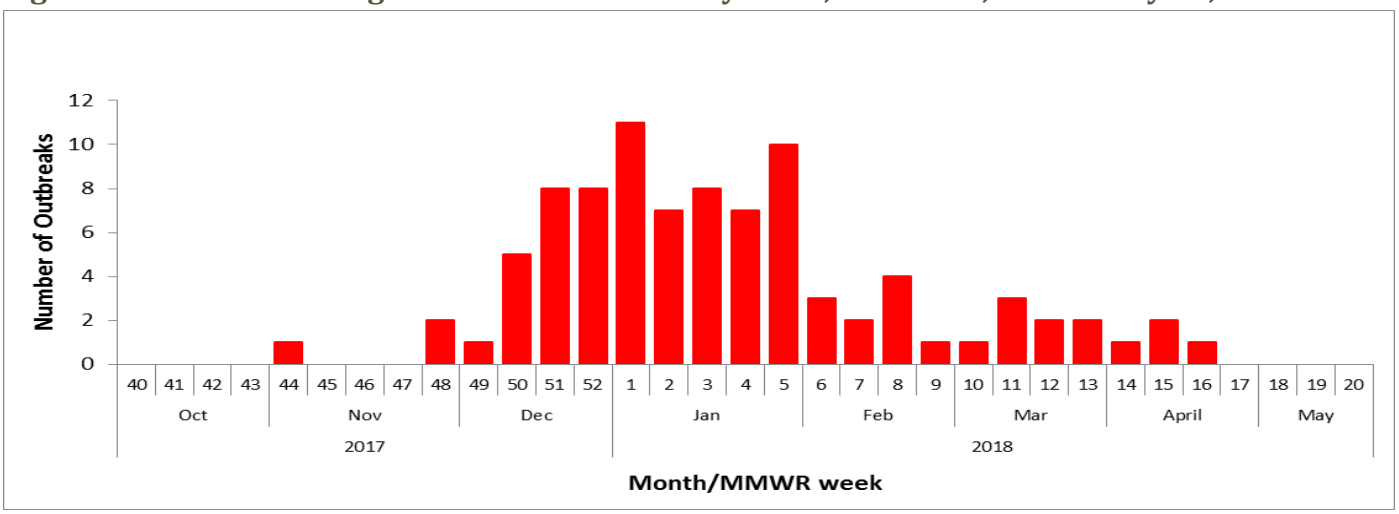
There were a total of 90 long-term care influenza outbreaks reported for the time period from October 1, 2017 through May 19, 2018 with at least five outbreaks in each region of Iowa (Table 19). The number of influenza outbreaks peaked with 11 outbreaks in the first week of January 2018 (Figure 11). During the same period in the 2016-17 season, 56 influenza outbreaks in long-term care facilities were investigated.

Table 19: Number of long-term care outbreaks investigated by region, October 1, 2017 – May 19, 2018

REGION*	Number Outbreaks
Region 1 (Central)	21
Region 2 (NE)	12
Region 3 (NW)	5
Region 4 (SW)	13
Region 5 (SE)	19
Region 6 (Eastern)	20
Total	**90**

Note: See map in the school section for a display of the counties in each region.

Figure 11. Number of long-term care outbreaks by week, October 1, 2017 – May 19, 2018



School surveillance program

IDPH monitors illnesses in schools (K-12) from two different types of reporting: 10 percent school absence reports and weekly sentinel illness reporting. Iowa schools track and report when the number of students absent with illness (including non-influenza illnesses) reaches or exceeds 10 percent of total student enrollment. Iowa sentinel schools that participate in IISN voluntarily track and report absence due to all illness and the total enrollment each week. IDPH tracks more than 60,000 students weekly for absence due to illness. This data provides excellent trends for influenza activity as well as age-specific information used to target vaccination efforts and messages.

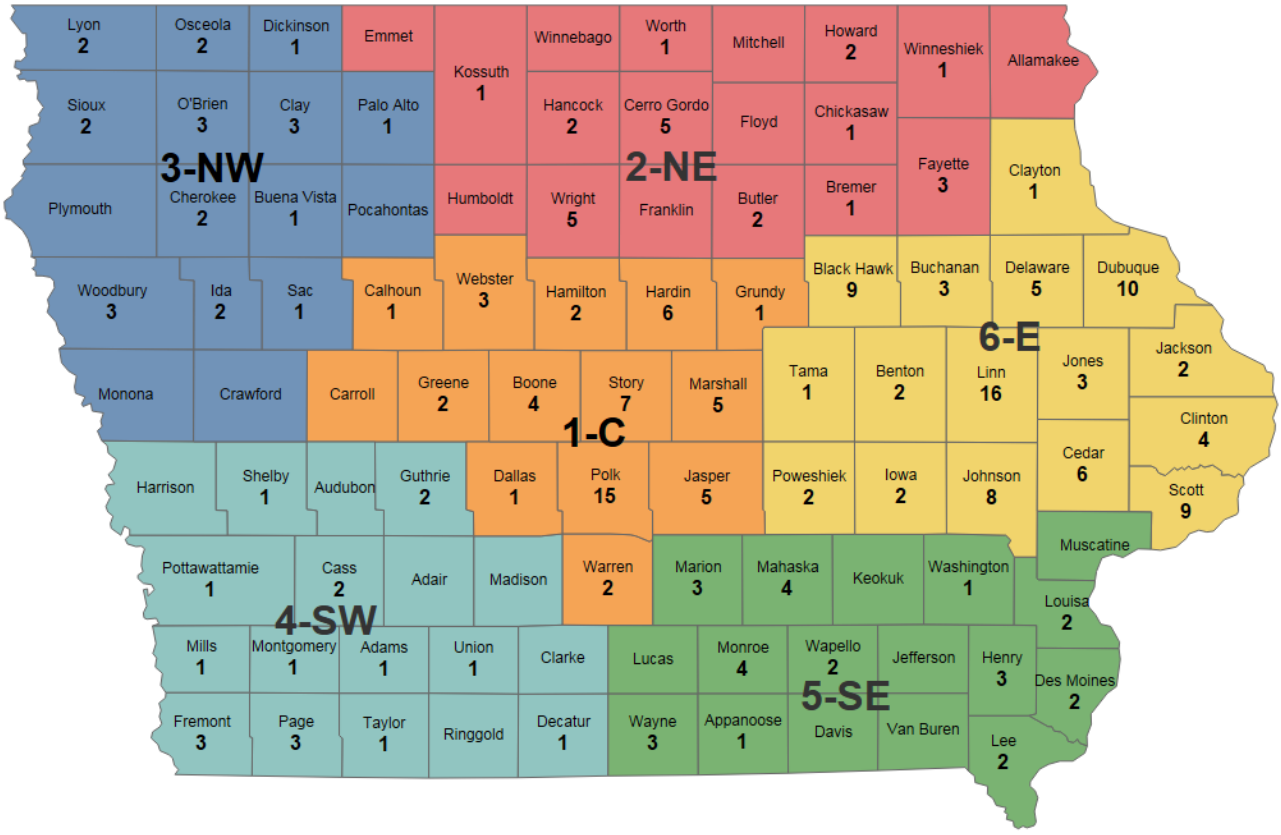
During the 2017-2018 influenza season, 229 schools reported over 10 percent absenteeism due to illness at least once during the year. Each school is counted only once per season. The number of schools with 10 percent ill peaked at 64 during the week ending February 10 (MMWR week 6). At least 15 schools in every region reported 10 percent illness (Table 20) and 75 counties reported at least one school with 10 percent illness during the year (Figure 12).

Table 20: Number of schools with at least 10 percent absenteeism due to any illness, October 1, 2017-May 28, 2018

REGION*	Number of Schools
Region 1 (Central)	57
Region 2 (NE)	24
Region 3 (NW)	23
Region 4 (SW)	18
Region 5 (SE)	26
Region 6 (Eastern)	81
Total	**229**

Note: See map in the school section for a display of the counties in each region.

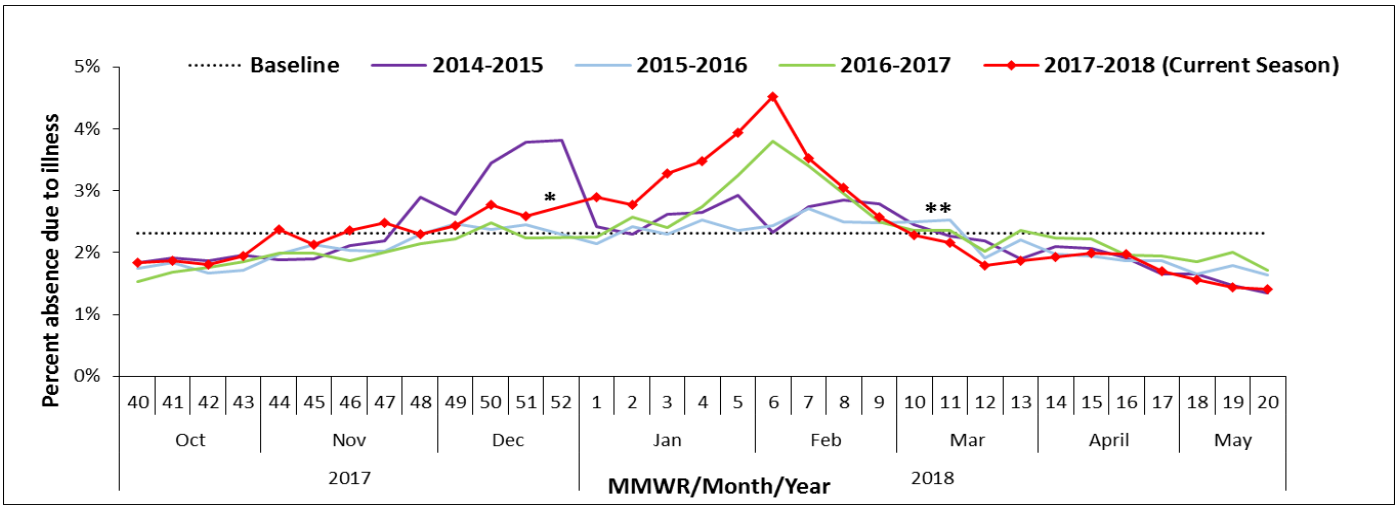
Fig 12. Schools with at least ten percent illness by county and region



Note: The number of schools by county that reported 10 percent absence due to illness at least once for the 2017-2018 influenza season are listed below each county. Region numbers and abbreviations are listed in black.

During the 2017-2018 influenza season, the percent of students absent due to illness from sentinel schools went above the 2.31 percent baseline 15 times including nine consecutive weeks in January and February (Figure 12). The percentage peaked at 4.5 percent in MMWR week 6 in February 2018.

Figure 13 Percent of enrolled students absent due to illness from sentinel school, 2014-2018

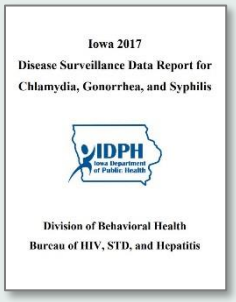


Notes: *School data not reported for week 52 due to holiday closings,
**School data may underestimate influenza illness for week 11 when many schools closed for spring break

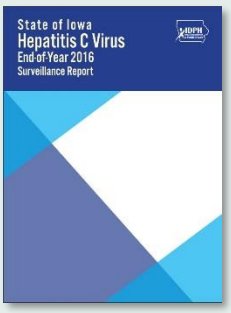
Section 6

RELATED PROGRAM REPORTS

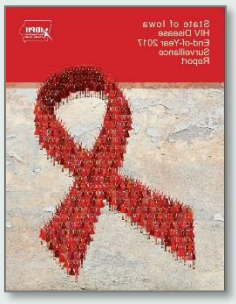
Division of Behavioral Health, Bureau of HIV, STD and Hepatitis



[Iowa 2017 Disease Surveillance Report for Chlamydia, Gonorrhea, and Syphilis]

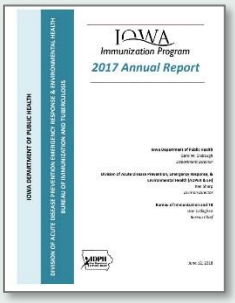


[Epidemiological Profile of Hepatitis C in Iowa]

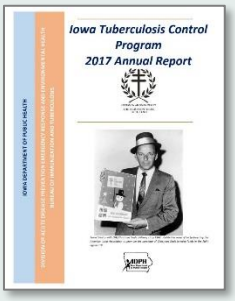


[State of Iowa HIV Disease End-of-Year 2017 Surveillance Report]

Bureau of Immunization and Tuberculosis



[2017 Immunizations in Iowa: Immunization Program Annual Report]



[Iowa Tuberculosis Control Program 2017 Annual Report]