

Lyme Disease Incidence in Wisconsin:

A Comparison of State Reported Rates with Rates from a Population-Based Cohort

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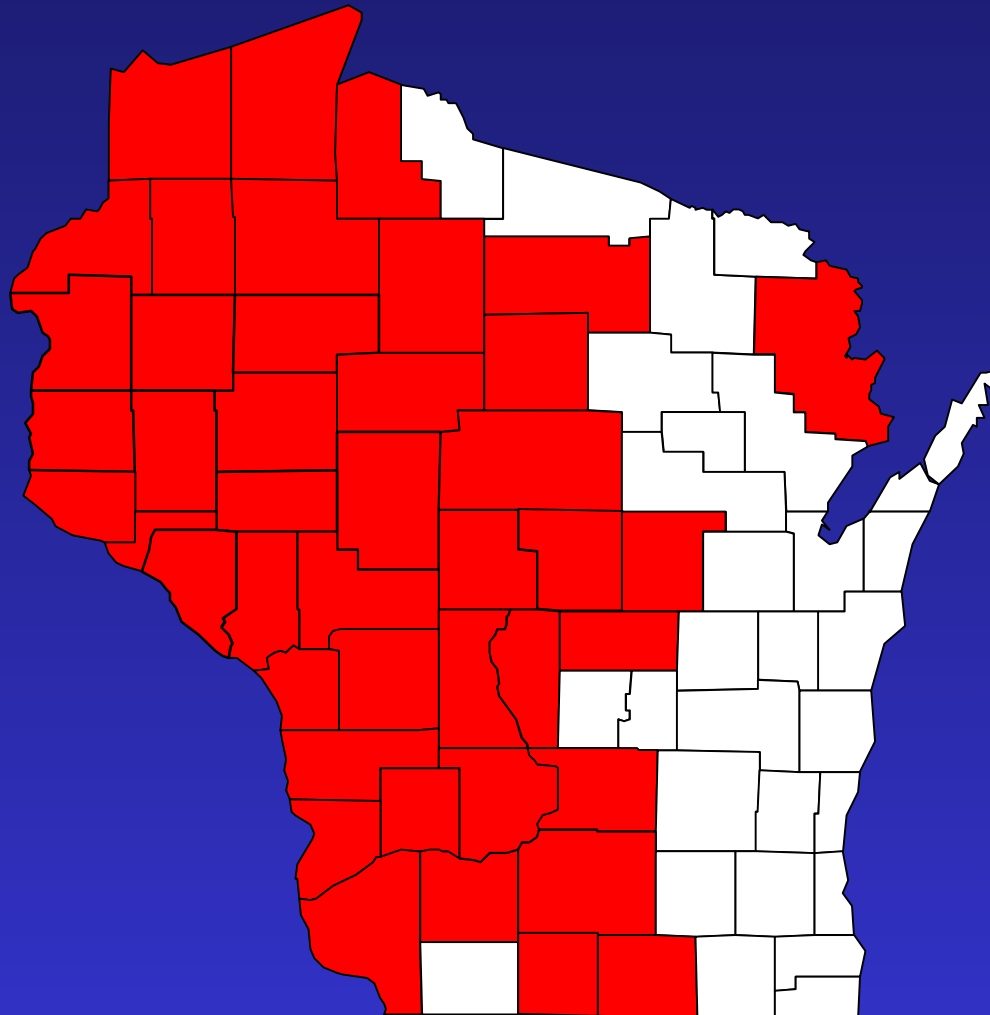
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Wisconsin Division of Public Health

Background

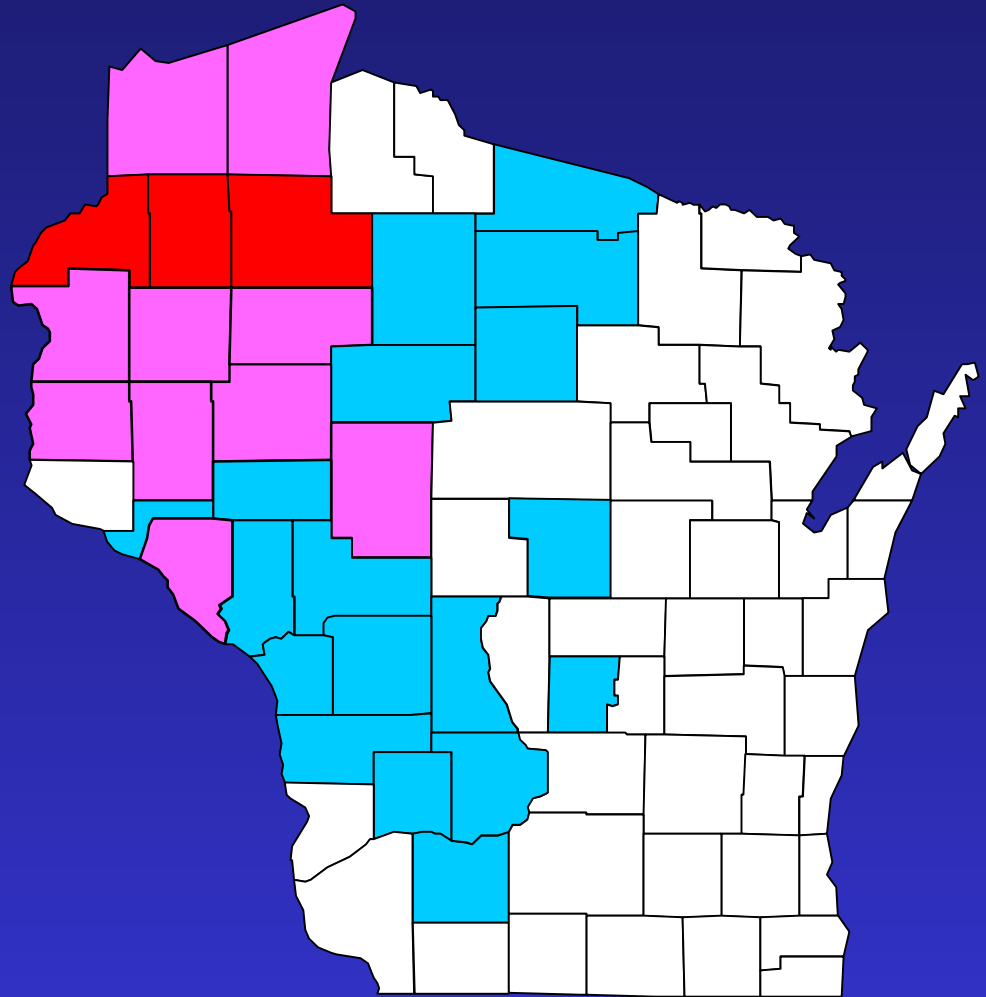
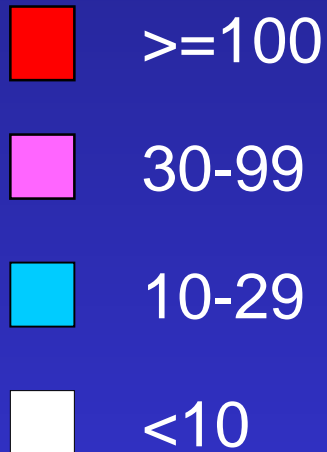
- Lyme disease is reportable in all states
- 88,967 cases reported to CDC (1992-1998) ---- 3,327 from Wisconsin
- Wisconsin mean annual incidence highest in north-central states and 7th highest nationally

Distribution of *Ixodes scapularis* by County, 1997



Reported Lyme Disease Incidence by County, 1992-1998

Incidence per 100,000



Specific Aims

- Assess completeness and accuracy of LD reporting in north-central Wisconsin
- Calculate and compare incidence rates and trends across age, gender, and time using state reported LD data and data from the Marshfield Epidemiologic Study Area (MESA)

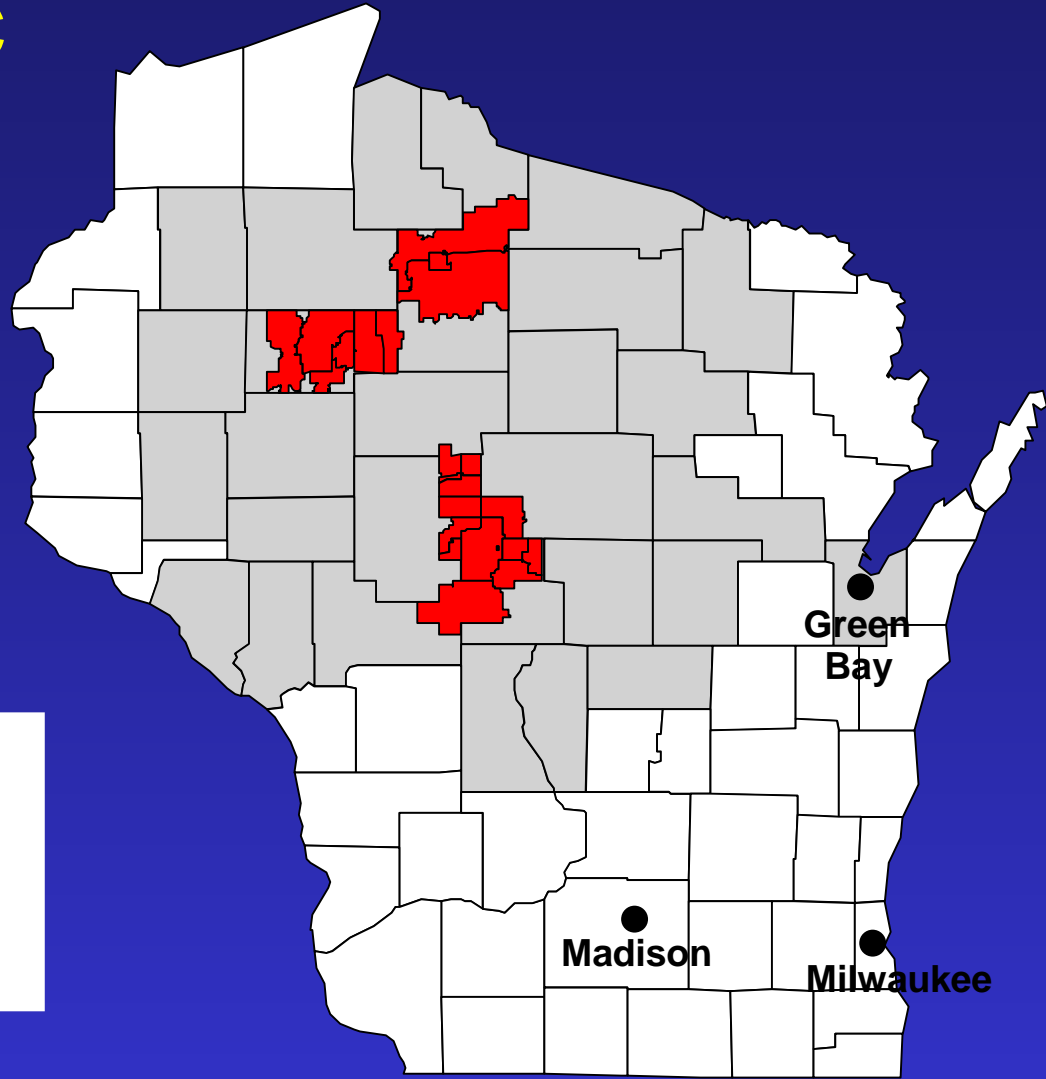
Marshfield Clinic

- 600 physician multi-specialty group practice
- 350,000+ unique patients seen per year
- 1.6 million+ patient visits per year
- 40 regional centers in 32 communities
- All centers share a common electronic medical record

Marshfield Epidemiologic Study Area

- Dynamic, population-based cohort established in 1991 (n~78,000)
 - 14 ZIP codes surrounding main Marshfield Clinic campus
 - 10 ZIP codes surrounding northern regional centers
- Subset of geographic area served by Marshfield Clinic with high population and health event coverage

Marshfield Epidemiologic Study Area



MESA (n=77,280)



Marshfield Clinic
Primary Service Area

Case Ascertainment

- Electronic diagnosis file (1992-1998)
 - ICD-9 codes: 088.81, 695.90, 066.90
 - Outpatient and inpatient visits
 - Excluded patients with diagnosis prior to 1992
- Laboratory database
 - Positive Lyme serology
 - IFA or EIA, with or without WB

Chart Review & Adjudication

- *Probable LD* (National case definition)
 - Physician-diagnosed EM ≥ 5 cm in diameter
 - At least one arthritic, neurologic, or cardiac manifestation with lab confirmation of infection
- *Possible LD*
- *Not LD*

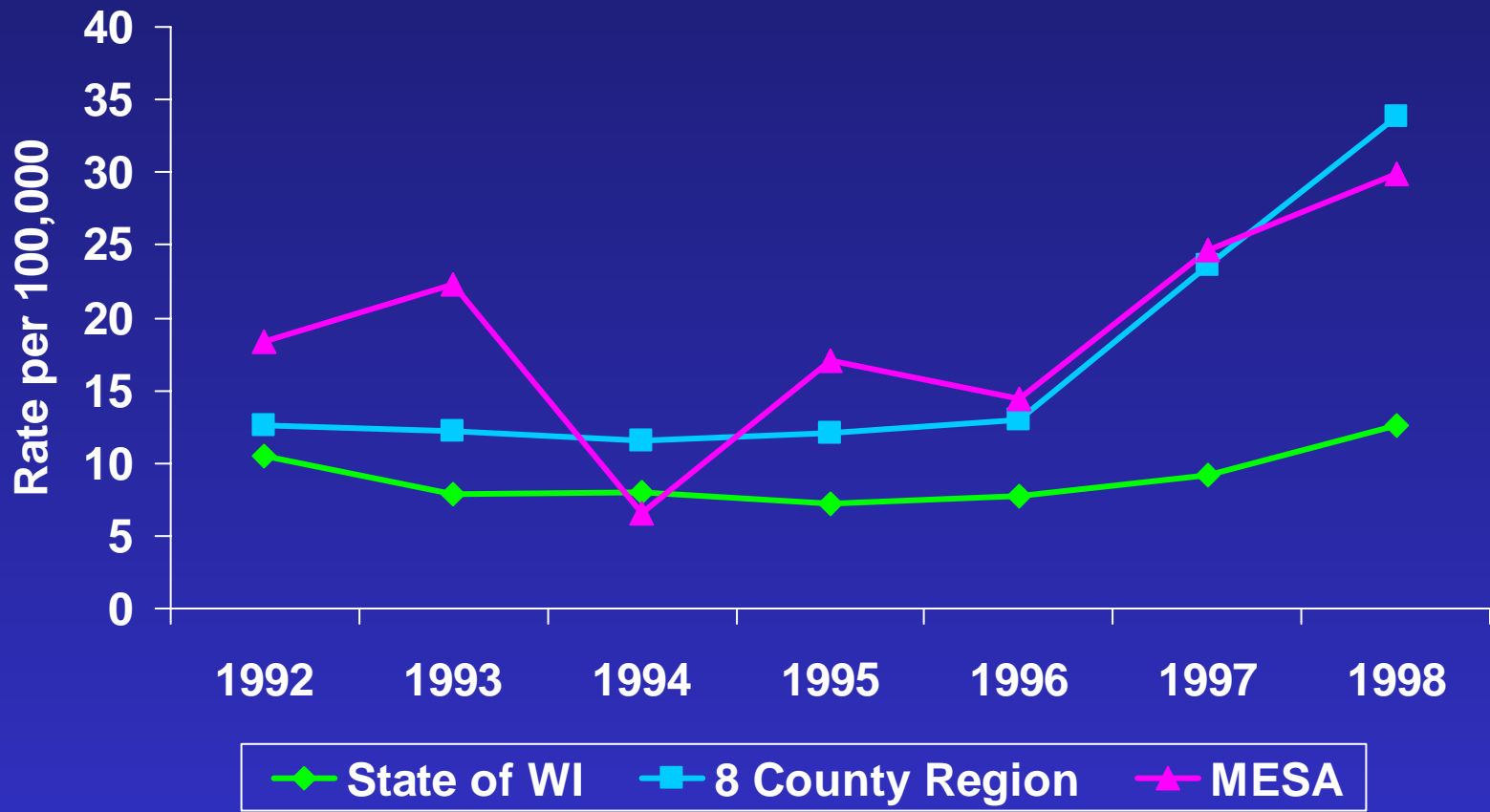
Incidence Rates

- Numerator: probable LD cases in MESA
- Denominator: U.S. Census data
- Annual rates calculated
- Rates stratified by age, gender, stage of disease at diagnosis
- Rates also calculated with DPH reported LD data for entire state and 8-county region surrounding MESA

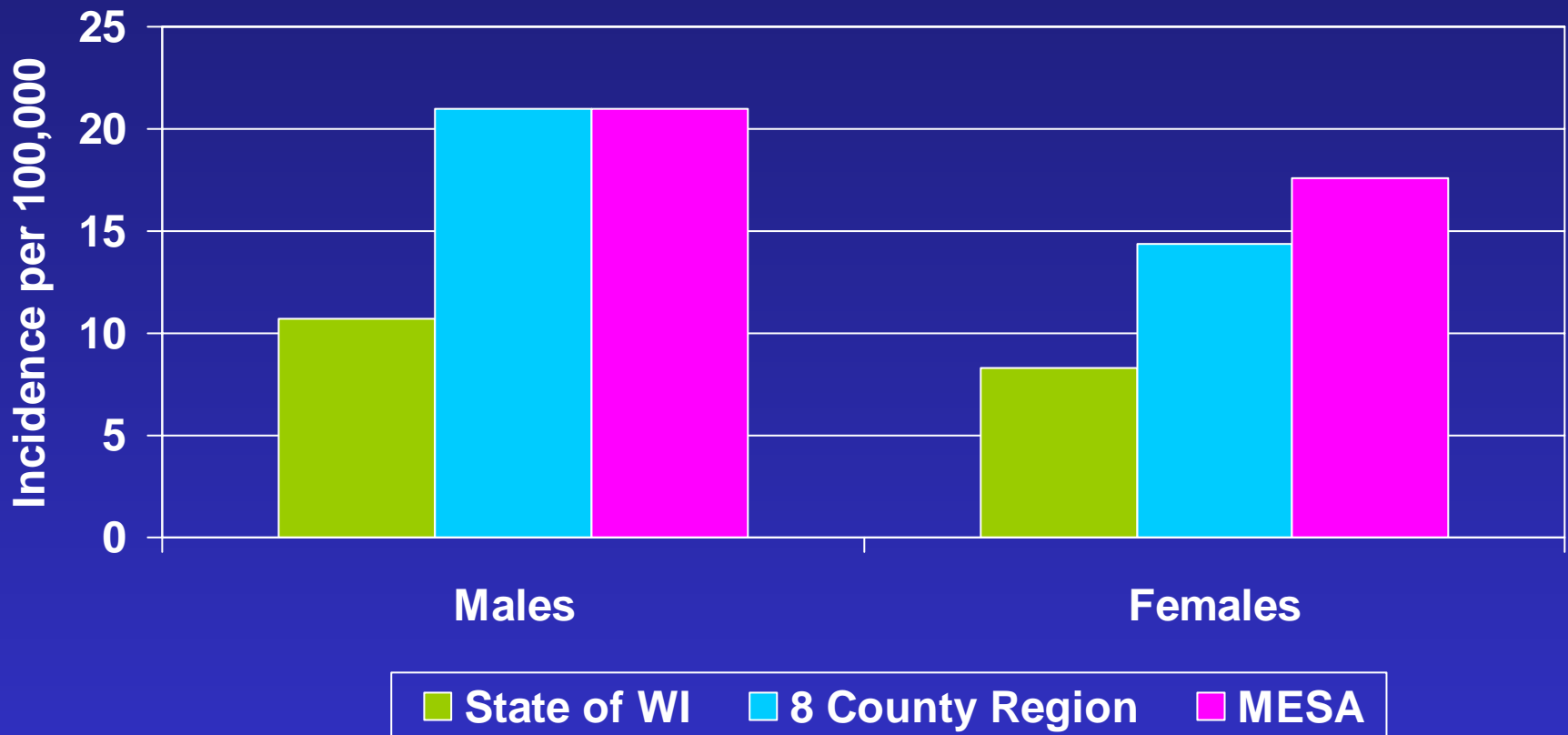
Assessment of Lyme Disease Passive Surveillance

- Patient identifiers sent to WI DPH
- Matched to reported cases based on name, date of birth, and date of diagnosis (+/-1 month)

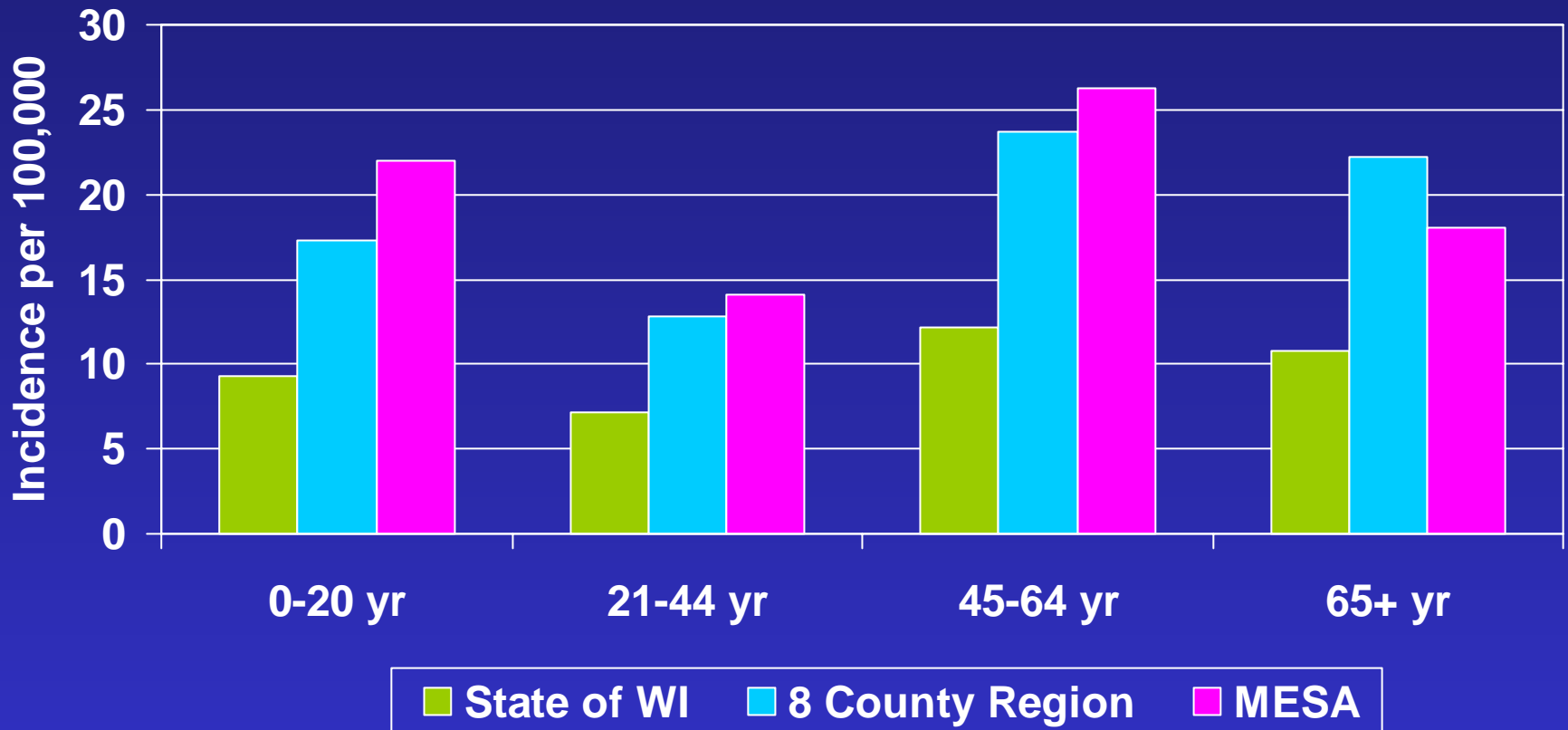
Lyme Disease Incidence



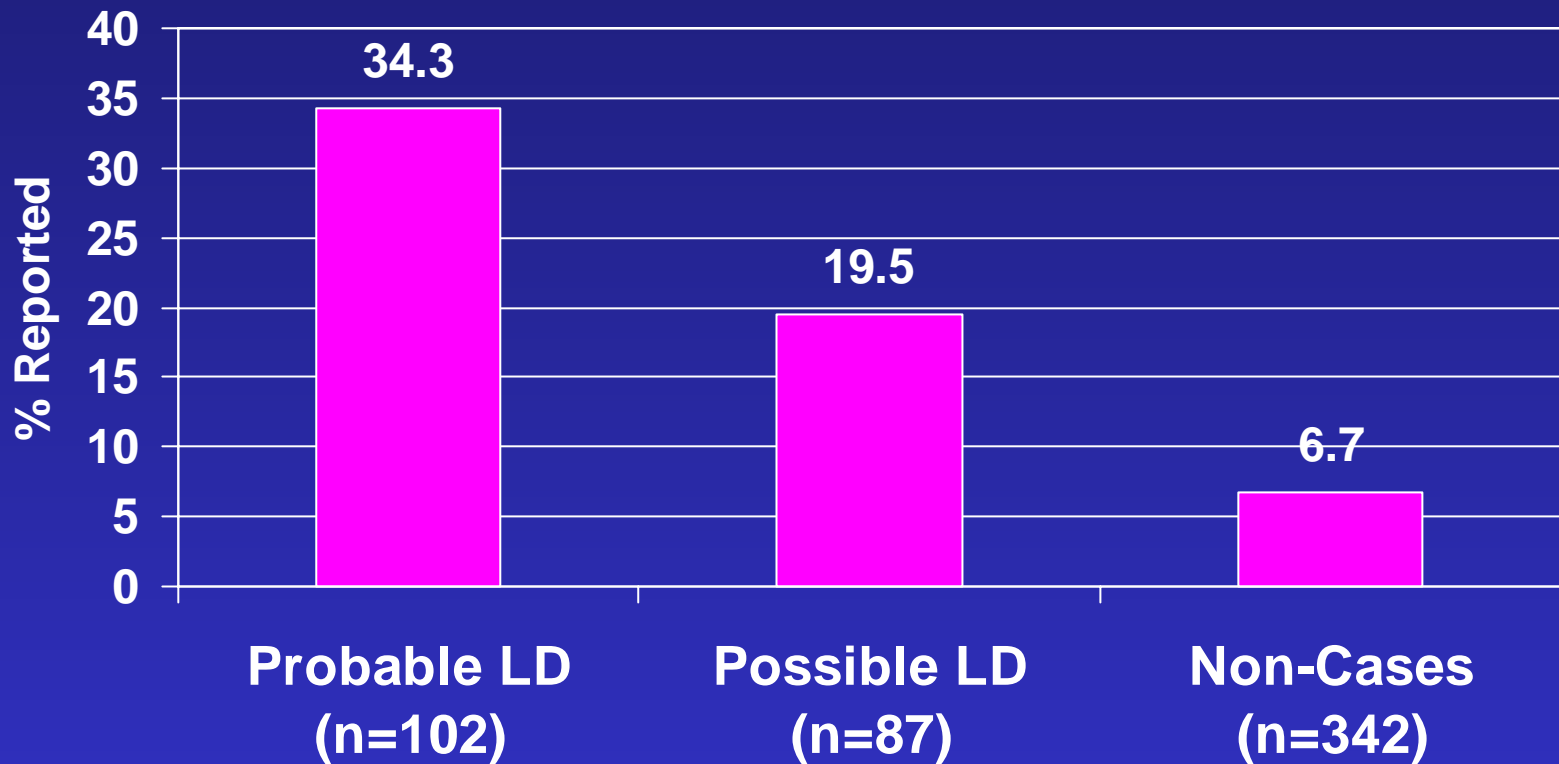
Lyme Disease Incidence



Lyme Disease Incidence



Lyme Disease Reporting



Summary of Findings

- Mean annual LD incidence 1992-1998
 - MESA: 19.1 per 100,000 per year
 - 8-county region: 17.0
 - Statewide: 9.0
- Rise in incidence 1996-1998
- Males and individuals 45-64 yr of age had highest LD rates

Limitations

- Capture of patient encounters not 100% in MESA
- 8-county region vs. MESA
 - Population ~300,000 vs. ~78,000
 - Non-Marshfield Clinic providers included in 8-County region
 - ZIP code information not available in state reports during study period

Conclusions

- Only 1/3 of cases reported to state health department, but this is higher than reported in other studies
- State LD surveillance system is monitoring trends in LD incidence across time, gender, and age reasonably well -- despite underreporting