Lyme disease surveillance in Allegheny County, PA

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Lyme disease

- Vector-borne disease caused by spirochete Borrelia burgdorferi
- Transmitted by blacklegged ticks I. scapularis and I. pacificus
- Birds & small mammals are reservoirs
- Deer support tick populations – “deer tick”

Lyme disease

- Early symptoms
  - Erythema migrans/ “bulls-eye rash”
  - Flu-like symptoms
  - Swollen lymph nodes
- Late symptoms
  - Arthritis
  - Neurological: Bell’s palsy/other cranial neuritis, meningitis, vision problems, other
  - Cardiac: heart block

Lyme disease surveillance

- Nationally notifiable since 1991
- Confirmed case
  - A case of EM with a known exposure OR positive lab test
  - A case with at least one late symptom and positive lab test
- Probable case definition added in 2008
  - Any other case of physician-diagnosed Lyme disease with positive lab test
Laboratory criteria for diagnosis

- Positive culture for *B. burgdorferi*, OR
- Two-tier testing:
  - Positive IgM when ≤30 days from symptom onset
  - Positive IgG at any point during illness
- Single-tier IgG immunoblot seropositivity
- CSF antibody positive for *B. burgdorferi* by EIA or IFA, if CSF titer > serum

Lyme disease surveillance: challenges

- Time and staff constraints
- Underreporting
- Case residence vs. case exposure

Reported cases of Lyme disease

Lyme diseases cases in Allegheny County 2004-2008

- < 30 confirmed cases per year
- Many had travel history

Source: CDC Lyme stats
http://www.cdc.gov/lyme/stats/
**Lyme diseases cases in Allegheny County 2009-2013**

- Number of reports began to rise
- Health department did not have resources to contact providers
- Cases could not be confirmed
- Anecdotal evidence of increasing burden of disease
- Official case count still <35 per year

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**Objectives of 2014 Lyme surveillance**

- Assess burden of disease
- Describe characteristics of cases
- Develop plan for estimating burden of disease with limited follow-up

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**Protocol**

Collect clinical info on all lab reports with help of student interns/volunteers, admin assistant and AmeriCorps member

- Fax one-page data collection form to providers
- Call providers who do not respond to fax
- Call patients if cannot reach provider
- Enter information into PA-NEDSS
- Allow PA DOH algorithm to classify cases
Results

I. Burden of disease

• 1455 individuals reported from labs or providers
• 96 providers could not be reached
• Final case classification -> 822 cases (conf/prob)
  – 756 confirmed
  – 66 probable

Symptoms reported by 2014 cases

• EM (65%)
• Arthritis/joint swelling (43%)
• Bell’s Palsy or other cranial neuritis (8%)
• Radiculoneuropathy (4%)
• Lymphocytic meningitis (2%)
• 2nd or 3rd degree AV block (0.8%)
• Encephalitis/Encephalomyelitis (0.6%)

II. Characteristics of cases, Allegheny County, 2014 (N=822)

2014 cases by age group and sex
2014 cases by month of symptom onset

![Graph showing the number of cases reported by month](image)

Reported incidence rates, SW PA

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III. Estimating number of cases

- NY verified that random sampling provides good estimate of case counts
- MN adopted sampling methodology
- ACHD random sample of 2014 cases yielded estimated case count not significantly different from complete case count
Conclusions

• Dramatic increase in number of Lyme disease reports in Allegheny County
• Number of confirmed cases depends on local health department capacity
• Case characteristics similar to national profile
• 20% random sampling is reasonable method to estimate case counts

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