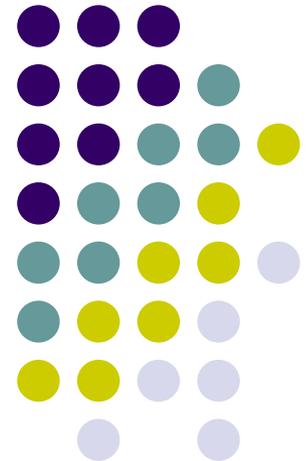


# Tickborne and Arboviral Diseases

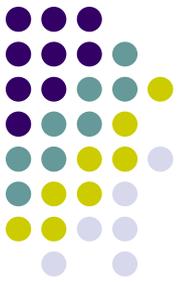
**Jodi Reber, RN**

Vectorborne Nurse Epidemiologist &  
Regional Communicable Disease Nurse  
Consultant

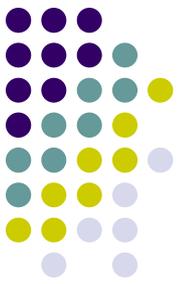
North Carolina Division of Public Health



# Ticks and Mosquitoes



Photos Courtesy of CDC



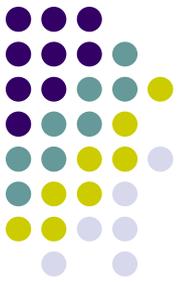
# Learning Objectives

1. Identify reportable tickborne diseases
2. Distinguish between neuro-invasive and non neuro-invasive arboviral disease
3. Distinguish between viral, arboviral, bacterial, and other causes of meningitis/encephalitis
4. Identify key surveillance criteria for tickborne and arboviral diseases



# Tickborne Terminology

- Rocky Mountain Spotted Fever (RMSF) *is now Spotted Fever Group*
- Human Granulocytic Anaplasmosis (HGA) *is now Anaplasmosis*

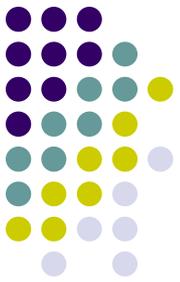


# RMSF Rash

- Late symptom
- Indicates high risk for life-threatening illness



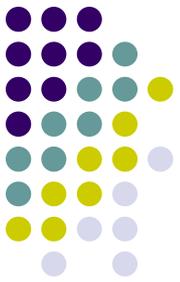
Photo Courtesy of CDC



# Tickborne Disease

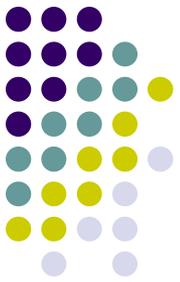
## Serology tests results

- Anemia
- Leukopenia
- Thrombocytopenia
- Elevated liver enzymes



# Surveillance Labs

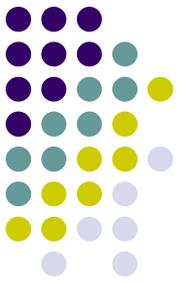
- Not required
- Not always performed
- Most commonly used requires two separate tests



# RMSF, Ehrlichiosis, Anaplasmosis

## Surveillance criteria

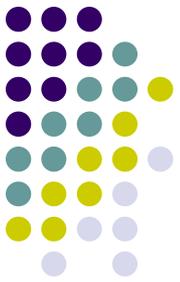
- No fever = no case
- Requires clinical and laboratory criteria
- Medical diagnosis may substitute for clinical criteria, but lab criteria must still be met



# RMSF, Ehrlichiosis, Anaplasmosis

## Confirmed event

- Requires clinical evidence (not just a medical diagnosis)
- Requires two serum tests taken 2-4 weeks apart showing a four-fold change in titer



# Tickborne Disease

## Suspect Case Classification

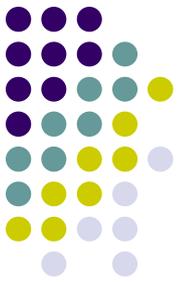
- Use when unable to obtain any data from physician
- Applies when internal policy for collection of surveillance data has been met



# Lyme Disease

- Discovered in Lyme, Connecticut in 1975
- Most common tickborne disease in US
- Over 20,000 cases reported annually
- Can now be acquired in NC

# Early Localized Lyme Disease



## Erythema migrans (EM) rash

- First sign in 60-80% of patients
- Gradually expands over several days
- Up to 12 inches (30 cm) across
- Center of the rash may clear as it enlarges – “bull's-eye”



Photos Courtesy of CDC



# Early Disseminated Lyme Disease

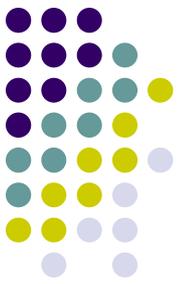
## Systemic Manifestations

- Fatigue, chills, fever, headache, muscle and joint aches, swollen lymph nodes
- Additional skin rashes possible
- Neurologic symptoms (15% of untreated patients)
- Cardiovascular symptoms (5-10% of untreated patients)



# Late Lyme Disease

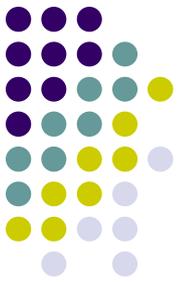
- Lyme arthritis:
  - ~ 60% of untreated patients
- Neurologic disease:
  - ~ 5% of untreated patients will have persistent neurologic symptoms



# Lyme Disease

## Surveillance criteria

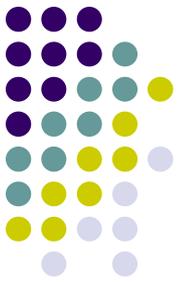
- Requires clinical and laboratory criteria
- Medical diagnosis may substitute for clinical criteria, but lab criteria must still be met
- May need more than one lab to meet lab criteria



# Lyme Disease

## Suspect Case Classification

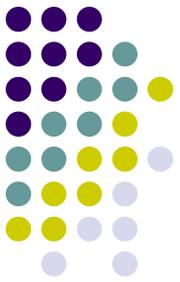
- Use when unable to obtain any data from physician
- Applies when internal policy for collection of surveillance data has been met



# Tickborne Disease

## Treatment

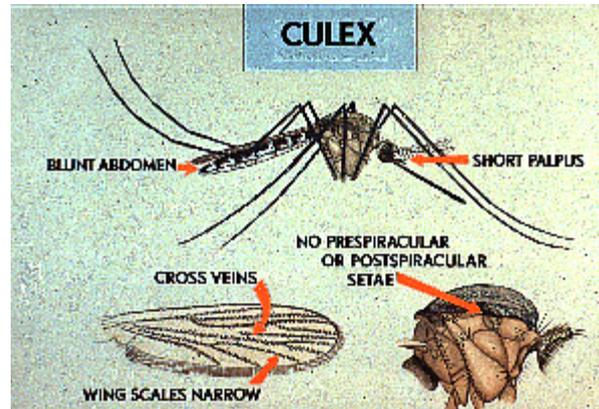
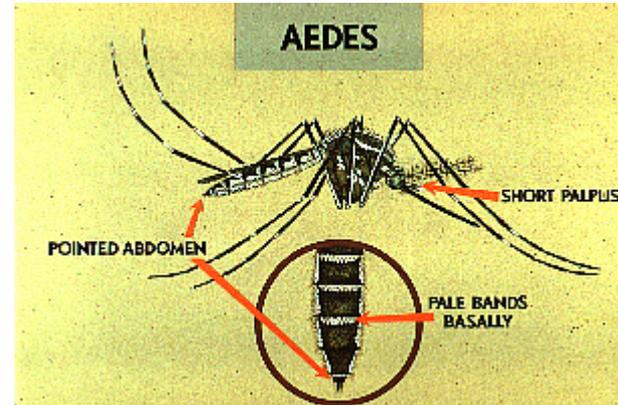
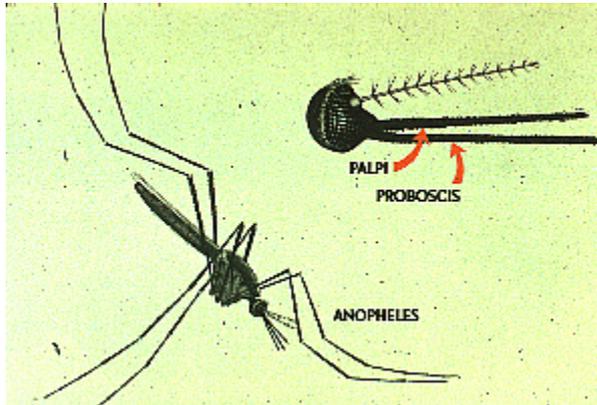
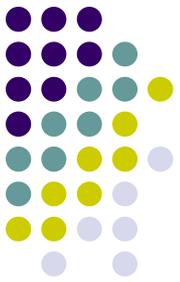
- Drug of Choice = Doxycycline
- Treat patient if tickborne disease is suspected...do not wait for laboratory test results



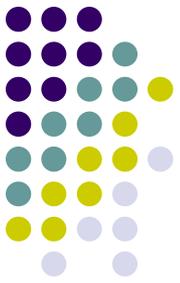
# Babesiosis

- Not acquired through tick bite in NC
- Transfusion-associated
- Reportable in US in 2011
- Reportable in NC in future

# Arboviral Disease



Photos Courtesy of CDC



# Arboviral Diseases Reportable in North Carolina

- Neuro Invasive Disease
  - West Nile Virus
  - La Crosse Encephalitis
  - Eastern Equine Encephalitis
  - Western Equine Encephalitis
  - St. Louis Encephalitis
- Malaria
- Dengue
- Yellow Fever



# Arboviral Disease

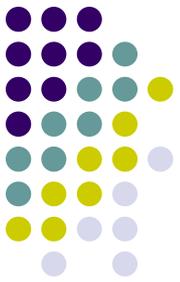
## Surveillance criteria

- Neuro Invasive Disease
  - Requires clinical & laboratory criteria
- Travel history

# Prevention and Control Measures



- <http://www.epi.state.nc.us/epi/tick/TickBitePrevention.pdf>
- <http://www.epi.state.nc.us/epi/arbovirus/mosquito.html>
- <http://wwwnc.cdc.gov/travel/yellowbook/2010/chapter-2/protection-against-mosquitoes-ticks-insects-arthropods.aspx>



# References

- North Carolina Communicable Disease website:

<http://www.epi.state.nc.us/epi/gcdc.html>

- Centers for Disease Control Website:

<http://www.cdc.gov/>