

Tickborne Illness in Wisconsin – Rickettsial Diseases, 2010

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Ehrlichiosis/Anaplasmosis

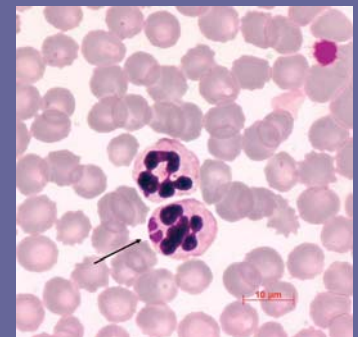
- Acute tickborne diseases of humans and animals caused by two separate groups of bacteria: *Anaplasma* and *Ehrlichia*
- Clinical manifestation: fever, headache, fatigue, muscle aches, and shaking chills
- Less common symptoms: nausea, vomiting, diarrhea, cough, joint pain, confusion, and occasional rash
- Laboratory findings: anemia, leukopenia, thrombocytopenia, and elevated liver enzymes
- Symptoms usually appear 5-10 days after a tick bite
- Treatment is effective with tetracycline antibiotics (doxycycline)
- Diagnostic testing- serology for IgM/IgG antibodies (IFA, ELISA), PCR, blood smear for morulae, and isolation





Anaplasmosis

- Human anaplasmosis (HA or HGA), formerly referred as HGE
- Genus *Anaplasma*, species *A. phagocytophilum*
- Infects the granulocytes-neutrophils or eosinophils
- Deer ticks (*Ixodes scapularis*) are known vectors for Lyme disease, babesiosis, and anaplasmosis in WI
- Second highest tickborne illness



Morulae-Anaplasma

Ehrlichiosis

- Ehrlichiosis or human monocytic *Ehrlichia* (HME)
- Genus *Ehrlichia*: multiple species
 - *E. chaffeensis* (infects monocytes)
 - *E. ewingii* (granulocytes, not common in WI)
 - *E. muris* –like (new species): cases reported in 2009 in Northwestern region of WI
- 2000-2007, very few cases of *E. chaffeensis*; mostly seen in WI residents that have traveled to other states
- 2008-2009, noticed an increase in probable *E. Chaffeensis* (no confirmed case to date)
- 2009, identified 3 confirmed patients cases of *E. muris* -like and in a pool of deer ticks collected in Northwestern region of WI (species have never been seen in the US)
- Symptoms of *Ehrlichia* infection tend to be more severe than *Anaplasma* (encephalitis)
- *Ehrlichia* infections may be under reported

***Lone star ticks (*Amblyomma americanum*) are very rare in WI and have been associated with *Ehrlichia* infections among the Southern States in US.**



Laboratory Testing

IFA test for IgG and IgM to specific *Ehrlichia* or *Anaplasma*

- Serology test can have cross-reactivity between agents
- IFA result is reported in titers (positive $\geq 1:64$) IgM or IgG antibody
- IgM is not used independently because of false positive and titer can last a long time; IgG is more dependable antibody
- Single sample (serum collected within first week of illness) is considered as probable, a second sample collected 2-4 weeks later to confirm
- Confirm- 4-fold change in titers between acute/convalescent sample
- WEDSS entry- indicate specific agent and titer (HA 1:128 or HE 1:256)

PCR is the test of choice

- Result is considered as confirmed (more specific, no cross-reactivity)
- Sample should be collected before treatment (EDTA blood sample)
- PCR is the only test that can identify the new *E. muris-like* species
- A negative result is not as meaningful, follow-up with serology if patient is ill with tickborne symptoms
- WEDSS entry- indicate positive and specific agent (HA or HE)

Human Ehrlichiosis- Old Case Definition

Prior to 2008, WI employ the human Ehrlichiosis CSTE/CDC case definition revised in 2000

- Confirmed or probable ehrlichiosis were reported in 3 categories:
 - 1) Human granulocytic ehrlichiosis (HGE)
 - 2) Human monocytic ehrlichiosis (HME)
 - 3) Ehrlichiosis undetermined- cases that cannot be easily classified
- In WI, most of the cases were classified as undetermined because labs did not perform testing for both agents.

New Case Definition for Determining Case Classification-2008

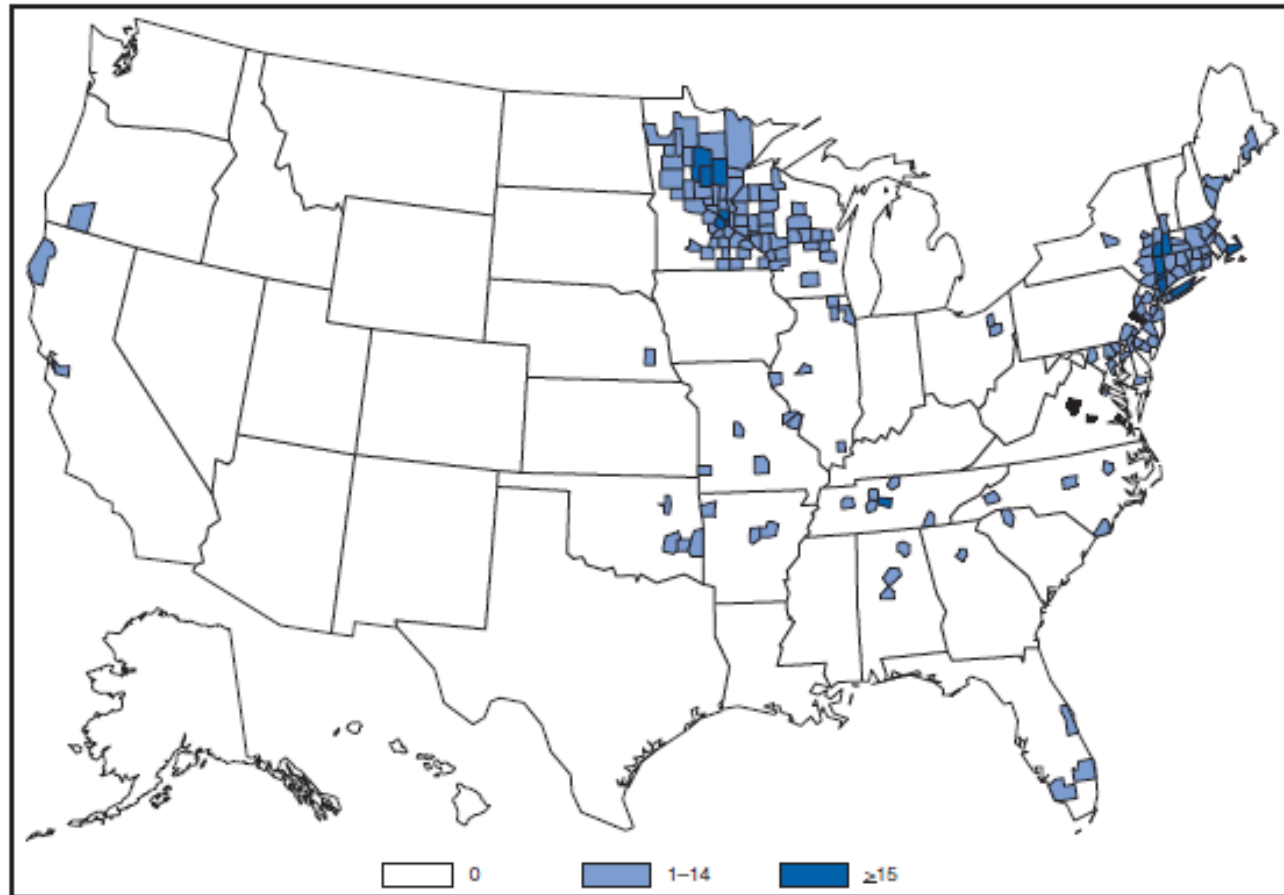
- Four categories (confirmed, probable)
 1. Anaplasmosis - *Anaplasma phagocytophilum*,
 2. Ehrlichiosis - *Ehrlichia chaffeensis*,
 3. Ehrlichiosis - *E. ewingii*
 4. Ehrlichiosis/anaplasmosis- undetermined
- Require clinical signs/symptoms and laboratory results meeting criteria
- If *Anaplasma* positive result is reported without *Ehrlichia* result, report as *Anaplasma*
- If *Ehrlichia* is positive result is reported without *Anaplasma* result, need to find out if *Anaplasma* was done and what is the result
 - if titer for *Ehrlichia* is only 2-fold higher than *Anaplasma*, report out as probable Ehrlichiosis/anaplasmosis-undetermined
 - if titer for *Ehrlichia* is 4-fold higher than *Anaplasma*, report out as probable *Ehrlichiosis chaffeensis*

Reporting in WI

- Report all positive titers for all agents (positive or negative result alone is not enough)
- Important to have clinical signs and symptoms (If no clinical symptoms, it is not a case)
- If *Ehrlichia* probable or confirmed case, need travel history
- Because of cross-reactivity between *Anaplasma* and *Ehrlichia*, important to report negative titers and positive titers (demonstrate that testing was performed for both agents)
- WEDSS and ELR- will be discussed in the afternoon workshop

Ehrlichiosis (HGE)- CDC Provisional Data, 2007

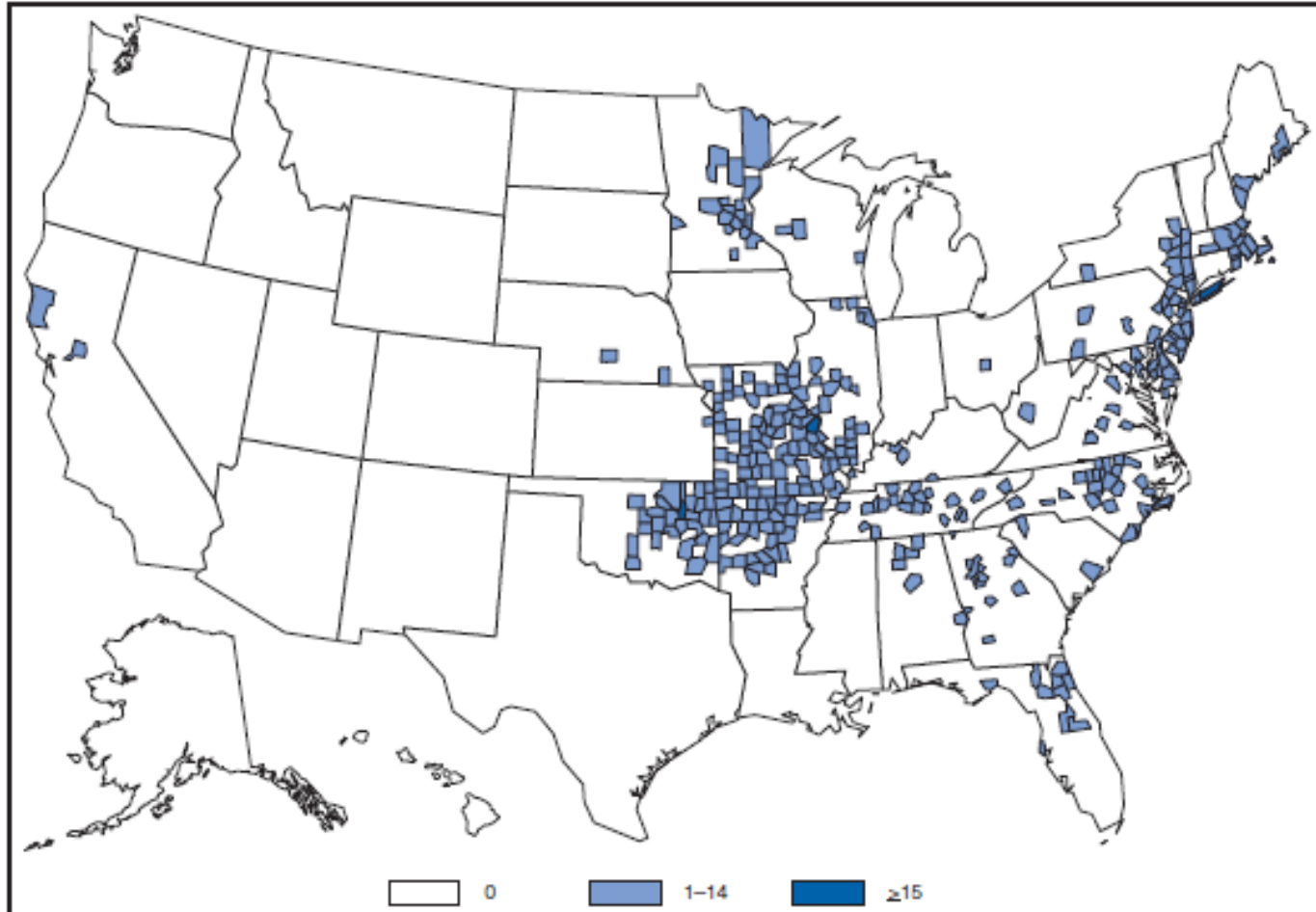
EHRILCHIOSIS, HUMAN GRANULOCYTYC. Number of reported cases, by county — United States, 2007



Human granulocytic ehrlichiosis (HGE), caused by *Anaplasma phagocytophilum*, is more correctly referred to as anaplasmosis as a result of recent taxonomic changes. Cases are reported primarily from the upper Midwest and coastal New England, reflecting both the range of the primary tick vector species (*Ixodes scapularis*) and the range of preferred animal hosts for tick feeding.

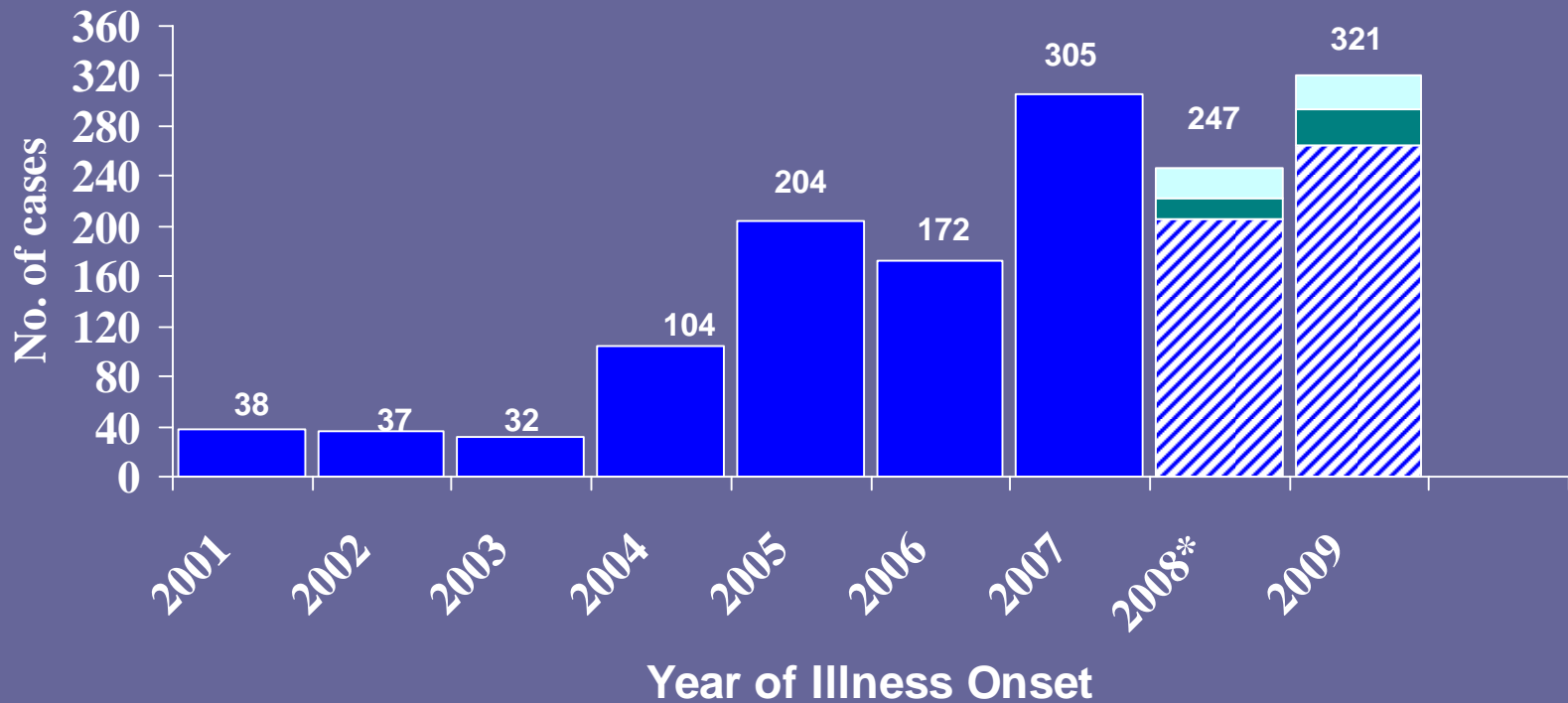
Ehrlichiosis (HME)- CDC Provisional Data, 2007

EHRILCHIOSIS, HUMAN MONOCYTCIC. Number of reported cases, by county — United States, 2007



Human monocytic ehrlichiosis (HME), caused by *Ehrlichia chaffeensis*, is the most common type of ehrlichiosis. Cases are reported primarily in the lower Midwest and the Southeast, reflecting the range of the primary tick vector species (*Amblyomma americanum*).

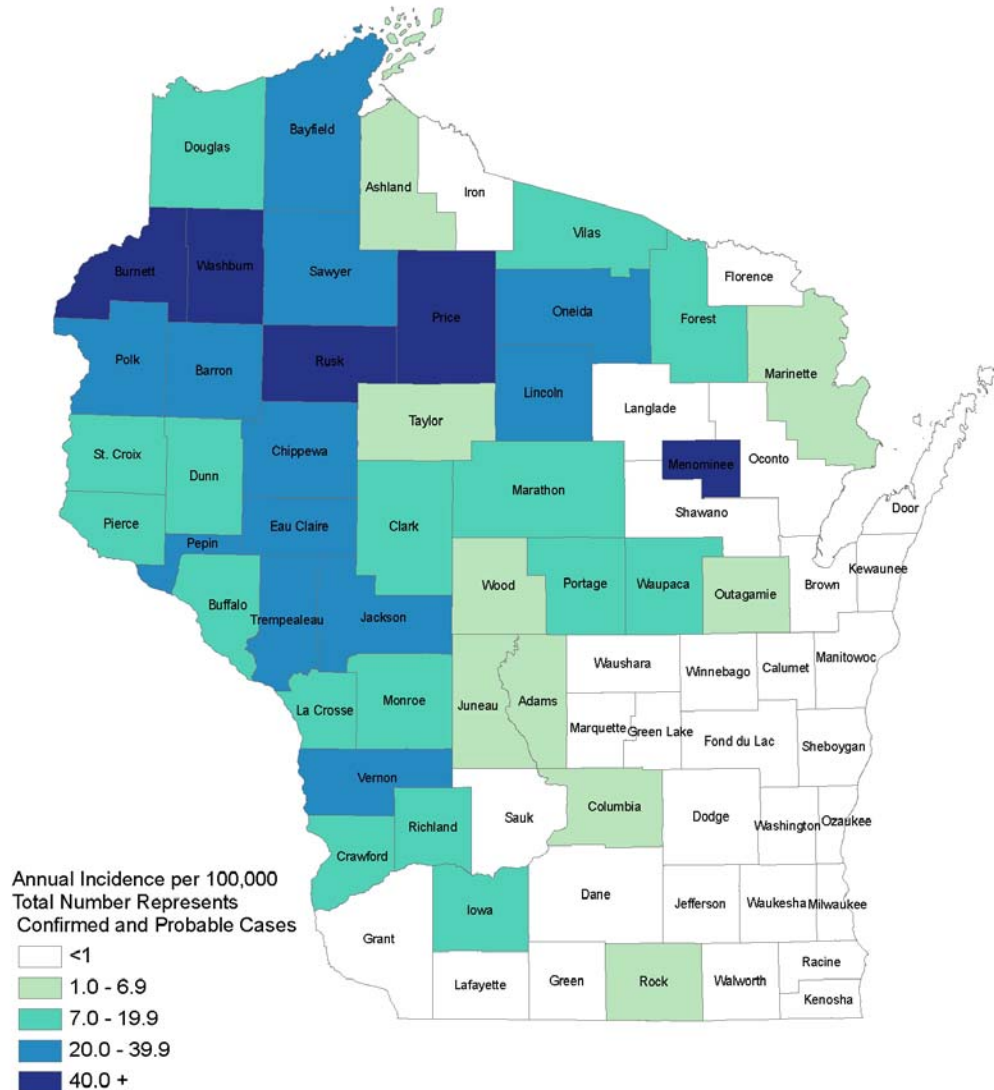
Reported Confirmed and Probable Cases of Ehrlichiosis/Anaplasmosis Infections Wisconsin, 2001-2009



*In 2008, cases were classified using the new CDC case definition (*A. phagocytophilum*, *E. chaffeensis*, *E. ewingii*, and *Anaplasma/Ehrlichia* undetermined).

Ehrlichia/Anaplasma Disease Incidence, WI 2009

Cases per 100,000 population



Total Cases of Ehrlichiosis/Anaplasmosis 2009, WI

