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Tickborne Disease Activity Summary

2015 End of Year Summary

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Executive Summary

The Arkansas Department of Health (ADH) received 2,099 reports of tickborne disease (TBD) in 2015, with 1,129 cases (i.e., disease cases, confirmed or probable). Cases represented four disease classes, including 16 cases of Anaplasmosis, 192 cases of Ehrlichiosis, 896 cases of Spotted Fever Rickettsiosis, and 25 cases of Tularemia. There were two deaths associated with TBD in 2015, both associated with Ehrlichiosis. TBD cases were investigated in 71 counties, with disease occurrence in 68 out of 75 counties, which represent all five public health regions. Onset of illness was from January through December, peaking in June.

Provisional Data

This update includes provisional data reported to the ADH, and subsequently to the Centers for Disease Control and Prevention's (CDC) National Notifiable Diseases Surveillance System (NNDSS). This summary of TBD includes:

- *Anaplasmosis*
- *Ehrlichiosis*
- *Spotted Fever Rickettsiosis*
- *Tularemia*

National Notifiable Diseases Surveillance System

The CDC NNDSS is a multifaceted public health disease surveillance system that allows public health officials to monitor the occurrence and spread of diseases. (CDC, 2014)

Data Limitations

The data collected on TBD, is from a passive surveillance system. The data is dependent on clinicians considering the diagnosis of a TBD, obtaining the appropriate diagnostic test, and reporting of laboratory confirmed cases to ADH. Diagnosis and reporting are incomplete, and the incidence of TBD is underestimated. Provisional TBD data are provided to help track recent TBD disease activity. However, these data may change substantially before they are finalized.

Tickborne Disease (TBD) Activity in Arkansas (2015)

The Arkansas Department of Health (ADH) received 2,099 reports of tickborne disease (TBD) in 2015, with 1,129 cases (i.e., disease cases, confirmed or probable). Cases represented four disease classes, including 16 cases of Anaplasmosis, 192 cases of Ehrlichiosis, 896 cases of Spotted Fever Rickettsiosis, and 25 cases of Tularemia. There were two deaths associated with TBD in 2015, both associated with Ehrlichiosis. TBD cases were investigated in 71 counties, with disease occurrence in 68 out of 75 counties, which represent all five public health regions. Anaplasmosis was present in 10 counties; Ehrlichiosis was present in 47 counties, Spotted Fever Rickettsiosis was present in 68 counties; and Tularemia was present in 21 counties.

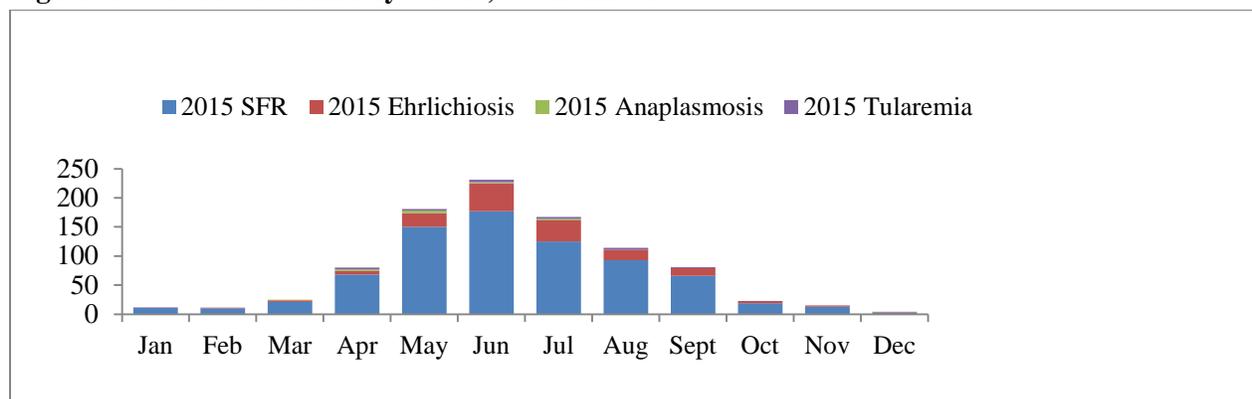
Tickborne Disease (TBD) Related Deaths in Arkansas (2015)

As of December 31, 2015, two deaths have been associated with TBD. The mean age for all deaths was 70 years (range 60 - 80).

Comparison to Previous Years

From 2011-2015, 4,638 cases of tickborne disease were reported to the Arkansas Department of Health (ADH). The mean number of cases in this timeframe was 928 (range 682 to 1,129) per year. More cases of TBD were reported to ADH in 2015 than any prior year on record. Prior to 2011, ADH relied heavily on surveillance information completed by the reporting physician. Since the beginning of 2011, ADH has conducted case investigations utilizing communicable disease staff in the ADH central office, local level communicable disease nurses, and epidemiologists. TBD onset of illness started in January and continued through December, peaking in June (Figure 1).

Figure 1. Tickborne disease by month, Arkansas 2015



Geographic Distribution of Tickborne Disease

Tickborne Disease occurrence is not equally distributed across Arkansas. Sixty-four percent of reported TBD occurred in the Northwest and Northeast Public Health Regions, with the Northwest Region accounting for 42% of all TBD cases (Figure 2). Benton and Washington Counties in the Northwest corner of the state accounted for 17% of all reported TBD cases in the state. Figure 3 geographically displays TBD incidence rate per 100,000 population, by county in 2015. Table 1 provides a line list of TBD.

Figure 2. Total Tickborne Disease Cases by Public Health Region, Arkansas 2015

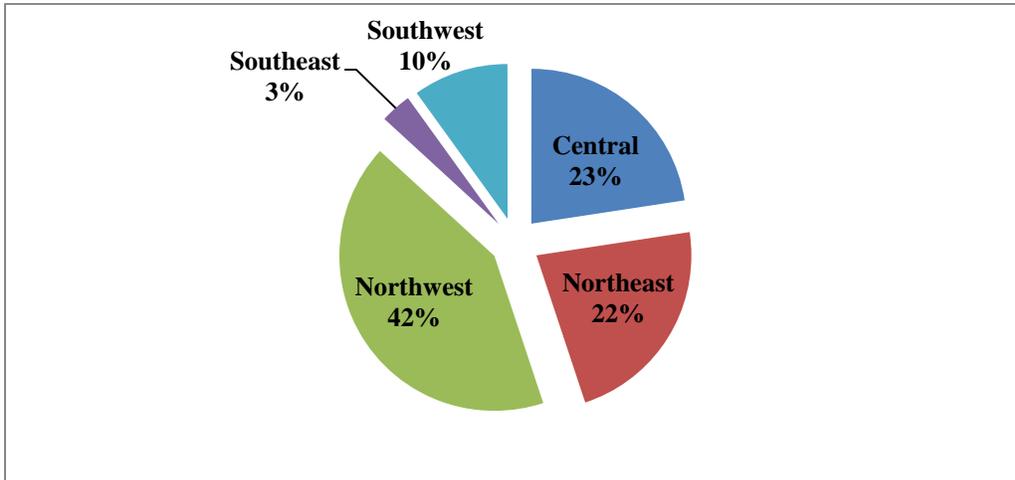
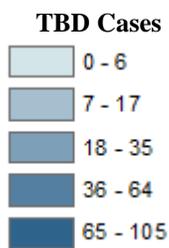
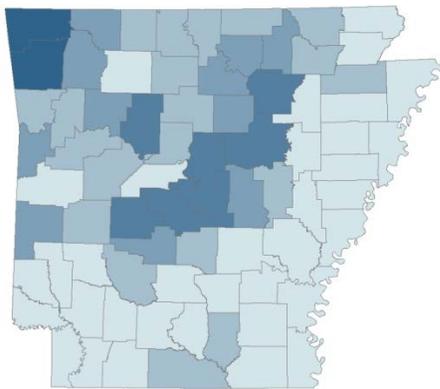


Figure 3. TBD Case Numbers & Incidence Rate per 100,000 population by County, Arkansas 2015

Tickborne Disease Case Numbers



Tickborne Disease Rates Per 10,000 People

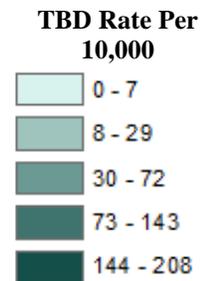
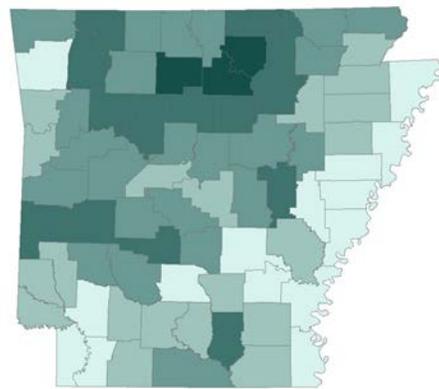


Table 1. Tickborne Disease Cases by County, 2015 Arkansas					
County	Anaplasmosis	Ehrlichiosis	Spotted Fever	Tularemia	County Total
Arkansas	0	0	2	1	3
Ashley	0	0	3	0	3
Baxter	0	7	7	0	14
Benton	4	16	85	0	105
Boone	0	2	9	1	12
Bradley	0	2	9	0	11
Calhoun	0	0	1	0	1
Carroll	2	11	11	1	25
Clark	0	2	8	0	10
Clay	0	1	4	0	5
Cleburne	0	6	20	0	26
Cleveland	0	0	1	1	2
Columbia	0	0	2	1	3
Conway	0	0	10	0	10
Craighead	0	2	8	0	10
Crawford	0	2	14	0	16
Cross	0	0	2	0	2
Drew	0	1	2	0	3
Faulkner	0	4	46	2	52
Franklin	0	2	5	0	7
Fulton	0	2	11	0	13
Garland	1	9	39	0	49
Grant	0	2	11	0	13
Greene	0	1	3	1	5
Hempstead	0	0	1	0	1
Hot Spring	2	3	30	0	35
Howard	0	0	2	0	2
Independence	0	5	35	1	41
Izard	0	1	25	0	26
Jackson	0	1	2	0	3
Jefferson	0	0	5	0	5
Johnson	1	5	17	1	24
Lawrence	0	4	3	0	7
Lincoln	0	1	1	0	2
Little River	0	0	2	0	2
Logan	0	2	9	0	11
Lonoke	0	5	19	0	24
Madison	1	3	15	1	20
Marion	0	3	4	1	8
Miller	0	0	1	0	1
Mississippi	0	0	1	0	1
Montgomery	0	2	11	0	13

Table 2. Tickborne Disease Cases by County, 2015 Arkansas, Continued					
	Anaplasmosis	Ehrlichiosis	Spotted Fever	Tularemia	County Total
Nevada	0	0	1	0	1
Newton	0	0	4	0	4
Ouachita	0	1	5	0	6
Perry	0	1	2	0	3
Phillips	0	0	1	0	1
Pike	0	2	2	0	4
Poinsett	0	0	3	0	3
Polk	0	8	16	0	24
Pope	0	9	45	1	55
Prairie	0	1	6	0	7
Pulaski	0	8	38	1	47
Randolph	0	2	5	2	9
Saint Francis	0	0	1	0	1
Saline	1	8	55	0	64
Scott	0	0	5	0	5
Searcy	0	2	11	1	14
Sebastian	1	6	17	0	24
Sevier	0	1	1	0	2
Sharp	0	6	15	1	22
Stone	0	6	18	2	26
Union	0	1	15	1	17
Van Buren	0	0	12	2	14
Washington	0	16	71	1	88
White	2	4	40	1	47
Woodruff	1	0	2	0	3
Yell	0	3	9	0	12
Total	16	192	896	25	1129

Anaplasmosis

National Information - The number of anaplasmosis cases reported to CDC has increased steadily since the disease became reportable, from 348 cases in 2000, to 1761 cases in 2010. The incidence of anaplasmosis has also increased, from 1.4 cases per million population in 2000 to 6.1 cases per million population in 2010. The case fatality rate has remained low, at less than 1%. The blacklegged tick (*Ixodes scapularis*) is a potential vector for Anaplasmosis in Arkansas, and is also suspected in the transmission of Lyme disease, babesiosis, and Powassan disease nationally. (US HHS CDC, 2014). The number of reported cases increased 52% between 2009 and 2010 (DVBD, 2014). Figure 4 shows the reported cases nationally from 2008-2012. Figure 5 displays the distribution of Anaplasmosis nationally (Dahlgren, 2014).

Figure 4. Anaplasmosis cases, United States, 2008-2012

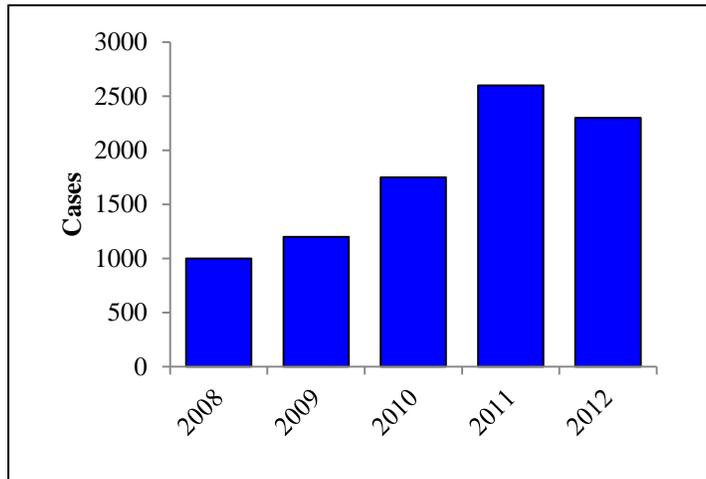
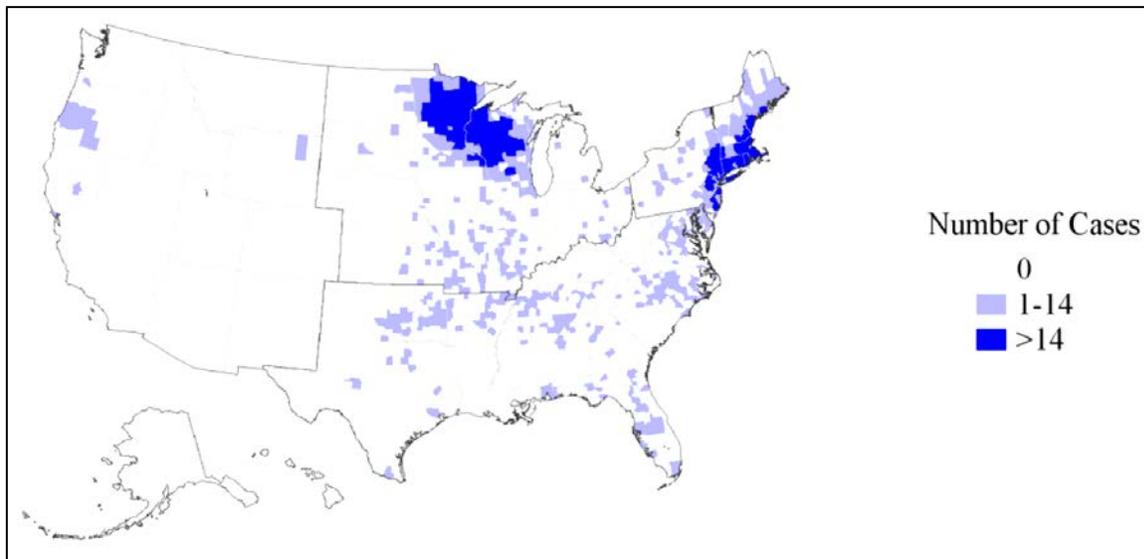


Figure 5. Map of reported cases of Anaplasmosis, United States, by county, 2008-2012



Arkansas Information – ADH investigated 23 reports of Anaplasmosis in 2015, resulting in one confirmed case and 15 probable cases in 10 counties in four public health regions. The number of Anaplasmosis cases reported to the ADH in 2015 was above the mean number of cases, by month, from 2011 to 2014 (Figure 6). There were no reported deaths associated with Anaplasmosis in 2015. Ethnicity was reported as not Hispanic for all 16 cases. Race was reported as one Black, and 15 White, with seven males and nine females (Table 3). Of the cases reported, 56 percent were located in the Northwest Public Health Region, 12 percent in the Central Public Health Region, 19 percent in the Northeast Region, 13 percent in the Southwest Region, and none from the Southeast Region (Figure 7), with onset of illness from February through October, peaking in July (Figure 6). The mean age of reported cases was 37 (range 3 - 63). (Figure 8).

Figure 6. Anaplasmosis Cases by Month, Arkansas 2015

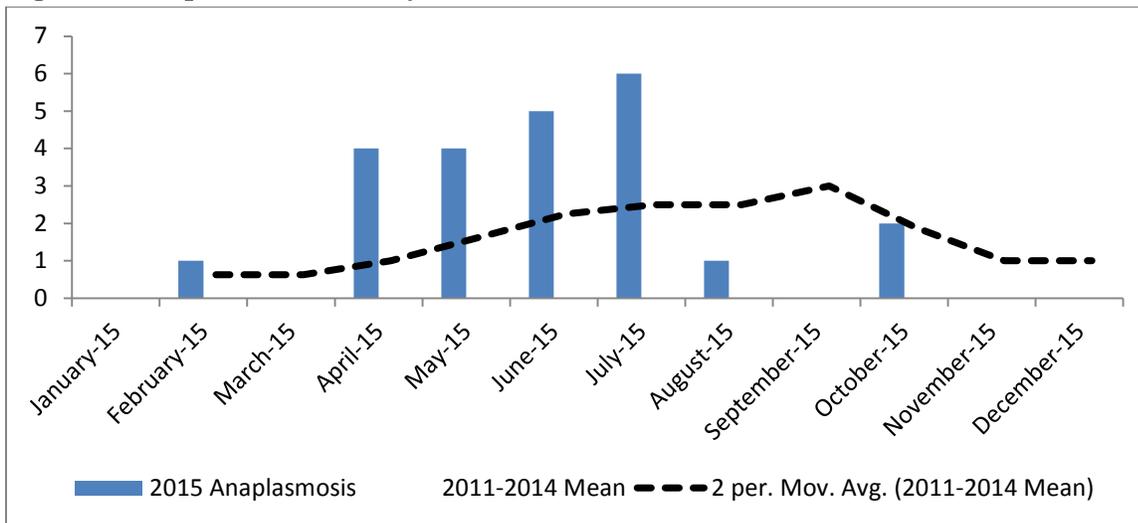


Figure 7. Anaplasmosis Cases by ADH Public Health Region, Arkansas 2015

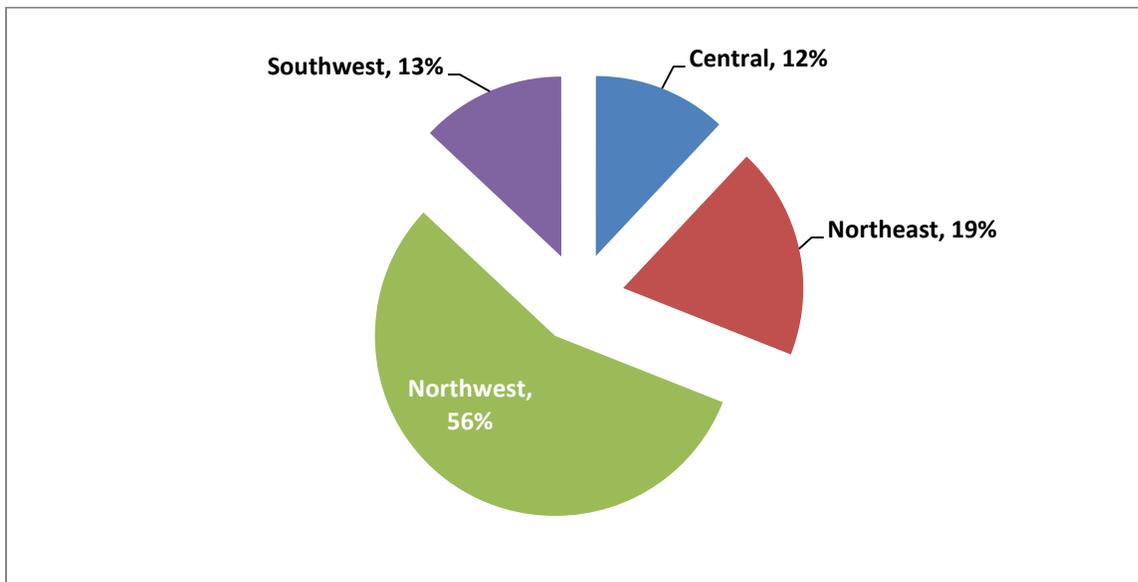


Table 3. Anaplasmosis Demographics, Arkansas 2015

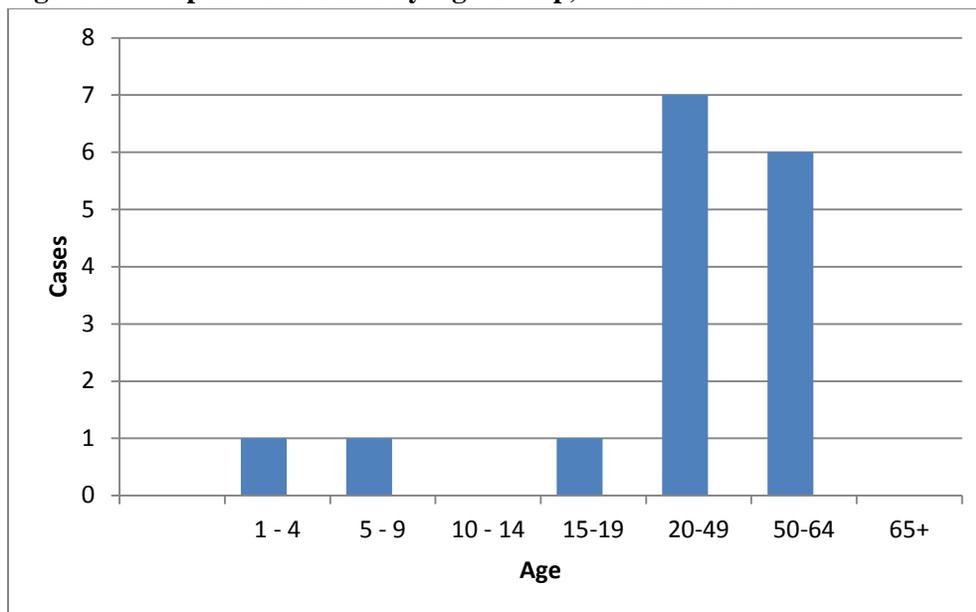
Case Status	Frequency	Percent
Confirmed	1	6
Probable	15	94
TOTAL	16	100

Age	Frequency	Percent	Male	Female	Deceased
1 to 4	1	6	0	1	0
5 to 9	0	0	0	0	0
10 to 14	1	6	1	0	0
15 to 19	1	6	0	1	0
20 to 49	7	44	4	3	0
50 to 64	6	38	2	4	0
65 +	0	0	0	0	0
TOTAL	16	100	7	9	0

Race	Frequency	Percent
Black or African American	1	6
White	15	94
TOTAL	16	100

Ethnicity	Frequency	Percent
Not Hispanic or Latino	16	100
TOTAL	16	100

Figure 8. Anaplasmosis Cases by Age Group, Arkansas 2015



Ehrlichiosis

National Information - Ehrlichia chaffeensis and E. ewingii are both causes of human illness in the United States, although the majority of reported cases are due to E. chaffeensis. The Lone Star tick (*Amblyomma americanum*) is a potential vector for Ehrlichiosis in Arkansas, and is also capable of transmitting Tularemia, and Southern Tick Associated Rash Illness (STARI). (US HHS CDC, 2014) The number of ehrlichiosis cases due to E. chaffeensis that have been reported to CDC has

increased steadily since the disease became reportable. The incidence of ehrlichiosis increased similarly, from less than 1 case per million persons in 2000 to 3.4 cases per million persons 2008, and decreased to 2.5 cases per million persons in 2010, but has increased to levels higher than 2008 in 2012. Since becoming a reportable disease, the annual case fatality rate has declined. (DVBD, 2014) Figure 9 shows the reported cases nationally from 2008-2012. Figure 10 displays the distribution of Ehrlichiosis nationally (Dahlgren, 2014).

Figure 9. Ehrlichiosis cases, United States 2008–2012

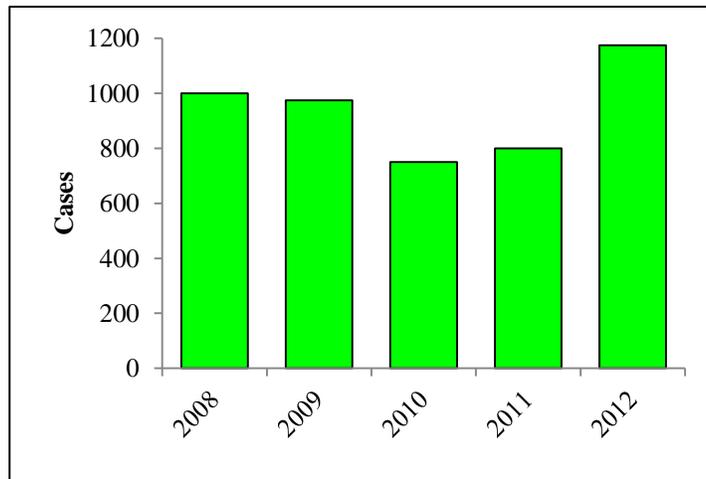
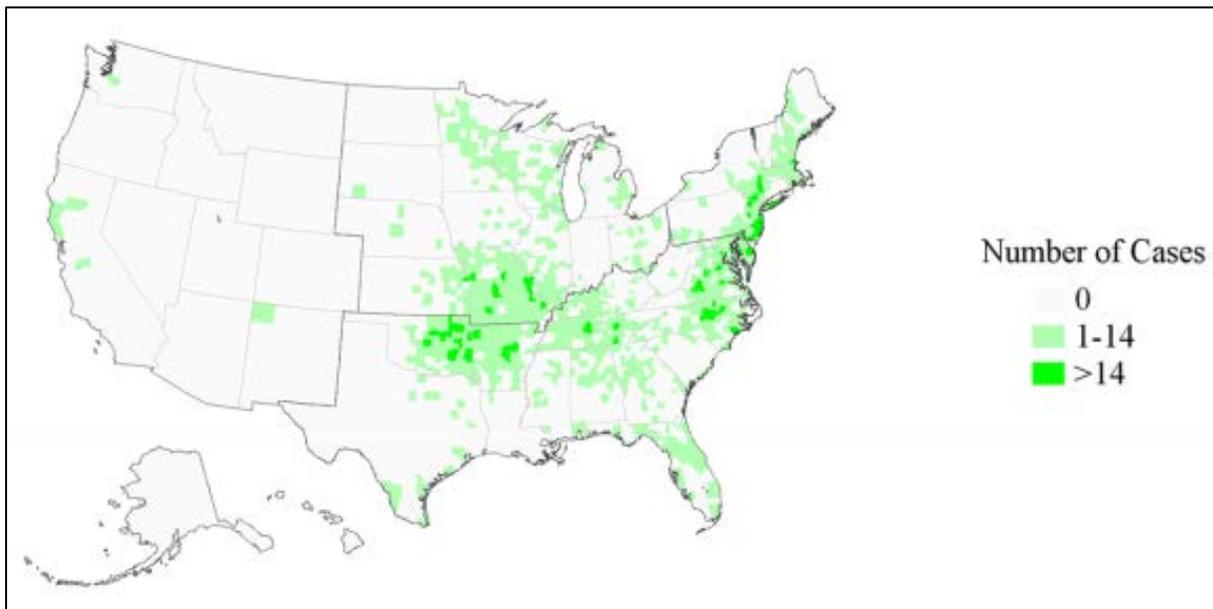


Figure 10. Map of reported cases of Ehrlichiosis, United States, by county, 2008-2012



Arkansas Information - the ADH investigated 294 suspect reports of Ehrlichiosis in 2015, resulting in 53 confirmed cases, including one case of *Ehrlichia ewingii*, and 139 probable cases, in 47 counties. The number of Ehrlichiosis cases reported to the ADH was above the mean number of cases, by month, from 2011 to 2015 during the first part of 2015 and below in the second half (Figure 11). There were two reported deaths associated with Ehrlichiosis in 2015. Of the reported cases, 94 percent reported race as White, three percent were reported as Unknown or missing, and two percent as Black/African American. Ethnicity was reported as 91 percent Not Hispanic or Latino, seven percent unknown or missing and less than two percent as Hispanic or Latino (Table 3). Of the cases reported, about half were located in the Northwest Public Health Region (Figure 12) with onset of illness from February through December, peaking in July (Figure 11). The mean age of reported cases was 55 (range 2 - 94). There were four reported cases in children under age 5 and 35 percent of the reported cases were age 65 or older (Figure 13).

Figure 11. Ehrlichiosis Cases by Month, Arkansas 2015

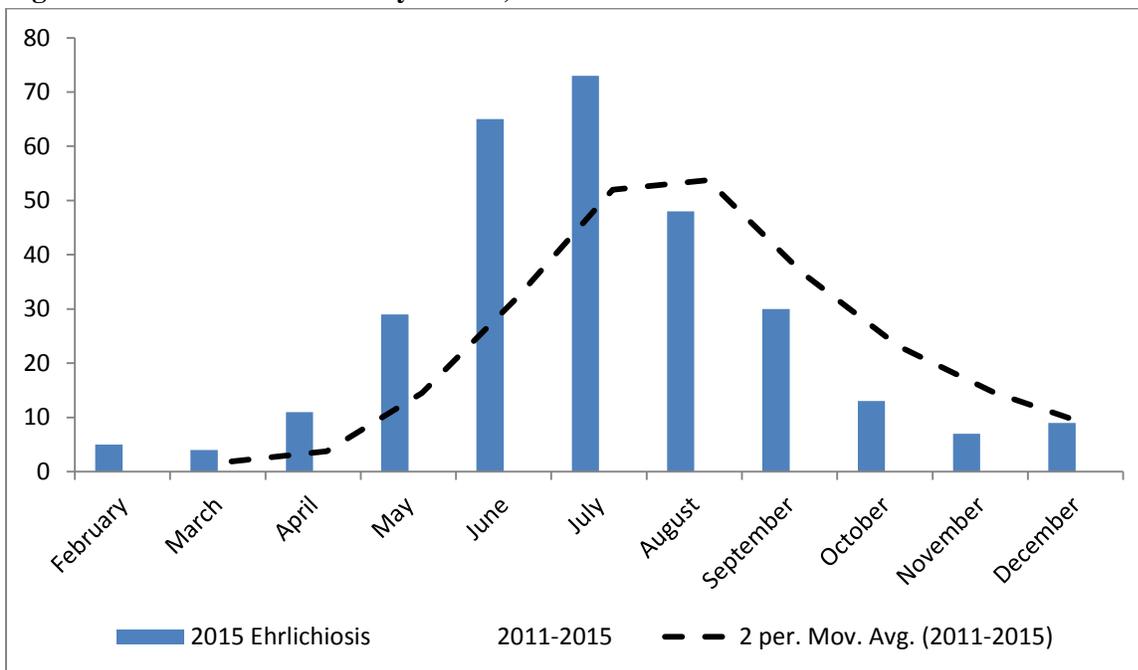


Figure 12. Ehrlichiosis Cases by ADH Public Health Region, Arkansas 2015

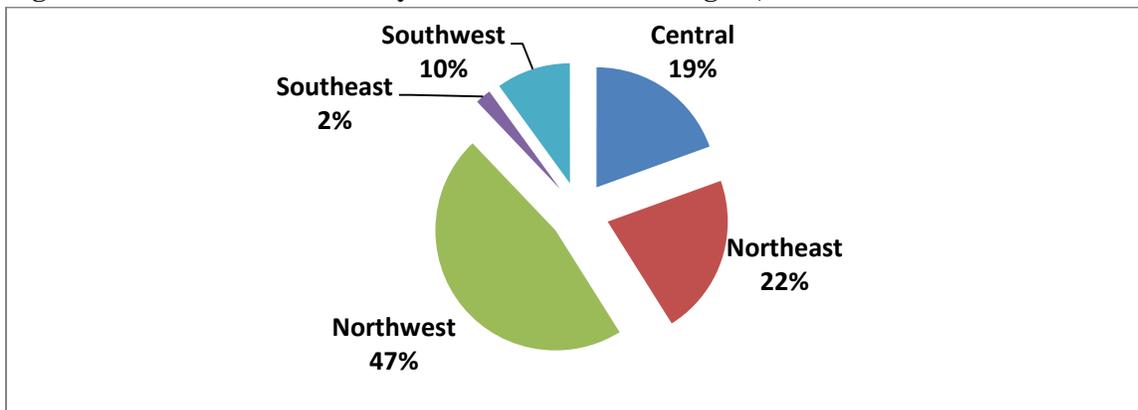


Table 3. Ehrlichiosis Demographics, Arkansas 2015

Case Status	Frequency	Percent
Confirmed	53	28
Probable	139	72
TOTAL	192	100

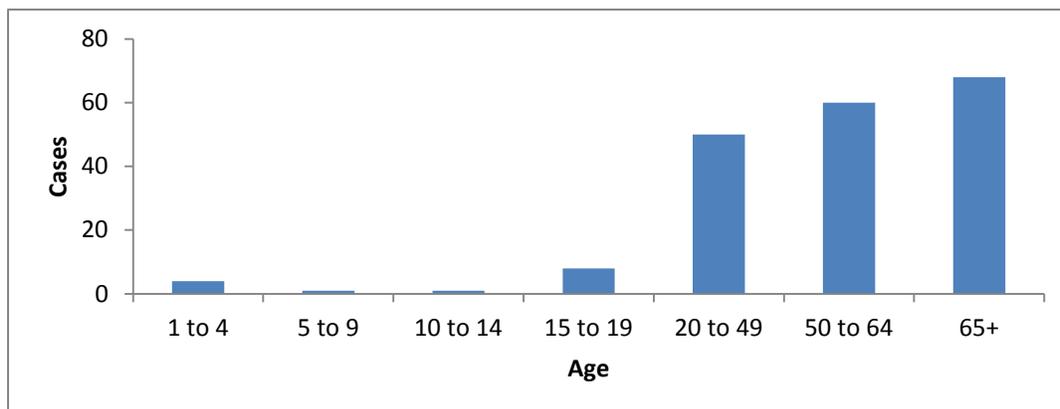
Age	Frequency	Percent	Male	Female	Deceased
1 to 4	4	2	4	0	0
5 to 9	1	0.5	1	0	0
10 to 14	1	0.5	0	1	0
15 to 19	8	4	6	2	0
20 to 49	50	26	36	14	0
50 to 64	60	31	25	35	1
65 +	68	35	37	31	1
Unknown or Missing	0	0	0	0	0
TOTAL	192	100*	109	83	2

Race	Frequency	Percent
American Indian or Alaska Native	1	1
Black or African American	4	2
Native Hawaiian / Pacific Islander	1	1
Unknown	6	3
White	180	94
TOTAL	192	100*

Ethnicity	Frequency	Percent
Hispanic or Latino	4	2
Not Hispanic or Latino	174	91
Unknown or Missing	14	7
TOTAL	192	100

*percentages may not add up to 100 due to rounding

Figure 13. Ehrlichiosis Cases by Age Group, Arkansas 2015



Spotted Fever Rickettsiosis

National Information - In addition to *Rickettsia rickettsii*, the agent of Rocky Mountain spotted fever (RMSF), several other tick-borne species of *Rickettsia*, broadly grouped under the heading "Spotted Fever group *Rickettsia*

(SFGR)" have been shown to cause human infections. The American Dog Tick (*Dermacentor variabilis*) and the Brown Dog Tick (*Rhipicephalus sanguineus*) are potential vectors for Spotted Fever Rickettsiosis in Arkansas. (US HHS CDC, 2014) RMSF has been a reportable disease in the United States since the 1920s. CDC compiles the number of cases reported by state health departments. The incidence of RMSF has increased during the last decade, from less than 500 cases reported in 1993 to nearly 4,500 reported in 2012. Figure 14 shows the reported cases nationally from 2008-2012. Figure 15 displays the distribution of Spotted Fever Cases nationally (Dahlgren, 2014).

Figure 14. Spotted Fever Rickettsiosis cases, United States 2008–2012

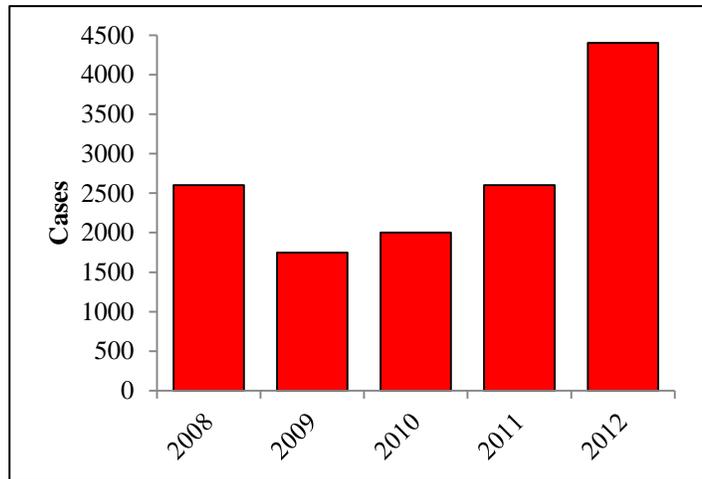
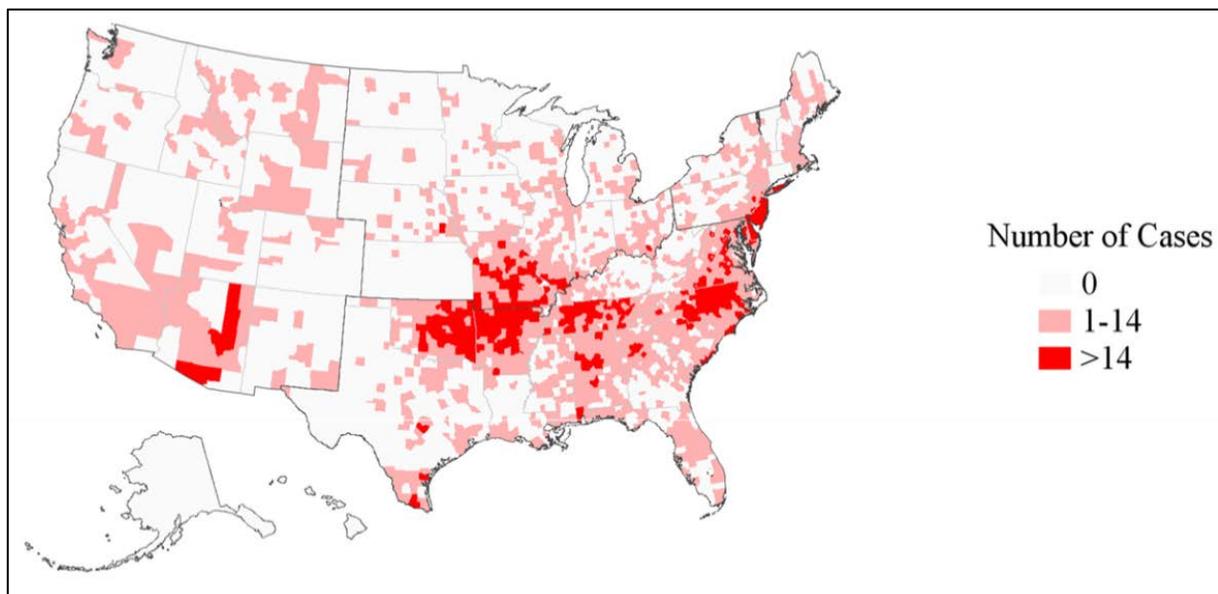


Figure 15. Map of reported cases of Spotted Fever Rickettsiosis, United States, by county, 2008–2012



Arkansas Information - the ADH investigated 1,712 suspect reports of Spotted Fever Rickettsiosis (SFR) in 2015, resulting in 891 probable cases and five confirmed cases in 68 counties. The number of SFR cases reported to the ADH in 2015 was above the mean number of cases, by month, from 2011 to 2015 (Figure 16). There no reported deaths associated with SFR in 2015. Of the reported cases, 93 percent reported race as White, four percent were reported as Unknown or missing, two percent as Black/African American, and less than two percent as or American Indian/Alaska Native, Asian, Native Hawaiian or other Pacific Islander. Ethnicity was reported as 95 percent Not Hispanic or Latino, four percent as unknown or missing, and one percent as Hispanic (Table 4). Of the cases reported, more than half were located in either the Northwest or Northeast Public Health Regions (Figure 17), with onset of illness from January through December, peaking in July (Figure 16). The mean age of reported cases was 52 (range 1 - 100). There were eight reported cases in children under age 5, with 28 percent of the reported cases were over age 65 (Figure 18).

Figure 16. Spotted Fever Rickettsiosis Cases by Month, Arkansas 2015

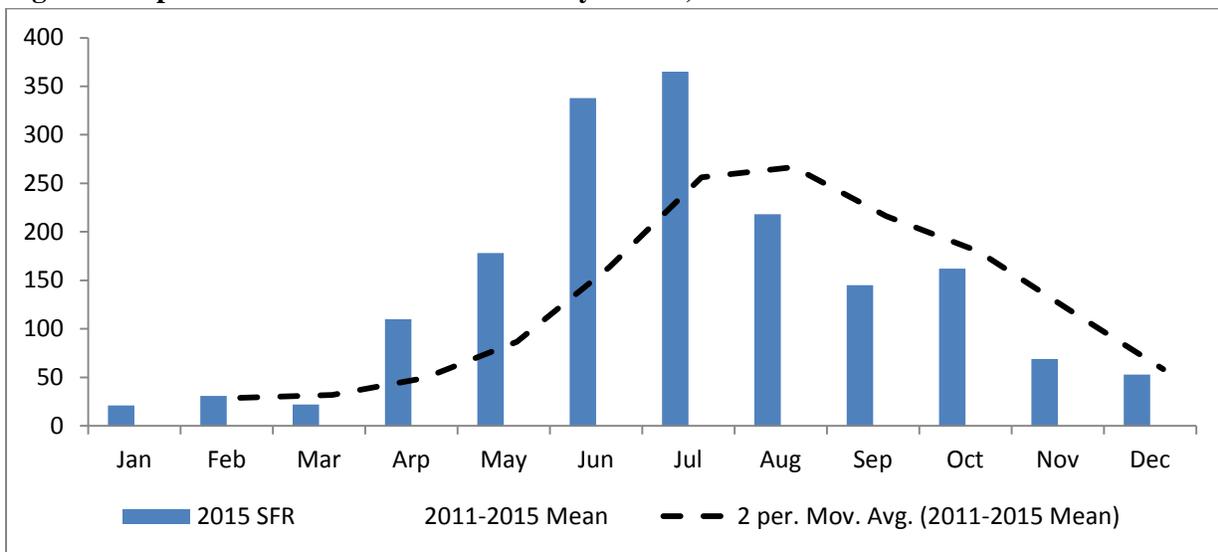


Figure 17. Spotted Fever Rickettsiosis Cases by ADH Public Health Region, Arkansas 2015

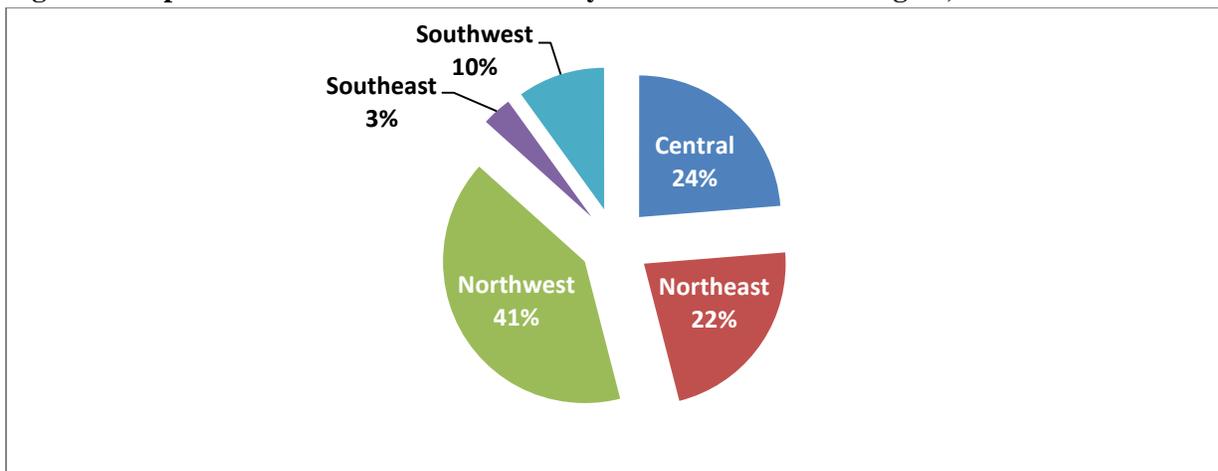


Table 4. Spotted Fever Rickettsiosis Demographics, Arkansas 2015

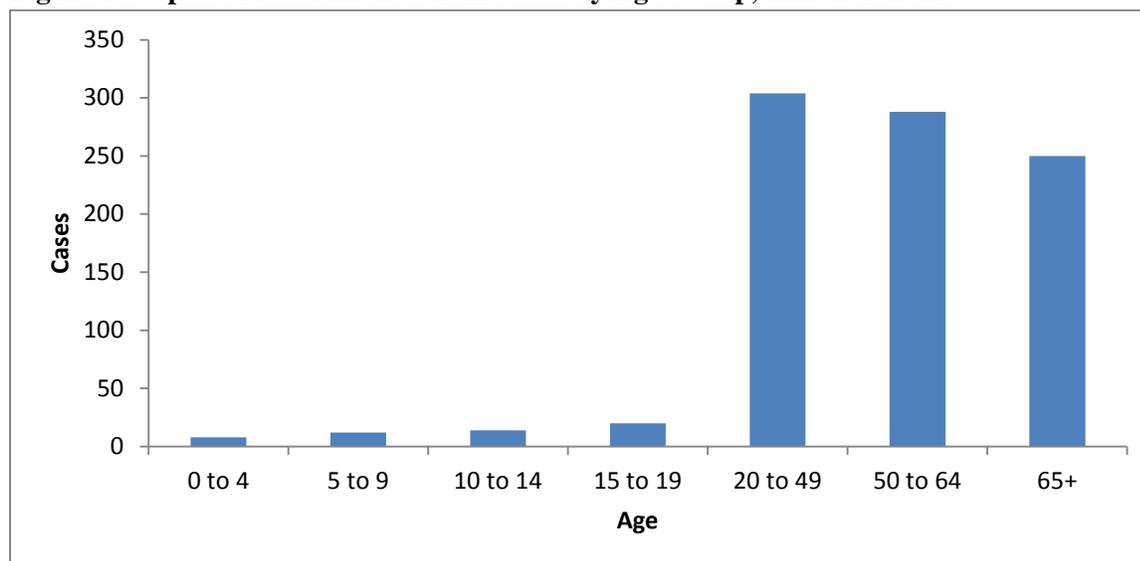
Case Status	Frequency	Percent			
Confirmed	5	1			
Probable	891	99			
TOTAL	896	100			

Age	Frequency	Percent	Male	Female	Deceased
1 to 4	8	1	7	1	0
5 to 9	12	1	8	4	0
10 to 14	14	2	12	2	0
15 to 19	20	2	9	11	0
20 to 49	304	34	196	108	1
50 to 64	288	32	185	103	0
65 +	250	28	165	85	0
TOTAL	896	100	582	314	1

Race	Frequency	Percent
American Indian or Alaska Native	6	1
Asian	1	0
Black or African American	19	2
White	837	93
Unknown	33	4
TOTAL	896	100

Ethnicity	Frequency	Percent
Hispanic or Latino	13	1
Not Hispanic or Latino	847	95
Unknown or Missing	36	4
TOTAL	896	100

Figure 18. Spotted Fever Rickettsiosis Cases by Age Group, Arkansas 2015



Tularemia

National Information – Tularemia is a rare but potentially serious bacterial zoonosis that has been reported from all U.S. states except Hawaii. The etiologic agent, *Francisella tularensis*, is highly infectious and can be transmitted through arthropod bites, direct contact with infected animal tissue, inhalation of contaminated aerosols, and ingestion of contaminated food or water. *F. tularensis* has been designated a Tier 1 select agent because it meets several criteria, including low infectious dose, ability to infect via aerosol, and a history of being developed as a bioweapon. (Nelson, Kugeler, Peterson, & Mead, 2013) During 2003–2012, more than 1,300 cases were reported to CDC. Cases submitted from Arkansas accounted for 15 percent of all cases submitted during this timeframe. Figure 19 shows the reported cases nationally from 2003-2013. Figure 20 is a map of reported cases of tularemia by year. (CDC, 2013)

Figure 19. Tularemia cases, United States 2003-2013

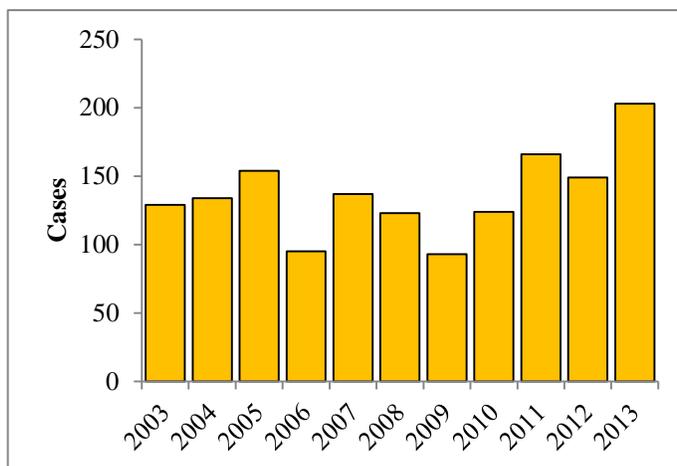
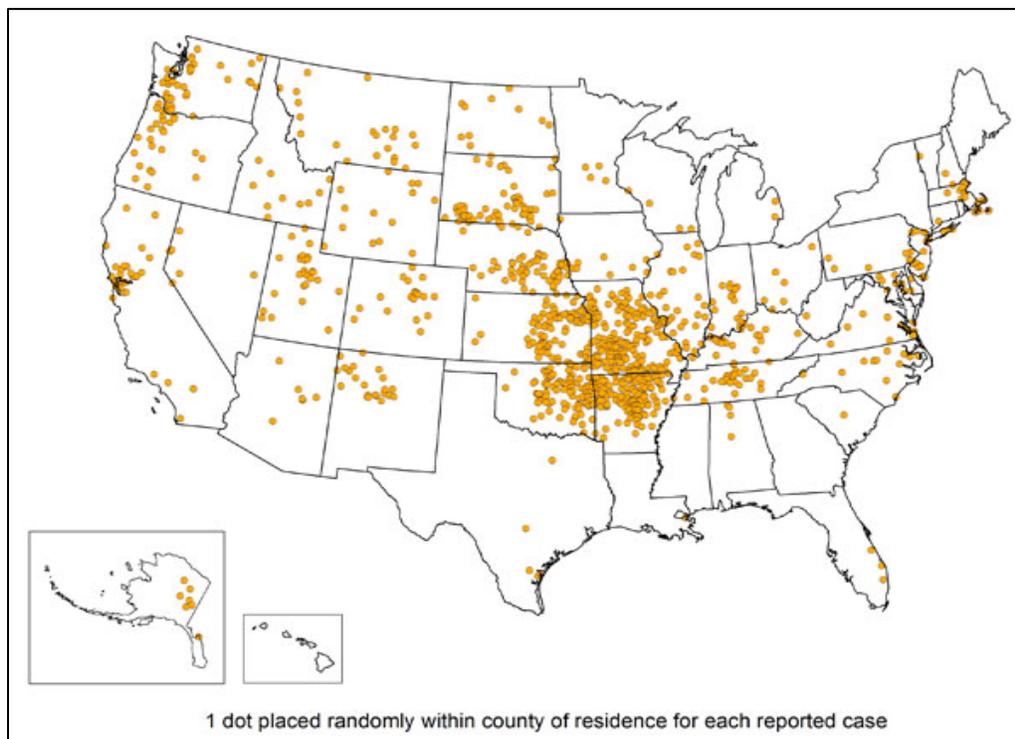


Figure 19 shows the reported cases nationally from 2003-2013. Figure 20 is a map of reported cases of tularemia by year. (CDC, 2013)

Figure 20. Map of reported cases of tularemia by year, United States, 2003-2012



Arkansas Information - the ADH investigated 70 suspect reports of Tularemia in 2015, resulting in no confirmed cases and 25 probable cases in 21 counties. The number of Tularemia cases reported to the ADH in 2015 was slightly below the mean number of cases, by month, from 2011 to 2015 (Figure 21). Of the 25 cases, 100 percent reported race as White. Ethnicity was reported as 100 percent Not Hispanic or Latino (Table 5). Of the cases reported, 72 percent were located in either the Northwest or Northeast Public Health Regions (Figure 22), with onset of illness from January through December, peaking in July (Figure 21). The mean age of reported cases was 54 (range 17 - 75) and thirty-two percent of the reported cases age 65 or older (Figure 23).

Figure 21. Tularemia Cases by Month, Arkansas 2015

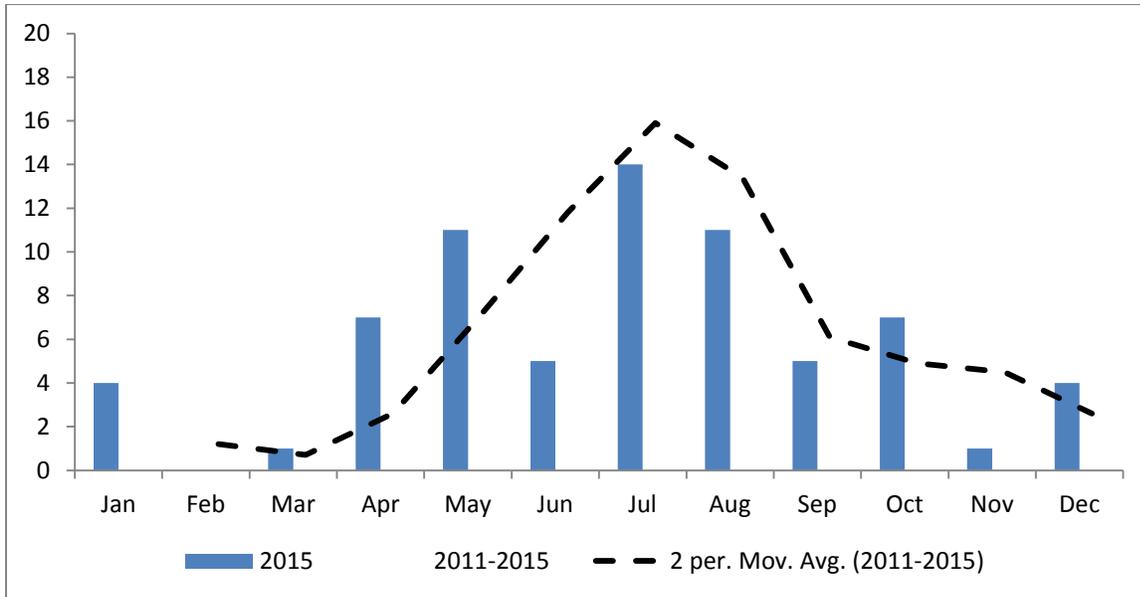


Figure 22. Tularemia Cases by ADH Public Health Region, Arkansas 2015

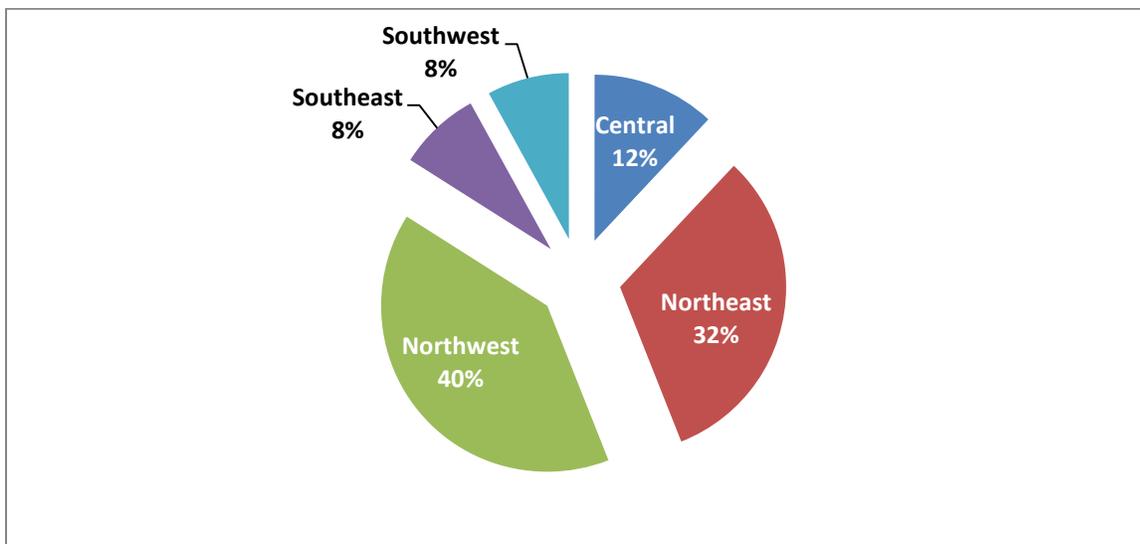


Table 5. Tularemia Demographics, Arkansas 2015

Case Status	Frequency	Percent
Confirmed	0	0
Probable	25	100
TOTAL	25	100

Age	Frequency	Percent	Male	Female	Deceased
1 to 4	0	0	0	0	0
5 to 9	0	0	0	0	0
10 to 14	0	0	0	0	0
15 to 19	2	8	1	1	0
20 to 49	7	28	3	4	0
50 to 64	8	32	6	2	0
65 +	8	32	6	2	0
TOTAL	25	100	16	9	0

Race	Frequency	Percent
White	25	100
TOTAL	25	100

Ethnicity	Frequency	Percent
Not Hispanic or Latino	25	100
TOTAL	25	100

Figure 23. Tularemia Cases by Age Group, Arkansas 2015

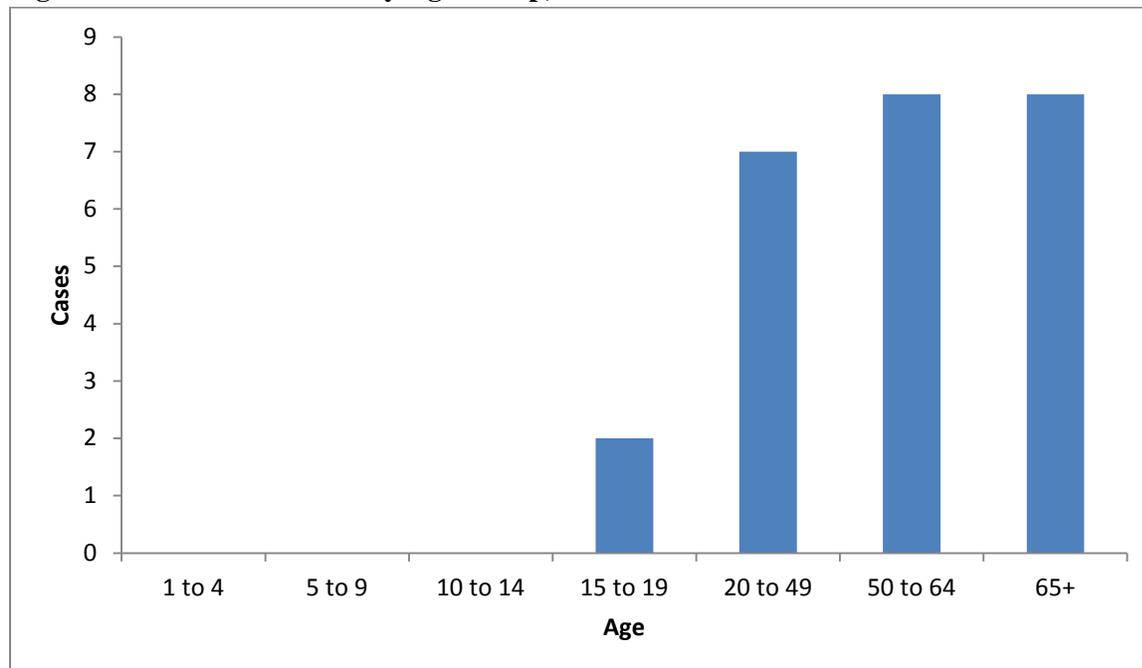
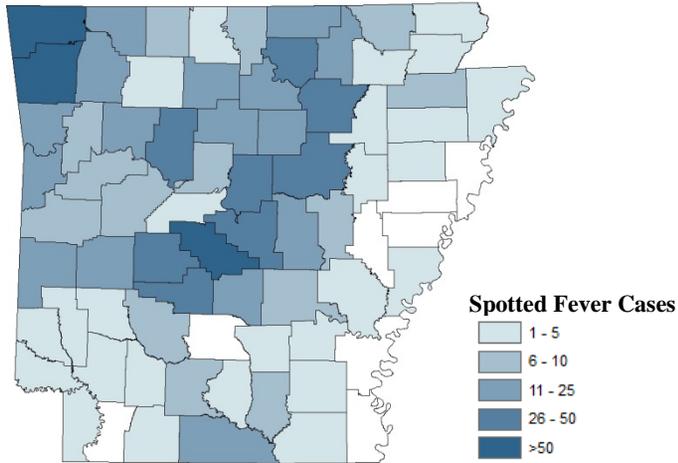


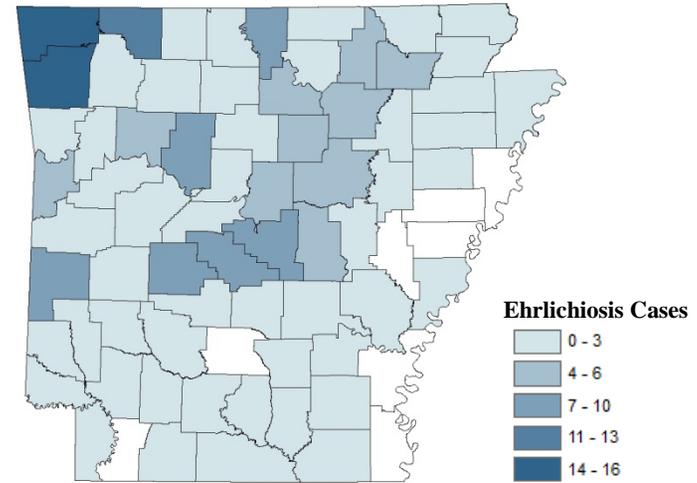
Figure 24. Tickborne Disease Map – Arkansas 2015

Tickborne Disease Cases* - Arkansas 2015 (Provisional Data)

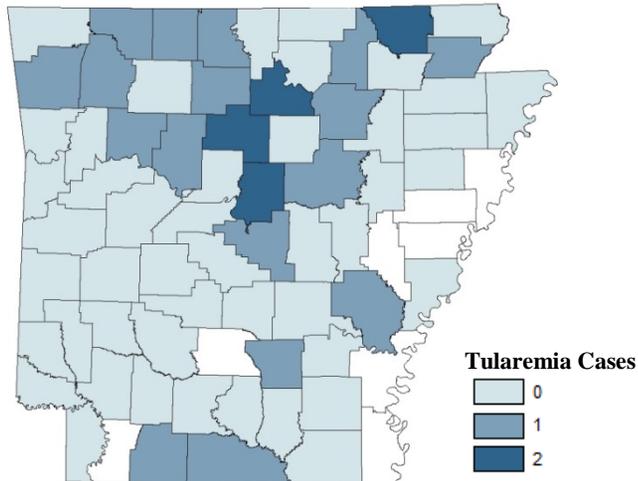
Rocky Mountain Spotted Fever



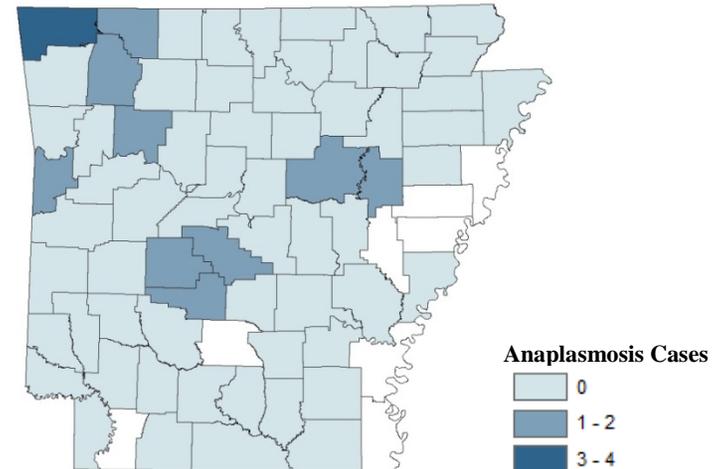
Ehrlichiosis



Tularemia



Anaplasmosis



*Cases are defined as both Confirmed and Probable

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