Inaugural Annual Meeting
Planetary Health/GeoHealth

From Science to Solutions
Mitigating Lyme Disease
at the County Level

Presented by: Joshua R. Ginsberg
Principal Investigators: Richard S. Ostfeld and Felicia Keesing

Cary Institute of Ecosystem Studies • Bard College • Centers for Disease
Control & Prevention • New York State Department of Health • Dutchess
County Department of Behavioral & Community Health

www.tickproject.org
Lyme disease 2001

1 dot placed randomly within county of residence for each reported case
Lyme disease 2013

1 dot placed randomly within county of residence for each confirmed case
Lyme disease
In the 21st century

- Rapidly increasing in incidence 300K+ cases per year
- No vaccines available, not just Lyme
- Diagnosis and treatment problematic
- Estimated cost: $712M to $1.3B/year
- Effective tick management poorly developed
  - Small scale, poor replication, poor control
GOAL
Change management of tick-borne disease through development of safe, effective, and affordable methods of killing ticks at the neighborhood scale

THE TICK PROJECT
www.tickproject.org
First intervention

*Metarhizium anisopliae*
Mice and chipmunks are the main source of tick infection.

Reservoir competence (percent)

- W-f mouse
- Chipmunk
- Masked shrew
- Veery
- Grey squirrel
- G-d birds
- Skunk
- Opossum
- Raccoon
- Deer
Second intervention
TCS Bait boxes
Study design

Location & Scale
Study design
Interventions, by neighborhood

(~100 homes)

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<thead>
<tr>
<th></th>
<th>Bait boxes</th>
<th>Inactive bait boxes</th>
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<tbody>
<tr>
<td>Fungus</td>
<td>6 replicates</td>
<td>6 replicates</td>
</tr>
<tr>
<td>Inactive fungus</td>
<td>6 replicates</td>
<td><strong>6 replicates</strong></td>
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Scientific gold standard: randomized, placebo-controlled, double-blind
Study design

Measurements

- Per capita cases of tick-borne disease
- Numbers of encounters with ticks
- Tick abundance and infection prevalence
- Covariates (wildlife diversity, deer abundance, percent of properties participating)
- Non-target effects
Policy Implications

Control ticks to help people, pets

Science to local management (policy not Policy)

- Understand neighborhood scale dynamics
  - Small mammal populations
  - Tick abundance
  - Infection rates across diseases

- Policy guidelines for prevention at local scale
  - Building partnership of local institutions
    - Local government, civil society, DoH
Policy Implications

Control ticks to help people, pets

Policy

- Landscape-level fragmentation impacts
- Impact of predators top/down effects
- Impact of biodiversity, dilution effect
- Non-target impacts of Met-52
Local roots. Global reach.

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