Expanding Integrated Tick Control: Sharing Responsibility for Reducing the Risk of Tick-borne Disease

Robert Jordan
Monmouth County
Division of Mosquito Control
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Tick-borne Disease Prevention

Public Health Agencies

Public

Pest Management Industry

Pesticide Companies

Pest-control Companies

Home-based Prevention

Community-based Prevention

Parks and recreation areas

(Figure stolen from Kirby Stafford)
Discussions about the potential for tick surveillance and ITM by vector control agencies tend to be colored by their history with mosquito-borne diseases (MBD), leading to erroneous conclusions and inappropriate expectations about tick-borne diseases (TBD) intervention.
MBD surveillance and mapping is facilitated by specific, discrete habitat requirements.

Action Thresholds are outbreak-driven and enforceable by public health and/or code enforcement agencies.

Chemical control is possible with targeted pesticides in discrete locations.

Source reduction may result in permanent removal of breeding habitat and MBD risk.

MBD emergence may be unpredictable, but with sometimes lengthy periods between outbreaks.
Tick vectors are terrestrial and found in all wooded and successional habitats, with the exception of wetlands, in relatively high numbers so that disease infection prevalence (IP) and tick-borne disease incidence (TBD) are endemic and non-focal.

Although IP may be somewhat predictive of transmission risk for both MBDs and TBDs, risk is substantially different because mosquitoes can fly to (human) hosts, while people must enter tick habitat to become exposed.
Challenges to Effective Public Tick Control:
1. Where are the ticks at?

“Heck, son, the Kroeger’s parkin’ lot is b’ar habitat when thar’s a box a donuts onnit.”
– Edwin (“Big Ed”) Michaels, West Virginia DNR, 1985

“Tick Habitat” is where the ticks are.
Roughly 42% of New Jersey is covered in some type of forest ≈ 2,866 mi² of potential (likely) tick habitat that is highly-dispersed and largely nonfocal.

ROUNGLY TWO-THIRDS OF NEW JERSEY FORESTED LANDS (AND, THUS, HABITAT FOR VECTOR TICKS, RESIDES IN PRIVATE OWNERSHIP

CHALLENGES TO EFFECTIVE PUBLIC TICK CONTROL:
1. Where are the ticks at?
Public agency implementation of best practices for tick suppression/control remains debated among experts and public health professionals because any benefit to public health may conflict with:

- High public cost for implementation and monitoring
- Unknown public acceptance and consensus
- Complexity of implementation and uncertain efficacy to reduce TBD incidence

(Aenishaenslin et al. 2015).
Practically, public ITM is constrained by a lack of:

- Data needed for cost-benefit analysis to assess control measures (Eisen et al. 2012);

- Tick density and pathogen IP data needed to set action thresholds and effective surveillance to determine if or when re-treatment is necessary (Gaff et al. 2011); and

- Tick density/IP thresholds to guide decisions about what degree of suppression must be met (and for how long) to reduce human infection rates (Bellini et al. 2014).
Withdrawal of any tick control measure will result in eventual (sometimes rapid) return to pre-intervention conditions. Once an investment in tick control is made, does the budgetary hole become bottomless…. (see also Gaff et al. 2011)?
"Level property tax relief funding makes it harder to deliver essential services for more municipalities each year."

Jon Moran, NJ State League of Municipalities

Challenges to Effective Tick Control
4. How will we pay for it?

Good job, boys: Only 136 miles to go…..
Challenges to Effective Tick Control: 5. A Homeowner’s Problem

“Mosquito control is a community responsibility; tick control is an individual homeowner responsibility.”

(Piesman and Eisen. 2008)

Monmouth County Passive Surveillance: Where Tick Encounters Happen
“Community-wide intervention” needs to be operationally defined:

- How are “communities” defined?
- How would such projects be organized and by whom?
- How would such projects be funded in the long term?
- Who represents those who decide not to participate?
- How would success be determined?
- How long would the intervention continue?
the homeowner has limited access to most of the tick control methods currently available at this scale and must rely on commercial firms that are licensed to use them.
Residential Tick Control: PCO and Landscape Firms

IPM is (or ought to be) site specific and tailored to individual vector density, environmental/habitat conditions, owner perceptions, desires and concerns.

BUT, such an approach doesn’t easily fit a PCO model that allocates fixed time each month to each client, dictated by narrow profit margins within highly competitive markets.
“[IPM]…just means that they never want to completely get rid of ticks, so you keep calling them back, so they can make more money and have a steady client.”

– “Gary” from Tinton Falls, NJ on what IPM “really is”
How can we limit contractor (PCO and landscaper) reliance on synthetic acaricides and encourage adoption of other options?

• Alternative control methods must be made cost-effective within realistic expectations of efficacy.

• Contractors need to know what can be successfully marketed to their client base.

• Alternative control methods must demonstrate efficacy at price points acceptable to both homeowners and the contractor.
Effective tick control strategies are available, but surveys demonstrate that they are not widely used by at risk populations. Maybe we need to pay more attention to:

• How homeowners value the tick control they currently practice (Shepard et al. 2014).
• Homeowners’ willingness to pay for tick control (Dickinson and Paskewitz 2012, Halasa et al. 2012)
• How TBD risk affects perceived quality of life (Halasa et al. 2014).

Advice contrary to a desired behavior tends to be ignored:

Park visitors complain that constant warnings about TBD risk contribute more to spoiling an outdoor experience than the possibility of acquiring a TBD does (Marcu et al. 2013).
Questions...?
References

Bellini et al. 2014. Parasites and Vectors 7:323 (online).

Robert A. Jordan, Ph.D.
Tick-borne Diseases Program
Monmouth County Mosquito Control Division
1901 Wayside Road, Tinton Falls, NJ 07724
Robert.Jordan@co.monmouth.nj.us
Ph: (732) 542 – 3630 ext. 4213
Fx: (732) 542 – 3267