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Center for Health Protection

Zoonotic Disease Section

Tickborne Disease

Activity Summary

Calendar Year 2012

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Executive Summary

The Arkansas Department of Health (ADH) received 2,186 reports of tickborne disease (TBD) in 2012, with 918 cases (i.e., disease cases, confirmed or probable). Cases represented four disease classes, including seven cases of Anaplasmosis, 82 cases of Ehrlichiosis, 812 cases of Spotted Fever Rickettsiosis, and 17 cases of Tularemia. There were five (5) deaths associated with tickborne disease in 2012, including two Ehrlichiosis and three Spotted Fever Rickettsiosis deaths. TBD cases were investigated in 74 counties, with disease occurrence in 63 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
- Spotted Fever Rickettsiosis
- Ehrlichiosis
- Tularemia

NNDSS

The Centers for Disease Control and Prevention (CDC)'s National Notifiable Diseases Surveillance System (NNDSS[1]) is a multifaceted public health disease surveillance system that allows public health officials to monitor the occurrence and spread of diseases.

Data Limitations

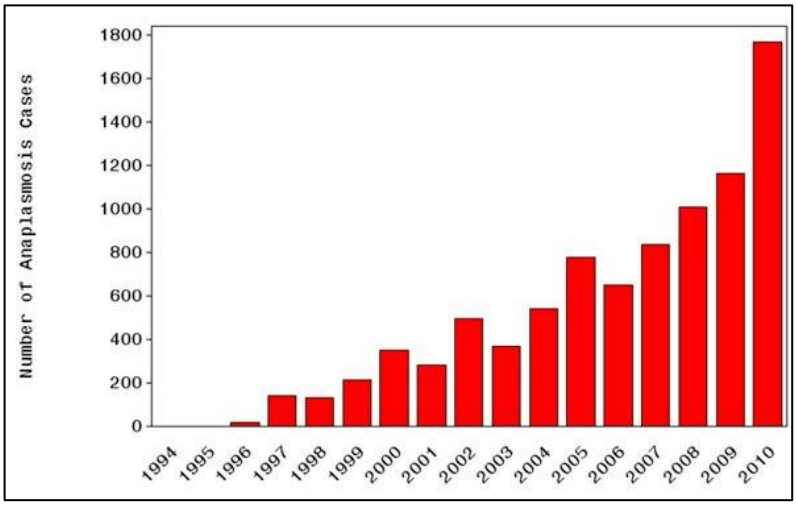
The data collected on TBD is from a passive surveillance system. The data is dependent on clinicians considering the diagnosis of a TBD, obtaining the appropriate diagnostic test, and reporting of laboratory confirmed cases to ADH. Diagnosis and reporting are incomplete, and the incidence of TBD is underestimated.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

[1] http://wwwn.cdc.gov/nndss/default.aspx

National Information

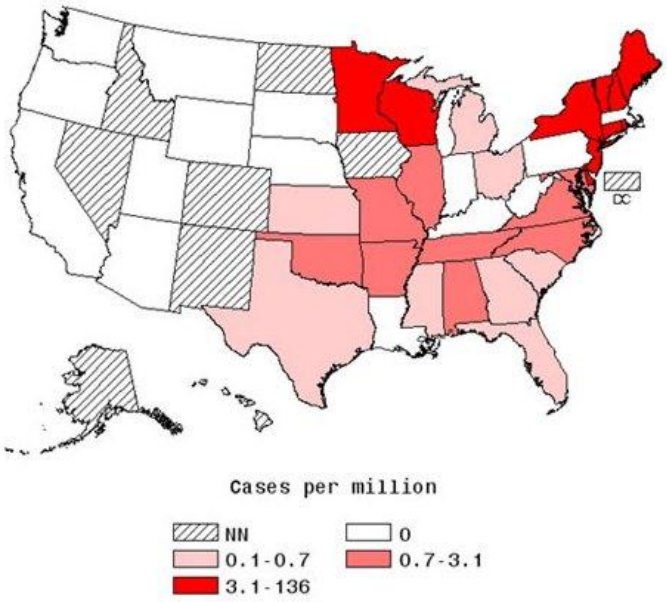
Anaplasmosis - The number of anaplasmosis cases reported to CDC has increased steadily since the disease became reportable, from 348 cases in 2000, to 1,761 cases in 2010[2]. The incidence of anaplasmosis has also increased, from 1.4 cases per million persons in 2000 to 6.1 cases per million persons in 2010. The case fatality rate has remained low, at less than 1%.

Figure 1. Number of U.S. anaplasmosis cases reported to CDC, 1994-2010



Cases of anaplasmosis have generally increased from 350 cases in 2000, when the disease became nationally notifiable, to 1,163 cases in 2009. The number of reported cases increased 52% between 2009 and 2010

Figure 2. Annual reported incidence (per million population) for anaplasmosis in the U.S. (NN=Not notifiable)



[2] http://www.cdc.gov/anaplasmosis/stats/ . Annual Cases of Anaplasmosis in the United States

National Information

Ehrlichiosis - *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*[3]. The number of ehrlichiosis cases due to *E. chaffeensis* that have been reported to CDC has increased steadily since the disease became reportable, from 200 cases in 2000, to 961 cases in 2008. A decrease in the number of cases of ehrlichiosis was noted in 2010. The incidence of ehrlichiosis increased similarly, from less than 1 case per million persons in 2000 to 3.4 cases per million persons in 2008, and has since decreased to 2.5 cases per million persons in 2010. Since becoming a reportable disease, the annual case fatality rate has declined.

Figure 3. Number of U.S. Ehrlichiosis cases reported to CDC, 2000-2010

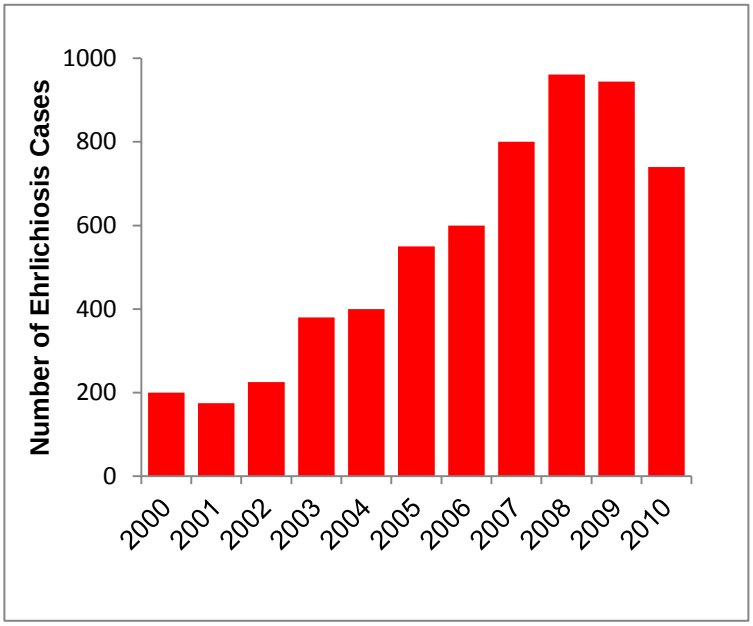
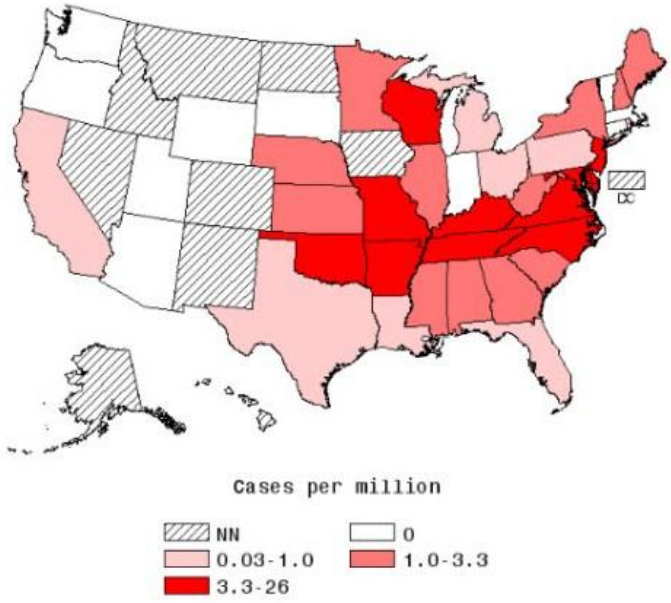


Figure 4. Annual reported incidence (per million population) for Ehrlichiosis in the U.S. for 2010. (NN=Not notifiable)



[3] http://www.cdc.gov/Ehrlichiosis/stats/

National Information

Spotted Fever Rickettsiosis - In addition to *Rickettsia rickettsii*, the agent of Rocky Mountain Spotted Fever (RMSF), several other tickborne species of *Rickettsia*, broadly grouped under the heading "Spotted Fever Group Rickettsia (SFGR)" been shown to cause human infections. 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 (the number of RMSF cases for every million persons) has increased during the last decade, from less than 2 cases per million persons in 2000 to over 8 cases per million persons in 2008. During the same time period, the case fatality has declined to a low of less than 0.5%.[4]

Figure 5. Number of U.S. RMSF cases reported to CDC, 1993-2010

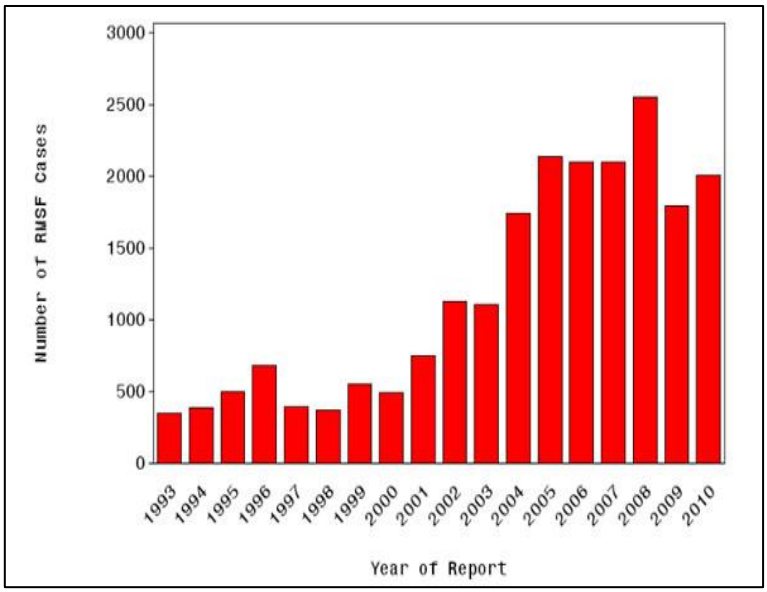
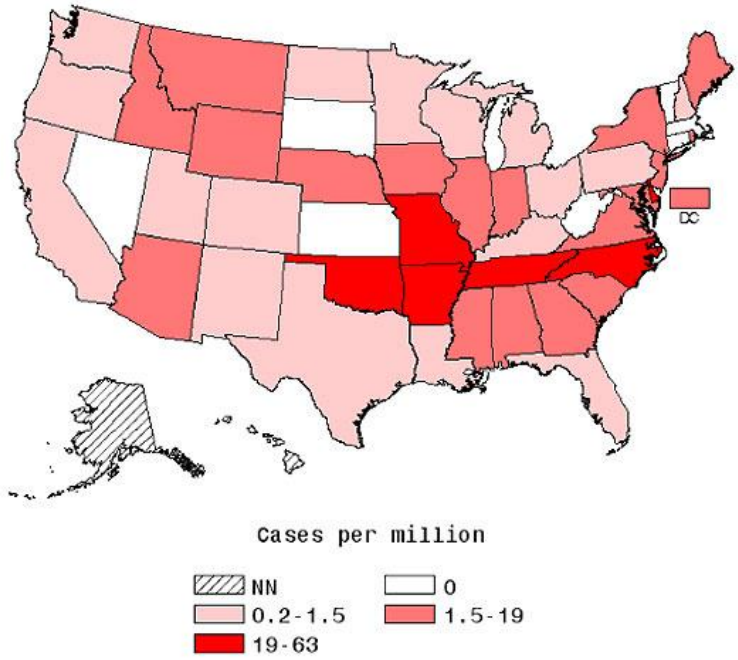


Figure 6. Annual reported incidence (per million population) for RMSF in the U.S. for 2010 (NN=Not notifiable)



[4] http://www.cdc.gov/rmsf/stats/

National Information

Tularemia – Tularemia was more prevalent in the early to mid-part of the 20th century than it is now. A decline of cases was seen from 1950 to 1970, with an increase in cases from 1980 to 1985. Since 2001, approximately 120 cases of tularemia are reported each year in the United States[5]. Arkansas ranks second in reported cases, comprising approximately 13 percent of all cases in the United States.

Figure 7. Reported Tularemia cases by year, U.S. 2001-2010

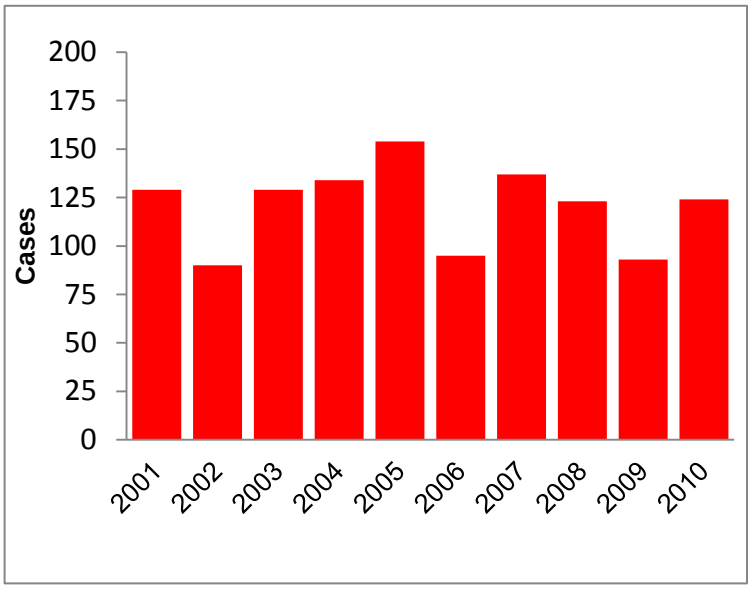
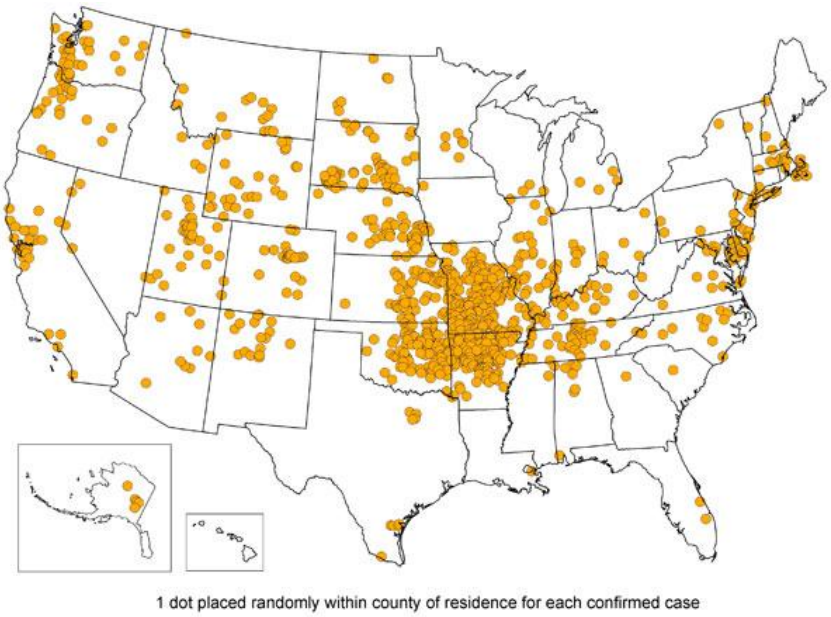


Figure 8. Map of reported cases of Tularemia by year, U.S. 2001-2010



Arkansas Information

Tickborne Disease (TBD) activity in Arkansas (2012)

ADH conducted a total of 2,136 investigations for TBD, of which 918 were determined to be cases (i.e., disease cases, confirmed or probable). Cases were investigated in 74 of 75 counties, with disease occurrence in 63 counties, which represent all five public health regions (Attachment 1. 2012 Tickborne disease investigations). Anaplasmosis was present in five counties; Ehrlichiosis was present in 33 counties; Spotted Fever Rickettsiosis was present in 62 counties; and Tularemia was present in 12 counties (Attachment 1. 2012 Tickborne disease investigations).

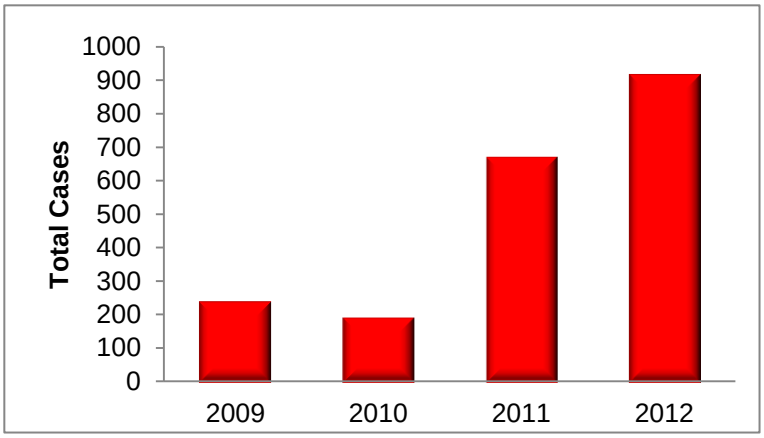
Tickborne Disease (TBD) Related Deaths in Arkansas (2012)

As of December 31, 2012, five (5) deaths have been associated with TBD. Two (2) deaths were associated with ehrlichiosis and two were associated with Spotted Fever Rickettsiosis.

Comparison to previous years

From 2009–2012, an average of 508 cases of TBD disease (range: 726 cases) was reported through the calendar year (Figure 9).

Figure 9. Tickborne disease cases, AR 2009-2012



Geographic distribution of TBD

TBD occurrence is not equally distributed across Arkansas. 71% of reported TBD occurred in the Northwest and Northeast public health regions, with the Northwest public health region accounting for 48% of all TBD cases (Figure 10).

TBD onset of illness started in January and continued through December, peaking in June (Figure 11).

Figure 10. Tickborne disease cases by public health region, AR 2012

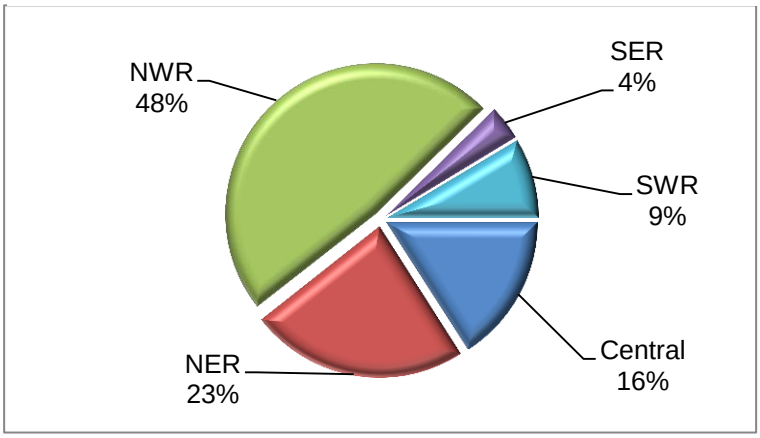
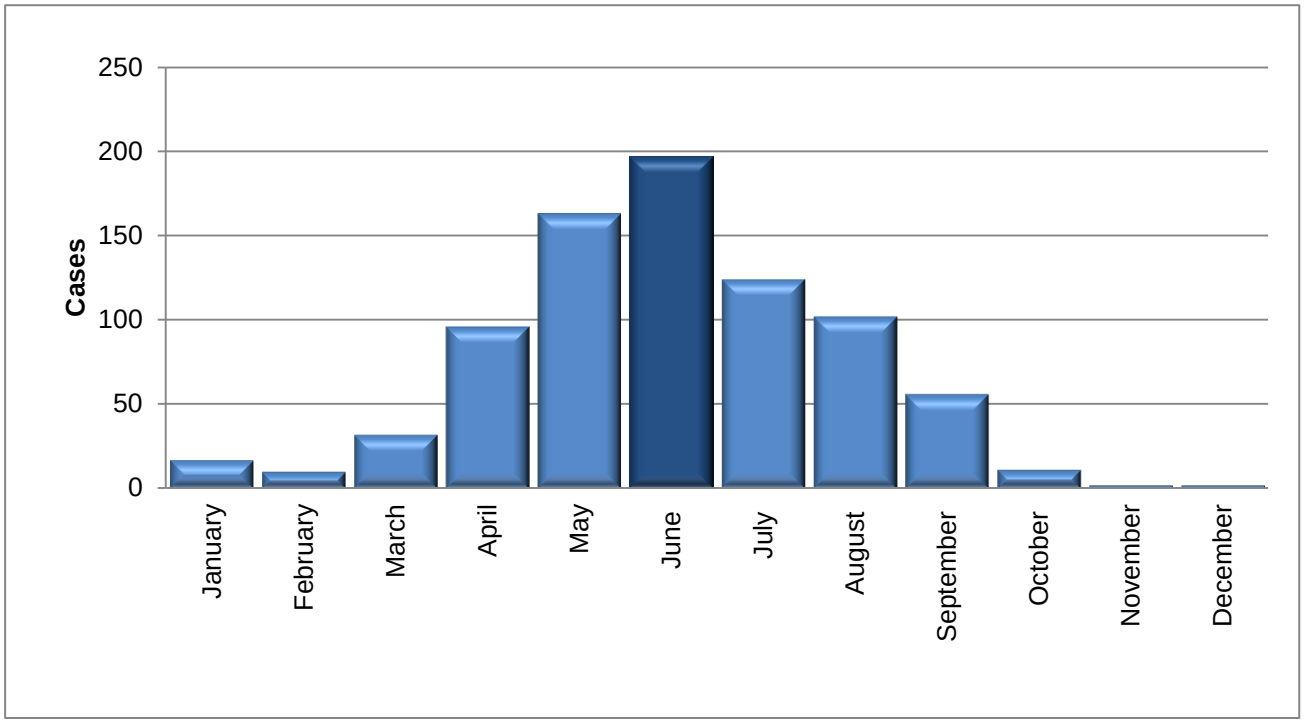


Figure 11. Tickborne disease onset of illness, AR 2012



Disease specific analysis for Arkansas - 2012

Anaplasmosis - The number of anaplasmosis cases reported to the ADH has remained at a constant level from 2009-2012. The mean number of cases reported from 2009 to 2012 is 7 (range: 3 cases) (Figure 12). Twenty-two (22) investigations of anaplasmosis were conducted in 2012, resulting in a total of seven (7) cases. There were no reported deaths associated with anaplasmosis. The mean age of reported cases was 52 (range: 54 years). Of the seven (7) cases, all were white (Figure 15), with five males and two females. Seventy-two (72) percent of the cases occurred in the northeast public health region (Figure 13), with onset of illness from January through October (Figure 14).

Figure 12. Anaplasmosis, AR 2009-2012

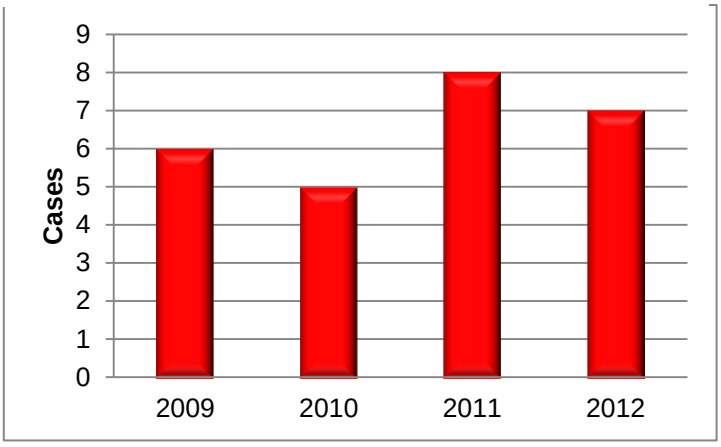


Figure 13. Anaplasmosis cases by public health region, AR 2012

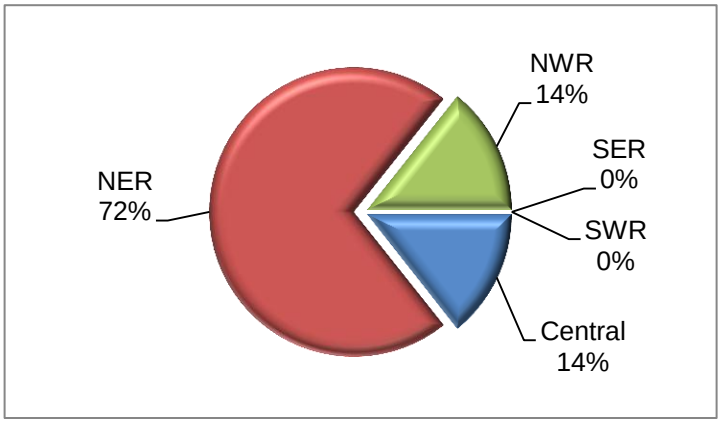


Figure 14. Anaplasmosis cases onset of illness, AR 2012

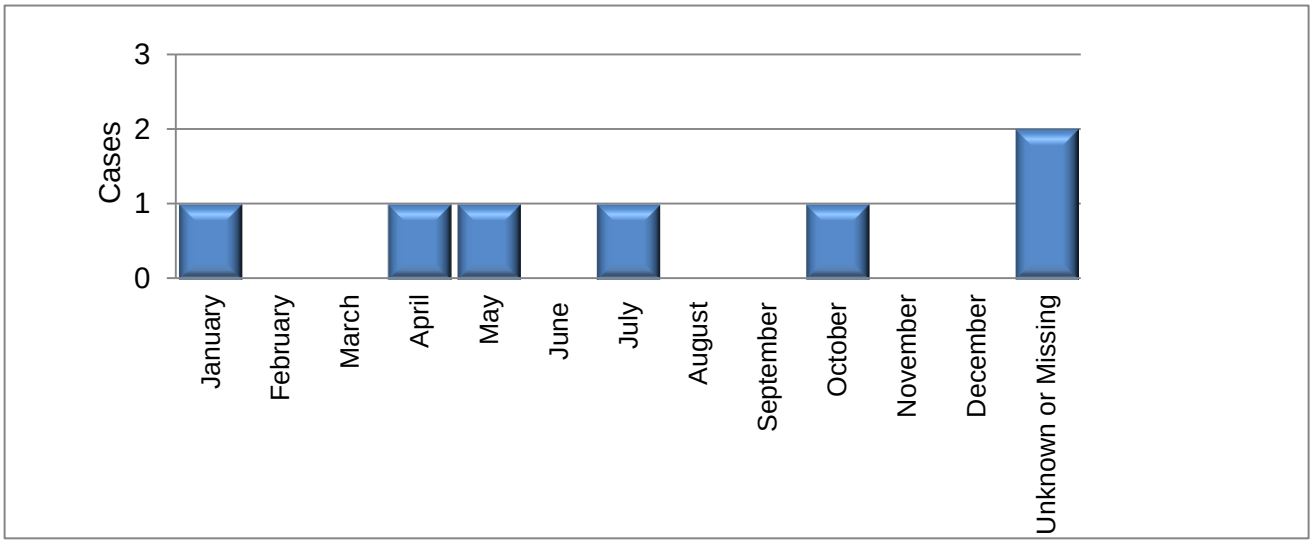


Table 1. Anaplasmosis, AR 2012

Case Status	Frequency	Percent
Confirmed	0	0
Probable	7	32
Suspect	5	23
Not a Case	10	45
Total Investigations	22	100
Total Cases	**7**	**32**

Age	Frequency	Percent	Male	Female
<20	0	0	0	0
20-29	1	14	1	0
30-39	1	14	1	0
40-49	0	0	0	0
50-59	3	43	1	2
60-69	1	14	1	0
>=70	1	14	1	0
Missing or unknown	0	0	0	0
Total	**7**	**100**	**5**	**2**

Gender	Frequency	Percent
Male	5	71
Female	2	29
Total	**7**	**100**

Race	Frequency	Percent
American Indian or Alaska Native	0	0
Asian	0	0
Black or African American	0	0
Unknown	0	0
Unknown White	0	0
White	7	100
Missing	0	0
Total	**7**	**100**

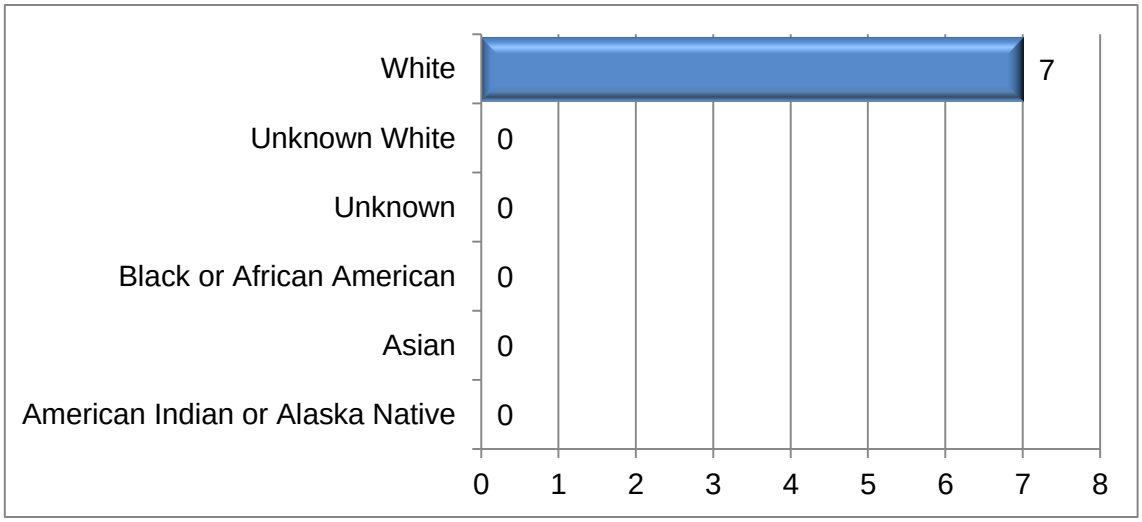
Ethnicity	Frequency	Percent
Hispanic or Latino	0	0
Not Hispanic or Latino	7	100
Unknown or Missing	0	0
Total	**7**	**100**

Table 1. Anaplasmosis, AR 2012, continued

Mortality	Frequency	Percent
Deceased	0	0
Living	7	100
Unknown or Missing	0	0
Total	**7**	**100**

Public Health Region	Frequency	Percent	Percent
Central	1	14	0
NER	5	71	0
NWR	1	14	0
SER	0	0	0
SWR	0	0	0
Total	**7**	**100**	**0**

Figure 15. Anaplasmosis cases by race, AR 2012



Ehrlichiosis

The number of ehrlichiosis cases reported to the ADH has increased from 2009-2012. The mean number of cases reported from 2009 to 2012 is 48 (range: 63 cases) (Figure 16).

159 investigations of ehrlichiosis were conducted in 2012, resulting in a total of 82 cases. There were two reported deaths associated with ehrlichiosis. The mean age of reported cases was 52 (range: 84 years). Of the 82 cases, 72 were white and nine were of unknown race (Figure 19), with 46 males and 36 females. Fifty-two (52) percent of the cases occurred in the northwest public health region (Figure 17), with onset of illness from January through September, peaking in June (Figure 18).

Figure 16. Ehrlichiosis cases, AR 2009-2012

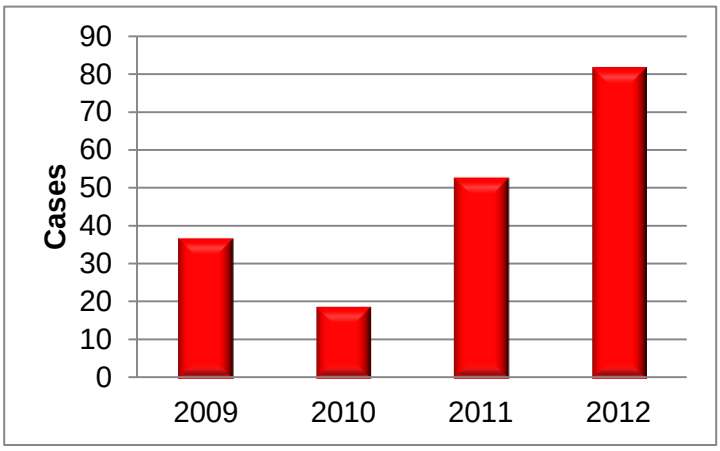


Figure 17. Ehrlichiosis cases by public health region, AR 2012

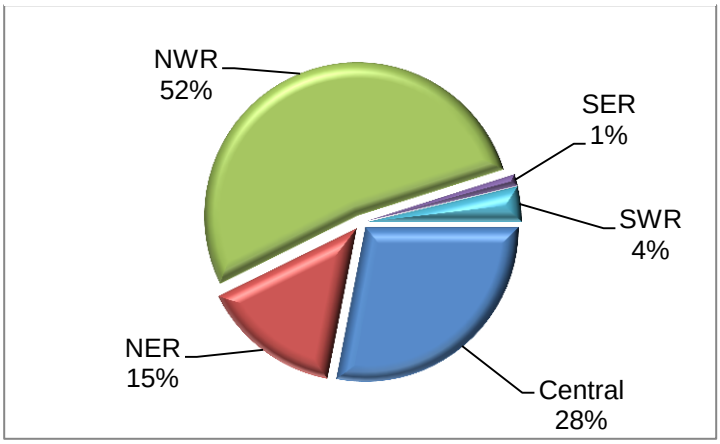


Figure 18. Ehrlichiosis cases onset of illness, AR 2012

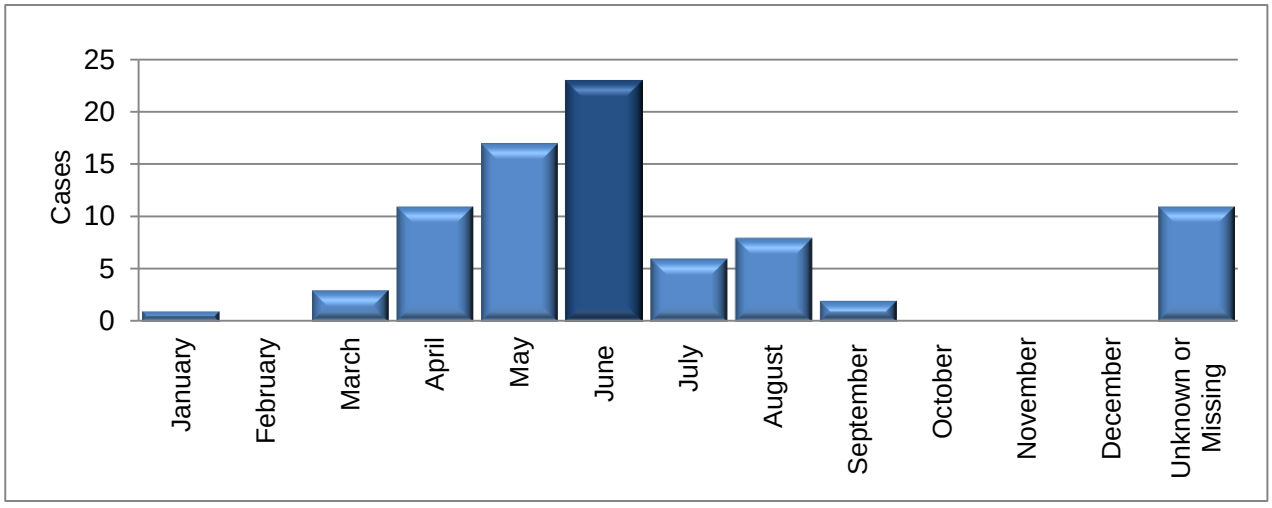


Table 2. Ehrlichiosis, AR 2012

Case Status	Frequency	Percent
Confirmed	16	10
Probable	66	42
Suspect	15	9
Not a Case	62	39
Total Investigations	159	100
Total Cases	**82**	**52**

Age	Frequency	Percent	Male	Female
<20	8	10	4	4
20-29	4	5	3	1
30-39	3	4	2	1
40-49	15	18	7	8
50-59	14	17	8	6
60-69	24	29	12	12
>=70	13	16	9	4
Missing or unknown	1	1	1	0
Total	**82**	**100**	**46**	**36**

Gender	Frequency	Percent
Male	46	56
Female	36	44
Total	**82**	**100**

Race	Frequency	Percent
American Indian or Alaska Native	0	0
Asian	0	0
Black or African American	0	0
Unknown	9	11
Unknown White	0	0
White	72	88
Missing	1	1
Total	**82**	**100**

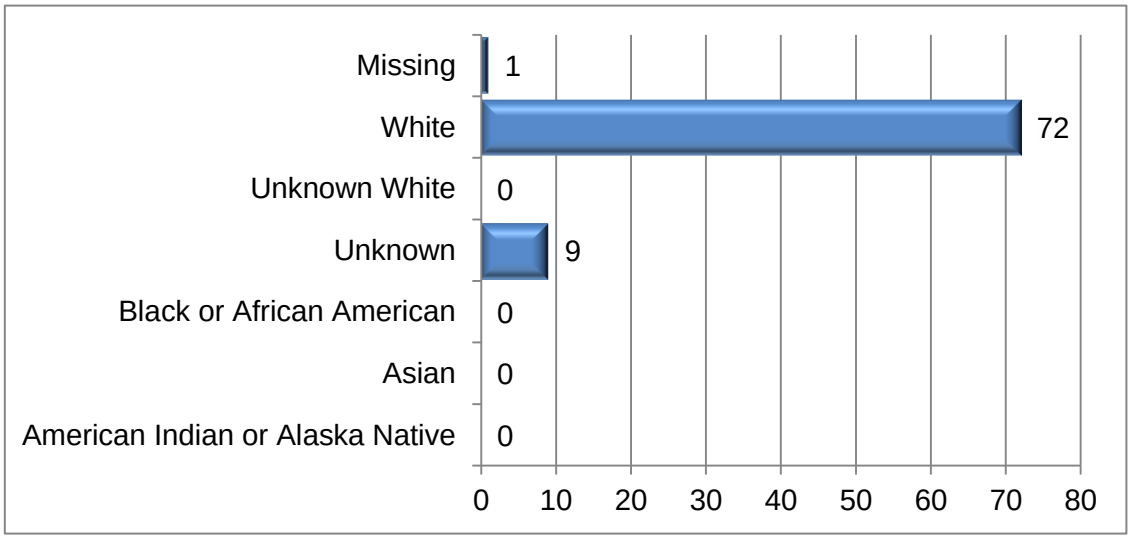
Ethnicity	Frequency	Percent
Hispanic or Latino	1	1
Not Hispanic or Latino	77	94
Unknown or Missing	4	5
Total	**82**	**100**

Table 2. Ehrlichiosis, AR 2012, Continued

Mortality	Frequency	Percent
Deceased	2	2
Living	80	98
Unknown or Missing	0	0
Total	**82**	**100**

Public Health Region	Frequency	Percent	Percent
Central	23	28	0
NER	12	15	100
NWR	43	52	0
SER	1	1	0
SWR	3	4	0
Total	**82**	**100**	**100**

Figure 19. Ehrlichiosis cases by race, AR 2012



Spotted Fever Rickettsiosis-

The number of Spotted Fever Rickettsiosis (SFR) cases reported to the ADH has increased from 2009-2012. The mean number of cases reported from 2009 to 2012 is 429 (range: 648 cases) (Figure 20). 1,941 investigations of SFR were conducted in 2012, resulting in a total of 812 cases (Table 5). There were three (3) reported deaths associated with SFR. The mean age of reported cases was 50 (range: 90 years). Of the 812 cases, 720 were White, one American Indian, two Asian, 14 Black, and 75 were of unknown race (Figure 23), with 527 males and 285 females. Forty-nine (49) percent of the cases occurred in the northwest public health region (Figure 21), with onset of illness from January through October, peaking in June (Figure 22).

Figure 20. Spotted Fever Rickettsiosis, AR 2009-2012

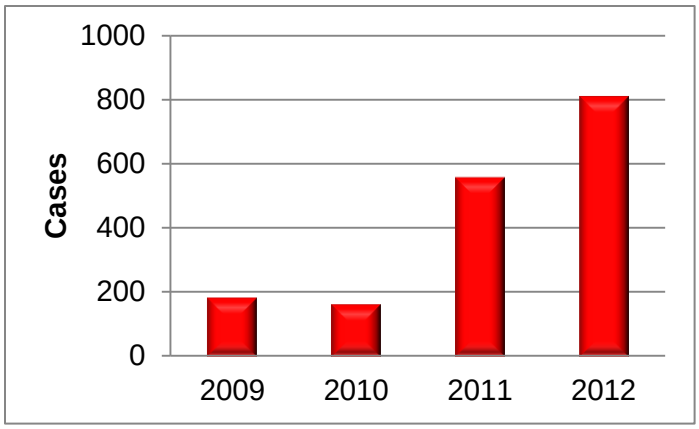


Figure 21. Spotted Fever Rickettsiosis cases by public health region, AR 2012

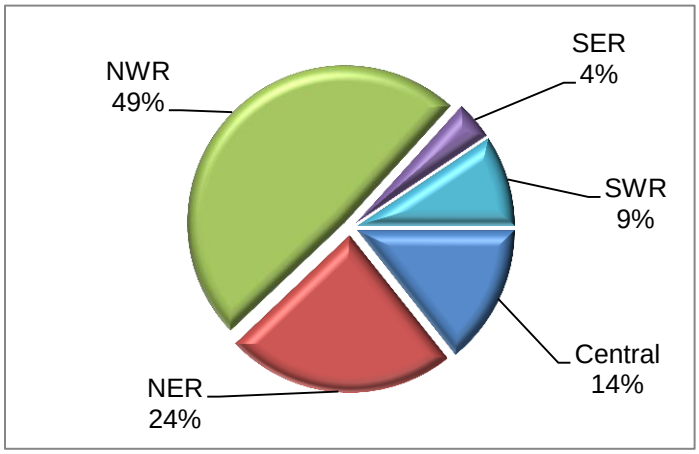


Figure 22. Spotted Fever Rickettsiosis cases onset of illness, AR 2012

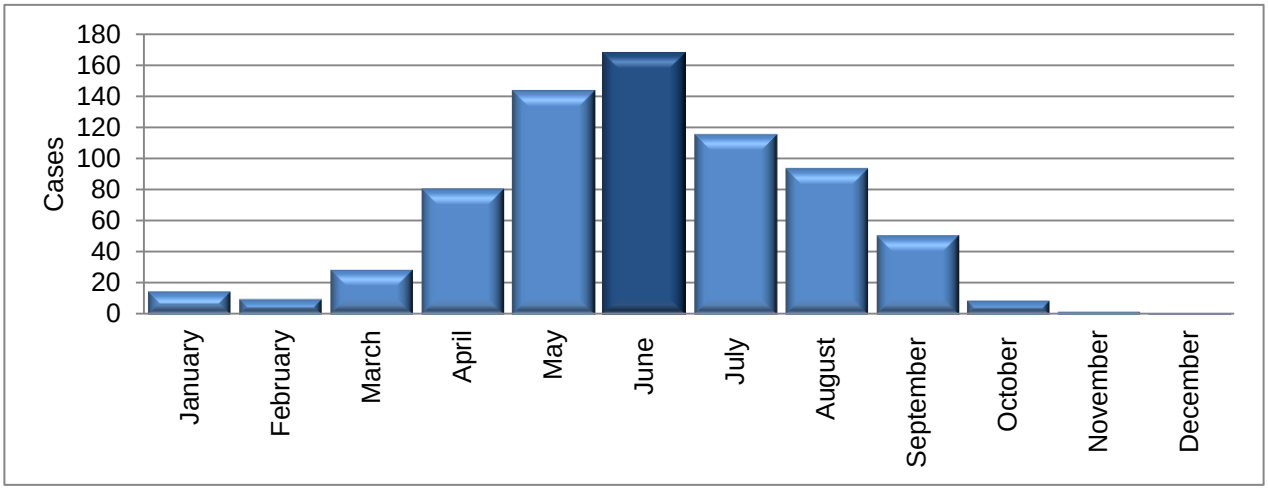


Table 3. Spotted Fever Rickettsiosis, AR 2012

Case Status	Frequency	Percent
Confirmed	3	0
Probable	809	42
Suspect	173	9
Not a Case	956	49
Total Investigations	1941	100
Total Cases	**812**	**42**

Age	Frequency	Percent	Male	Female
<20	80	10	47	33
20-29	51	6	38	13
30-39	81	10	53	28
40-49	146	18	97	49
50-59	157	19	98	59
60-69	168	21	111	57
>=70	129	16	83	46
Missing or unknown	0	0	0	0
Total	**812**	**100**	**527**	**285**

Gender	Frequency	Percent
Male	527	65
Female	285	35
Total	**812**	**100**

Race	Frequency	Percent
American Indian or Alaska Native	1	0
Asian	2	0
Black or African American	14	2
Unknown	69	8
Unknown White	2	0
White	718	88
Missing	6	1
Total	**812**	**100**

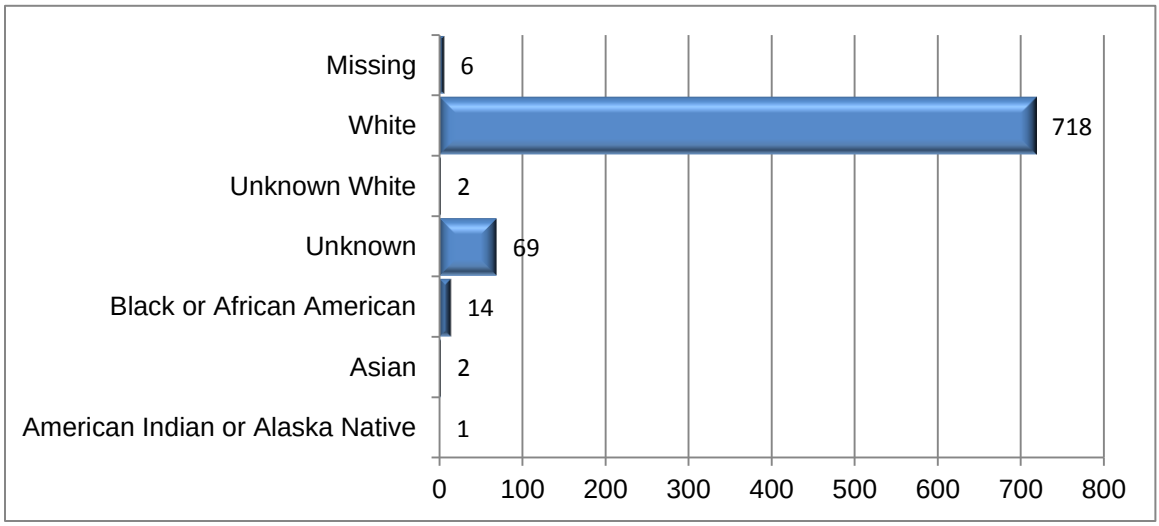
Ethnicity	Frequency	Percent
Hispanic or Latino	8	1
Not Hispanic or Latino	782	96
Unknown or Missing	22	3
Total	**812**	**100**

Table 3. Spotted Fever Rickettsiosis, AR 2012, Continued

Mortality	Frequency	Percent
Deceased	3	0
Living	809	100
Unknown or Missing	0	0
Total	**812**	**100**

Public Health Region	Frequency	Percent	Percent
Central	116	14	0
NER	192	24	0
NWR	396	49	100
SER	32	4	0
SWR	76	9	0
Total	**812**	**100**	**100**

Figure 23. Spotted Fever Rickettsiosis cases by race, AR 2012



Disease Specific analysis for Arkansas

Tularemia- The number of tularemia cases reported to the ADH has remained consistent from 2009-2012. The mean number of cases reported from 2009 to 2012 is 23 (range: 20 cases) (Figure 24).
64 investigations of tularemia were conducted in 2012, resulting in a total of 17 cases (Table 6). There were no reported deaths associated with tularemia in 2012. The mean age of reported cases was 42 (range 2 – 82 years). Of the 17 cases, 15 were White, one Black, and one of Unknown race (Figure 27), with 10 males and 7 females. Forty-one (41) percent of the cases occurred in the northeast public health region (Figure 25), with onset of illness from April through December, peaking in June (Figure 26).

Figure 24. Tularemia cases, AR 2009-2012

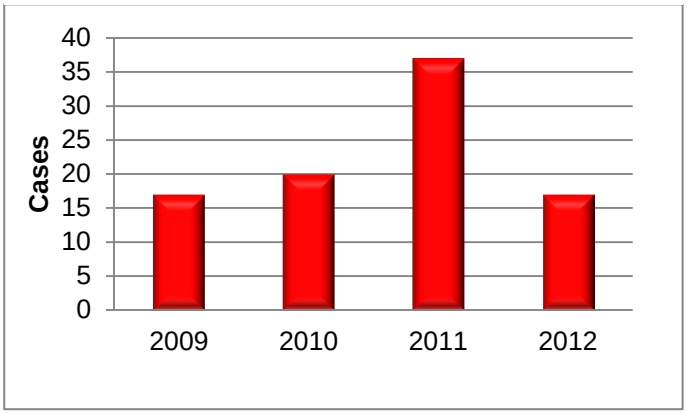


Figure 25. Tularemia cases by public health region, AR 2012

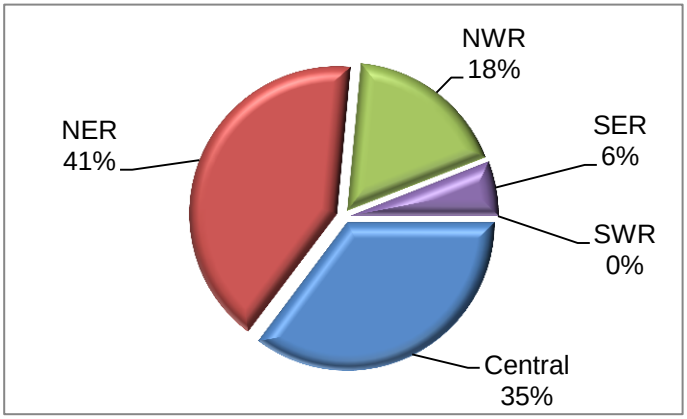


Figure 26. Tularemia cases onset of illness, AR 2012

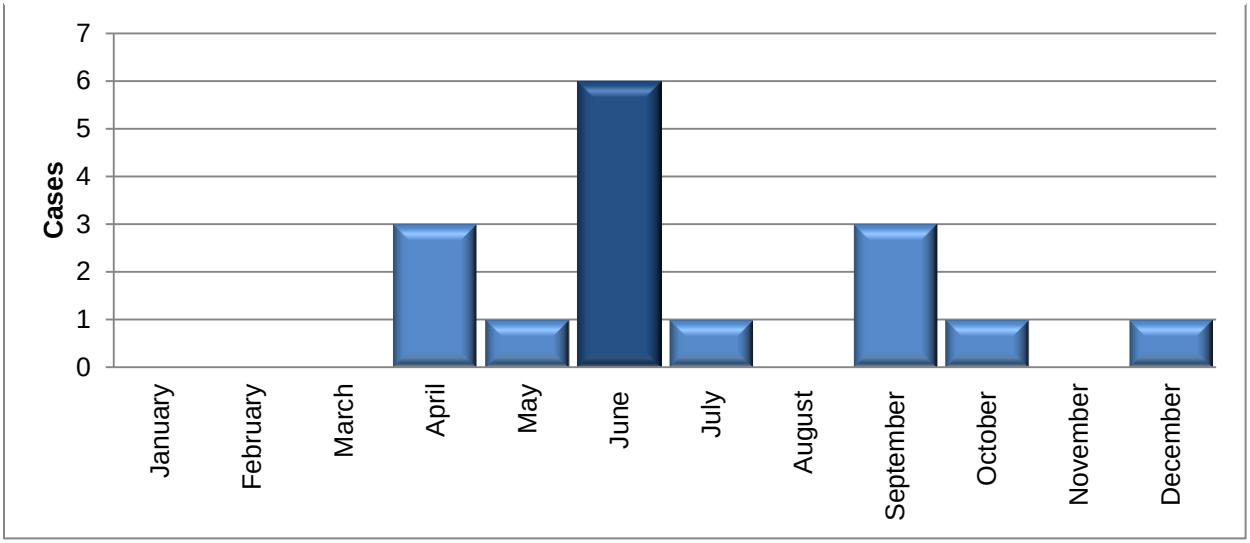


Table 4. Tularemia cases, AR 2012

Case Status	Frequency	Percent
Confirmed	7	11
Probable	10	16
Suspect	12	19
Not a Case	35	55
Total Investigations	64	100
Total Cases	**17**	**27**

Age	Frequency	Percent	Male	Female
<20	6	35	2	4
20-29	1	6	1	0
30-39	1	6	1	0
40-49	3	18	2	1
50-59	0	0	0	0
60-69	2	12	2	0
>=70	4	24	2	2
Missing or unknown	0	0	0	0
Total	**17**	**100**	**10**	**7**

Gender	Frequency	Percent
Male	10	59
Female	7	41
Total	**17**	**100**

Race	Frequency	Percent
American Indian or Alaska Native	0	0
Asian	0	0
Black or African American	1	6
Unknown	1	6
Unknown White	0	0
White	15	88
Missing	0	0
Total	**17**	**100**

Ethnicity	Frequency	Percent
Hispanic or Latino	0	0
Not Hispanic or Latino	17	100
Unknown or Missing	0	0
Total	**17**	**100**

Table 4. Tularemia cases, AR 2012, Continued

Mortality	Frequency	Percent
Deceased	0	0
Living	17	100
Unknown or Missing	0	0
Total	**17**	**100**

Public Health Region	Frequency	Percent	Percent
Central	6	35	0
NER	7	41	0
NWR	3	18	0
SER	1	6	0
SWR	0	0	0
Total	**17**	**100**	**0**

Figure 27. Tularemia case by race, AR 2012

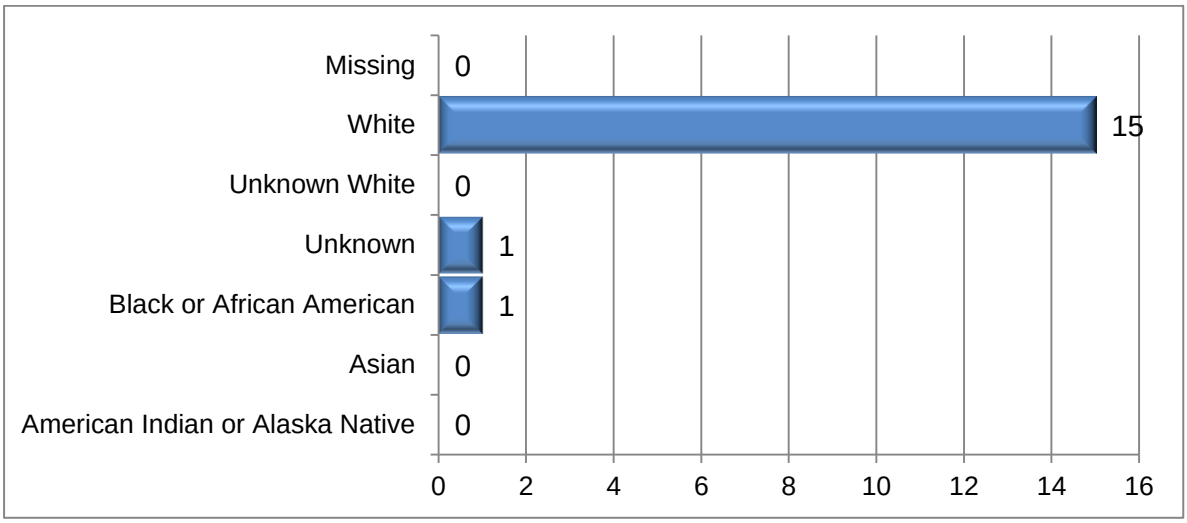


Figure 28. Tickborne disease map, AR 2012