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Strategic Paper: Outline

Marieta Braks

Hein Sprong, Wilfrid van Pelt, Agnetha Hofhuis

Joke van der Giessen

Laboratory for Zoonoses and Environmental Microbiology



Strategic consultation group WP4

- To link vector and public health expertise in Europe and to gain insight of the current situation in the MS on vector-borne disease surveillance.
- WP leader: Joke van der Giessen,
National Institute for Public Health and the Environment, RIVM, Netherlands

Deliverable 3

- Strategic paper describing the findings of the network.
 - The findings resulting from the science watch and ad hoc technical support.
 - The findings from the annual and steering committee meetings.
 - Other significant scientific findings in the area of vector surveillance and vector-borne diseases as related to human public health in the EU.

Strategic paper: Scope and time frame

(as discussed with Herve Zeller and Wim van Bortel, ECDC April 2010)

Scope:

The first strategic paper of VBORNET focuses on the relevance of surveillance for VBD, including one example on tick-borne diseases (e.g. Lyme disease).

For the years 2010-2011 ECDC has prioritized their actions on TBD.

ECDC has launched two calls for tender, one on Lyme disease and one on TBE and Rickettsiosis and Q fever, which have been just awarded.

Time frame:

- 1-3 June 2010: Outline to be discussed during the annual meeting in Antwerp.
- September 2010: Draft strategic paper 1 finalized
- November 2010: Final strategic paper 1 will be discussed during ECDC meeting

Strategic paper: Objective and outline

Objective:

The paper aims to explicate the relevance of the different surveillance elements for VBDs important for Public Health in Europe: vector surveillance, pathogen detection in vector, reservoir and humans. Emphasis will be placed on Lyme disease in Europe.

Outline:

1. Introduction
2. Surveillance of VBDs
3. Parameter needs for vector borne disease surveillance in Europe.
4. Parameter needs for vector surveillance relevant for public health issues
5. Linkage of information from vector surveillance and information from VBD

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Points for discussion

1. Introduction

VBD's pose challenge to veterinary and public health authorities

- complex interactions

- different disciplines,

 - including human and animal health, medical and veterinary entomology, epidemiology ecology, virology, bacteriology and parasitology.

- Here, we focus on the role of vector surveillance, the surveillance of pathogens in vectors and the linkage with VBD surveillance for public health .

2. Surveillance of VBDs

In general the following two distinct aims for the implementation of a surveillance systems are recognized:

- To serve as a tool in Early Warning system
- To monitor endemic diseases

The distinct aims demand a different approach.

Could certain surveillance elements serve both?

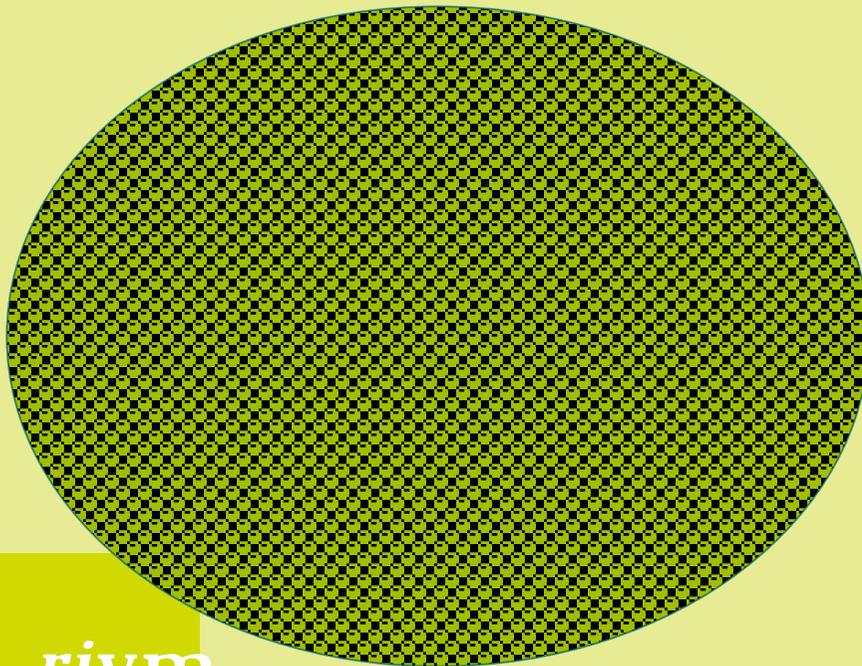
Example **endemic** disease: Lyme



2. Surveillance of VBDs?

Monitoring data:

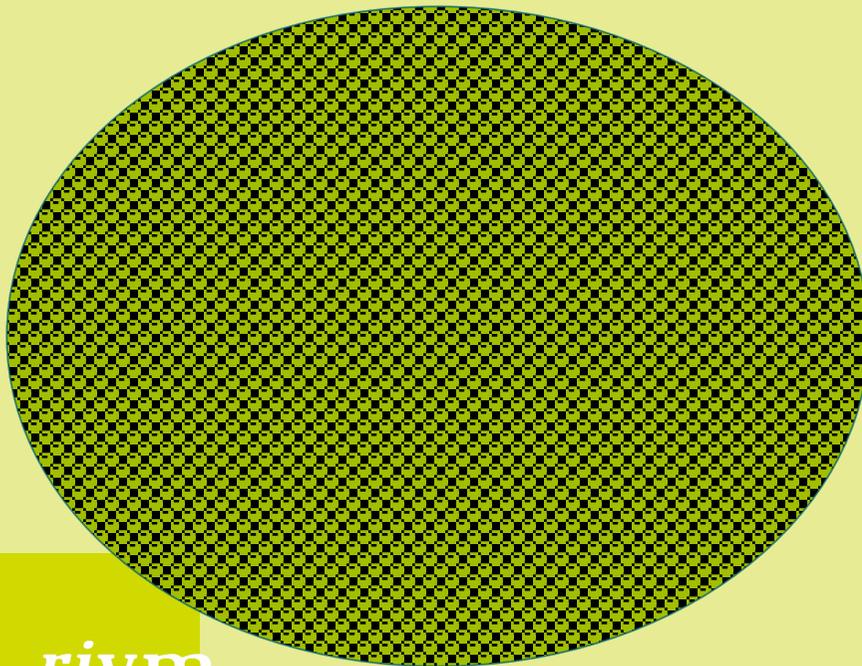
Measures in time and space



2. Surveillance of VBDs?

Monitoring data:

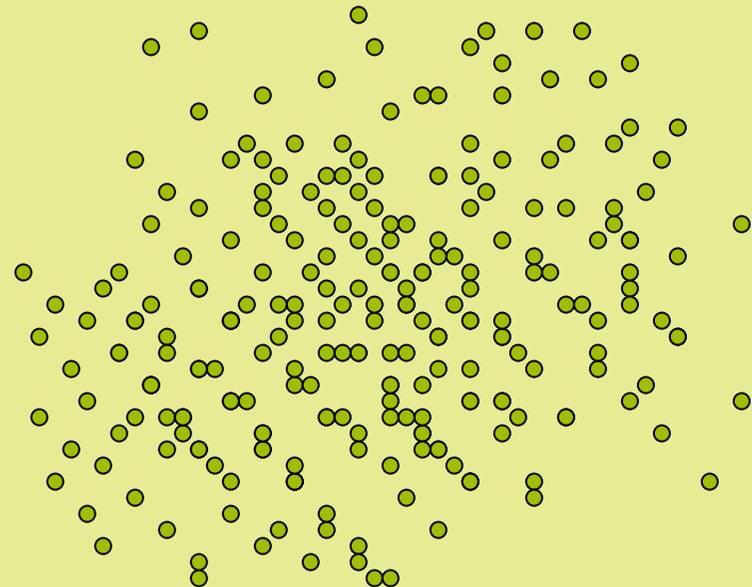
Measures in time and space



Surveillance data:

Measures in time and space

*with aim to identify predictive variables,
asses risk and
effect of intervention?*



3. Parameter needs for VBD surveillance relevant for public health issues

Estimation of incidence and prevalence in humans is an essential element of VBD surveillance of course

How to determine incidence and prevalence.

Focus Lyme disease: GP study in the NL a good example?

Harmonization of case definition and detection methods necessary?

Are estimations of disease burden of VBD's in Europe useful, if yes how to approach this. How to proceed for Lyme disease

4. Parameter needs for vector surveillance relevant for public health issues

Parameters estimates utilizing field and modeling data

- Vector diversity
- Spatial and temporal distribution of vectors
- Pathogen detection in vectors
- *More?*

Subsequently, determining the role of vectors in the transmission of a disease in a specific area relies on many ecological and human factors.

5. Linkage of information from vector surveillance and information from VBD

Elaboration on the relevance of the different elements of VBD surveillance.

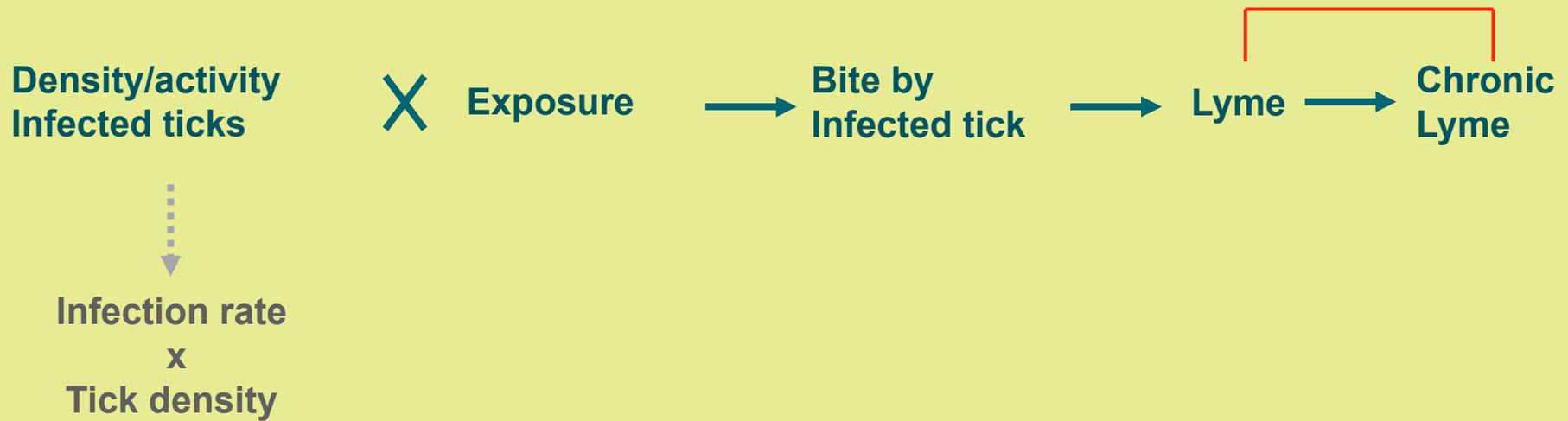
Are harmonized methods across Europe to collect information desirable and achievable?

What are the costs and benefits to achieve this?

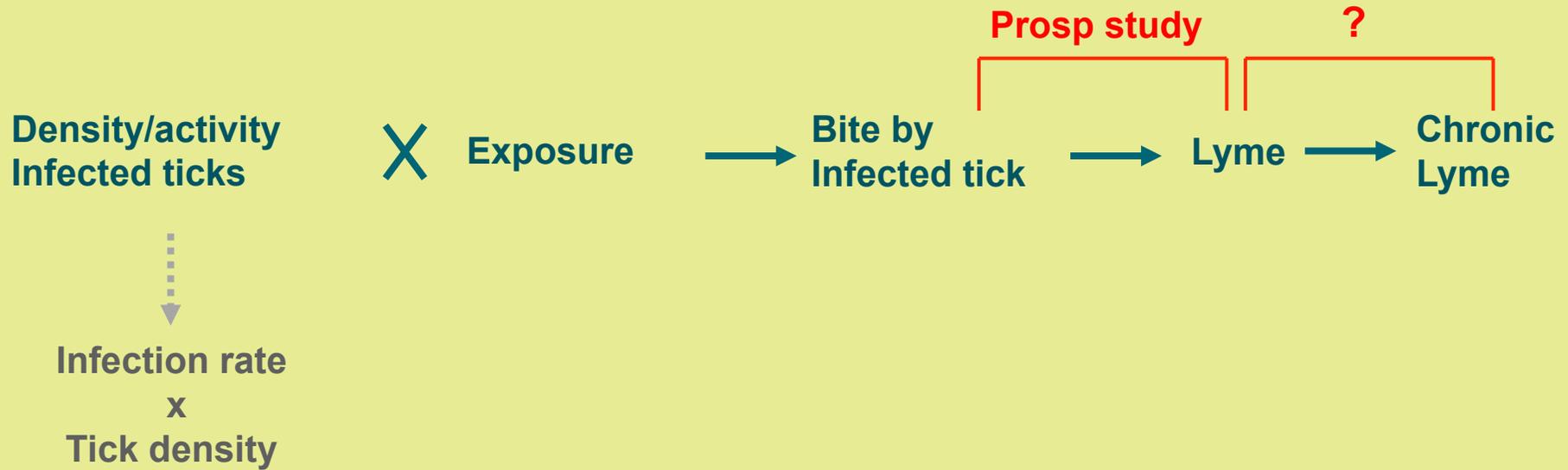
Lyme



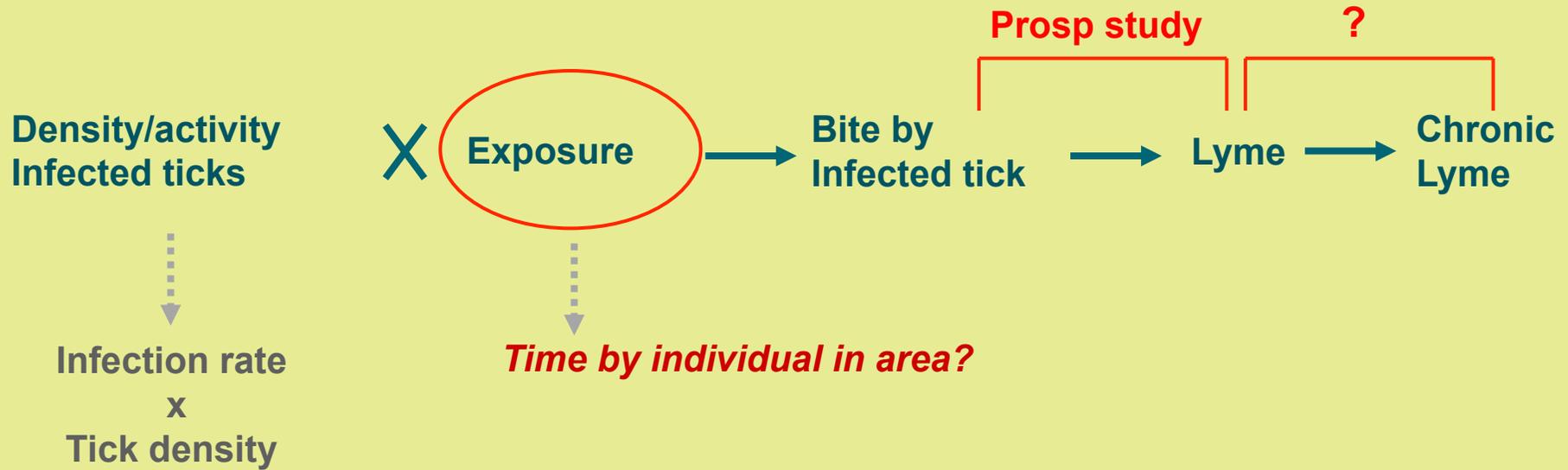
Lyme



Lyme



Lyme



Studies on Lyme disease in the Netherlands

→ retrospective studies among general practitioners (GP's)

- ✓ Past decade: 3x↑ GP-consultations for tick bites and erythema migrans
- ✓ Clear geographical distribution in the Netherlands
- ✓ Ecological risk factors for tick bites and erythema migrans

→ retrospective analysis of hospital admissions for Lyme disease

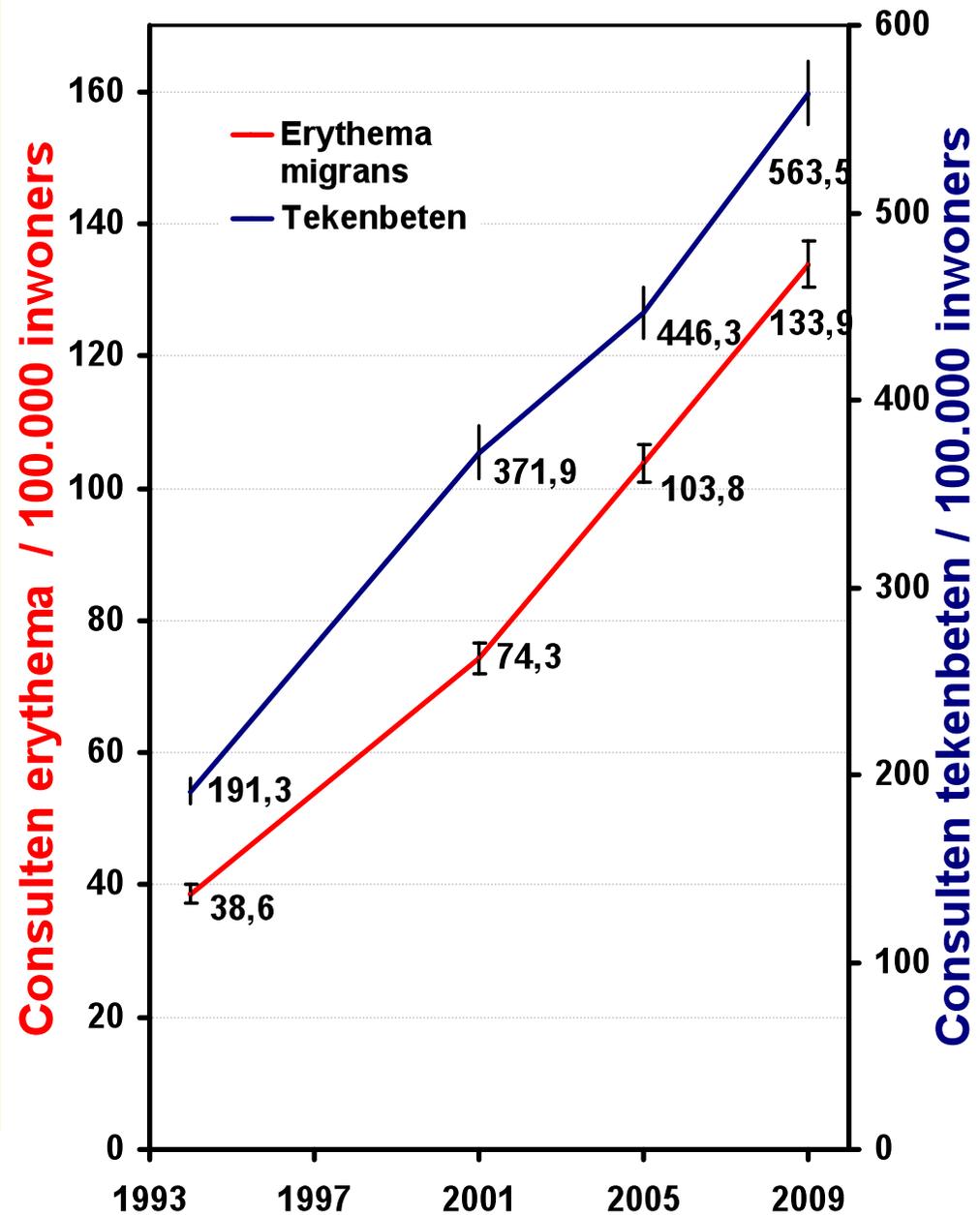
- ✓ Past 15 yrs: ↑ hospital admissions for Lyme disease
- ✓ Peak in late summer
- ✓ ↑ ↑ in 2003: renewed CBO-guidelines for Lyme-borreliosis?

→ collecting ticks in 4 different biotopes

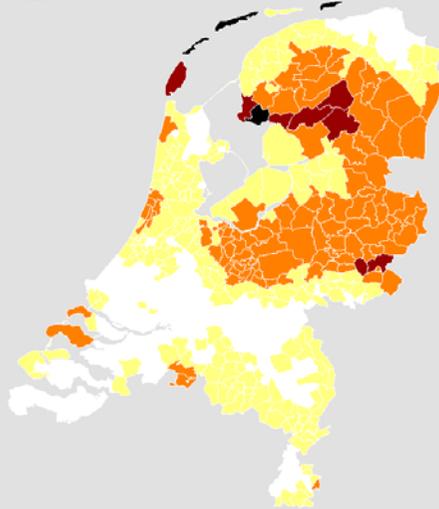
- ✓ Seasonal: summer peak for tick density & infection rate with *Borrelia*
- ✓ Annual: possibly a slow decrease of infection rate with *Borrelia*
- ✓ Ehrlichia (2-12%), Babesia (1-2%), Rickettsia (60-70%)

Retrospective GP-study → results

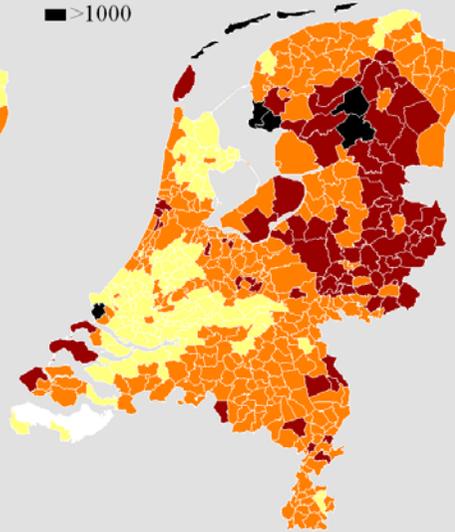
- Population coverage:
88% in 1994
↓
65% in 2009
- Tick bite consultations:
30.000 in 1994
↓
93.000 in 2009
- EM consultations:
6.000 in 1994
↓
22.000 in 2005



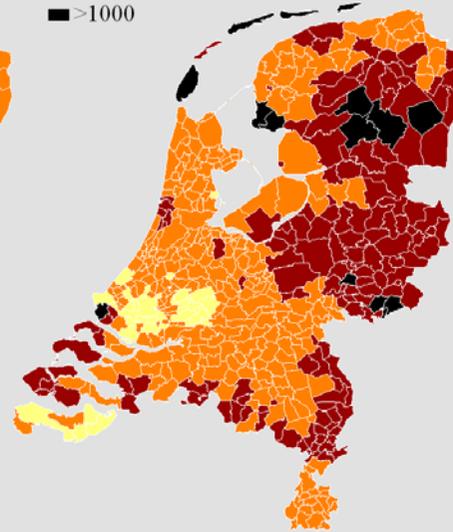
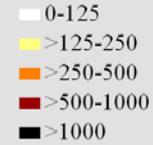
1994: Tickbites / 100.000



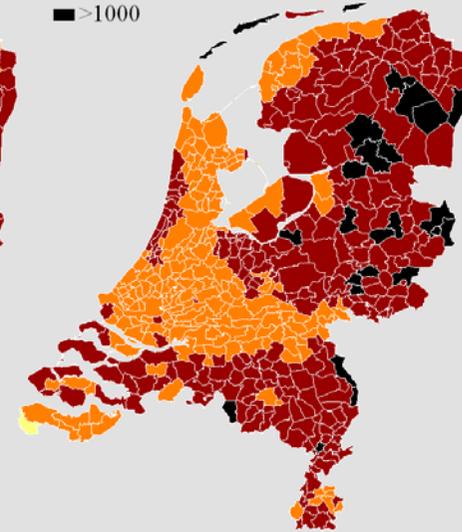
2001: Tickbites / 100.000



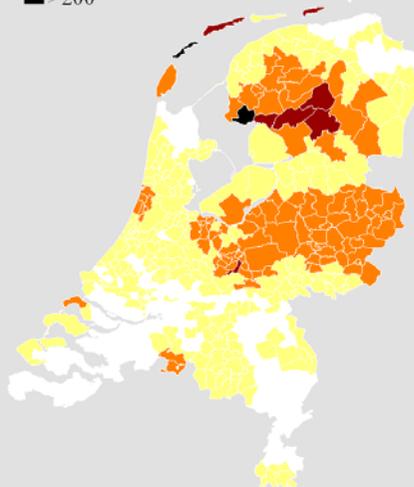
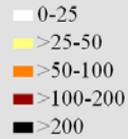
2005: Tickbites / 100.000



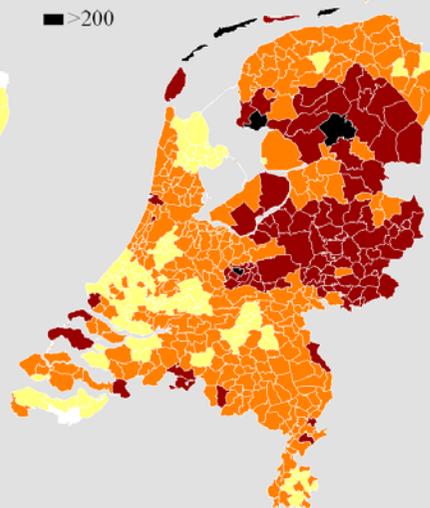
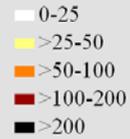
2009: Tickbites / 100.000



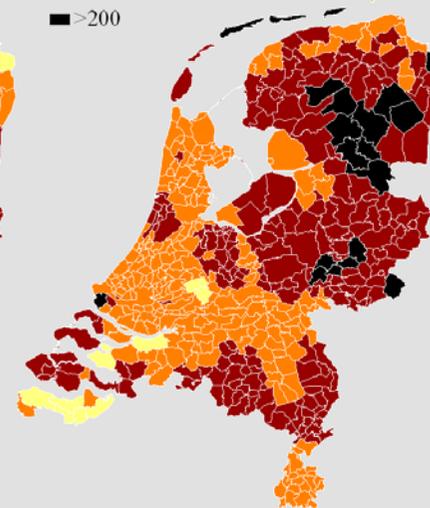
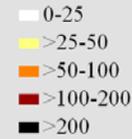
1994: Erythema / 100.000



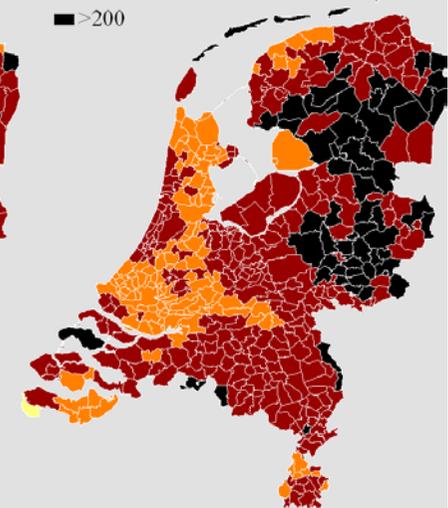
2001: Erythema / 100.000



2005: Erythema / 100.000



2009: Erythema / 100.000



National Tick Bites study → GP-based prospective study

- Risk of infection after a tick bite?
- Infection rate of ticks: *Borrelia*, *Ehrlichia*, *Babesia*, *Rickettsia*.
- Serology and clinical aspects after a tick bite or erythema migrans.
- Case-control study: risk factors for tick bites and erythema migrans.

Patient visits GP with available ticks or erythema migrans

baseline

Case: questionnaire, blood for serology, tick for PCR

Control: questionnaire

Case: 2nd questionnaire, 2nd blood for serology

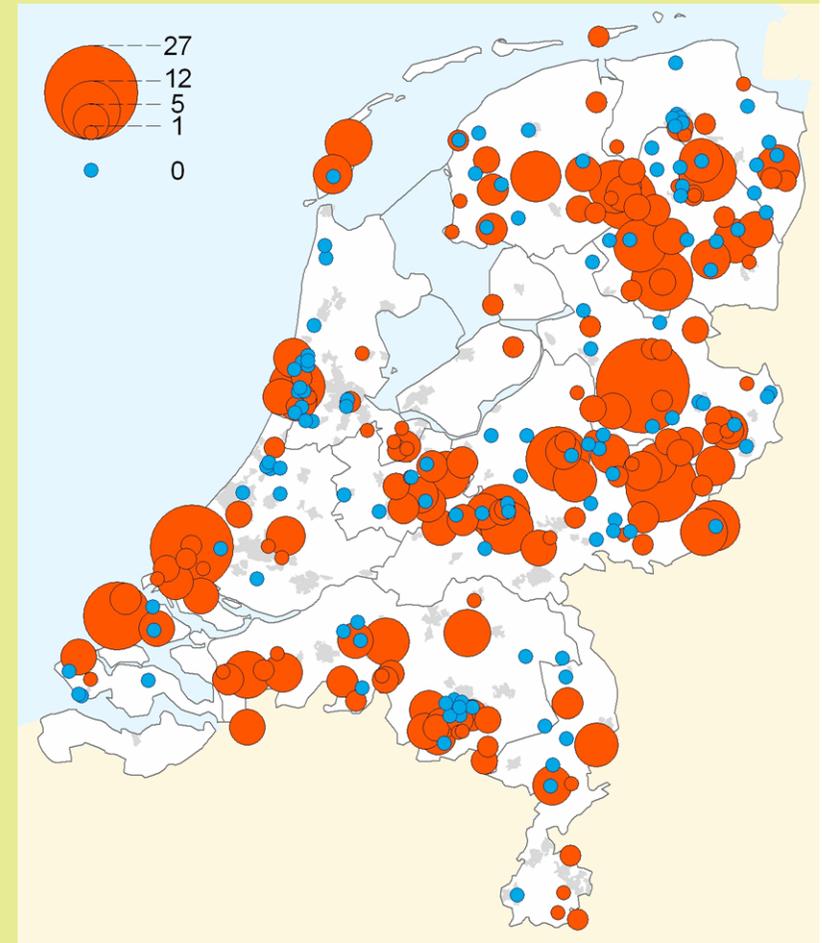
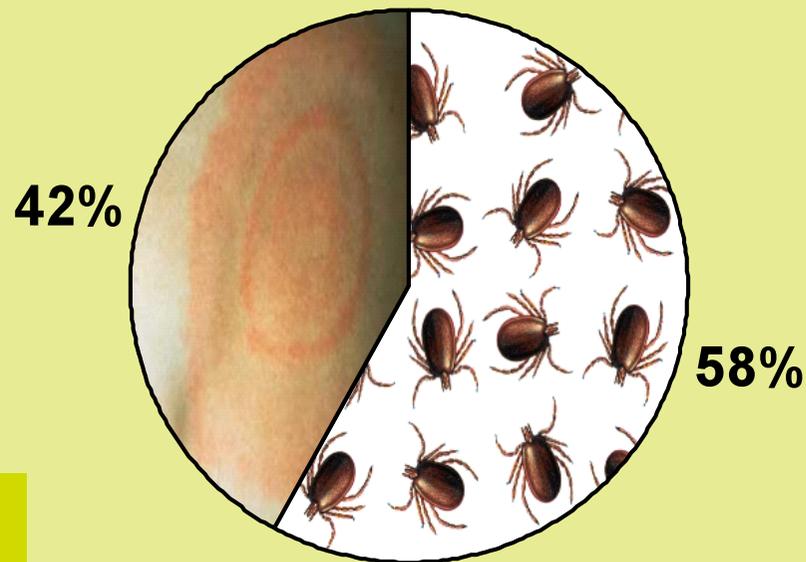
Control: questionnaire

10 to 12 weeks after baseline

National Tick Bites study → GP-based prospective study

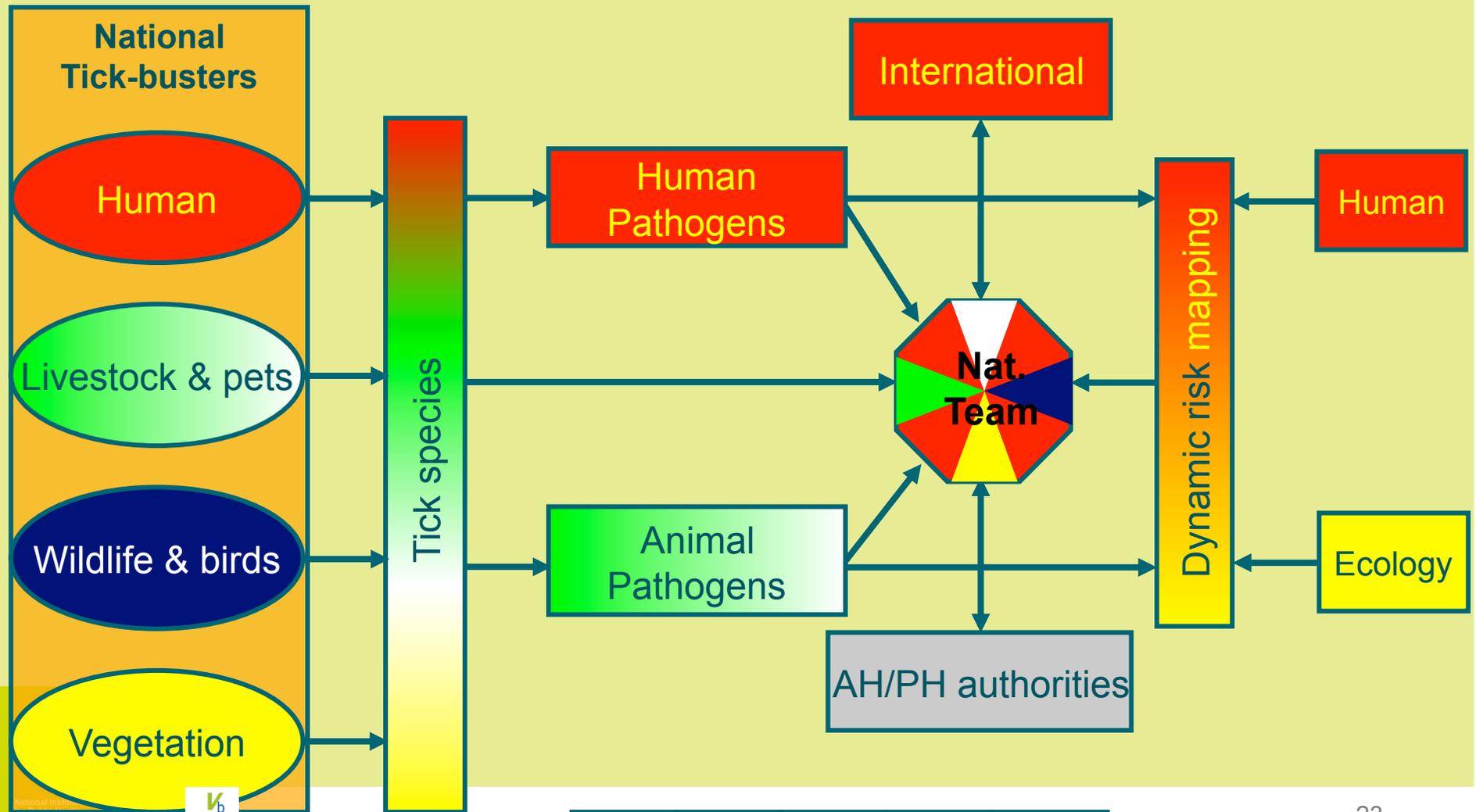
2007 & 2008:

700 cases & 500 controls enrolled from
300 selected general practitioners in
hotspot areas for tick bites and
erythema migrans.



Concept surveillance system TBV in Netherlands:

Country wide, Early warning, Quantitative, Direct link with risk-mapping



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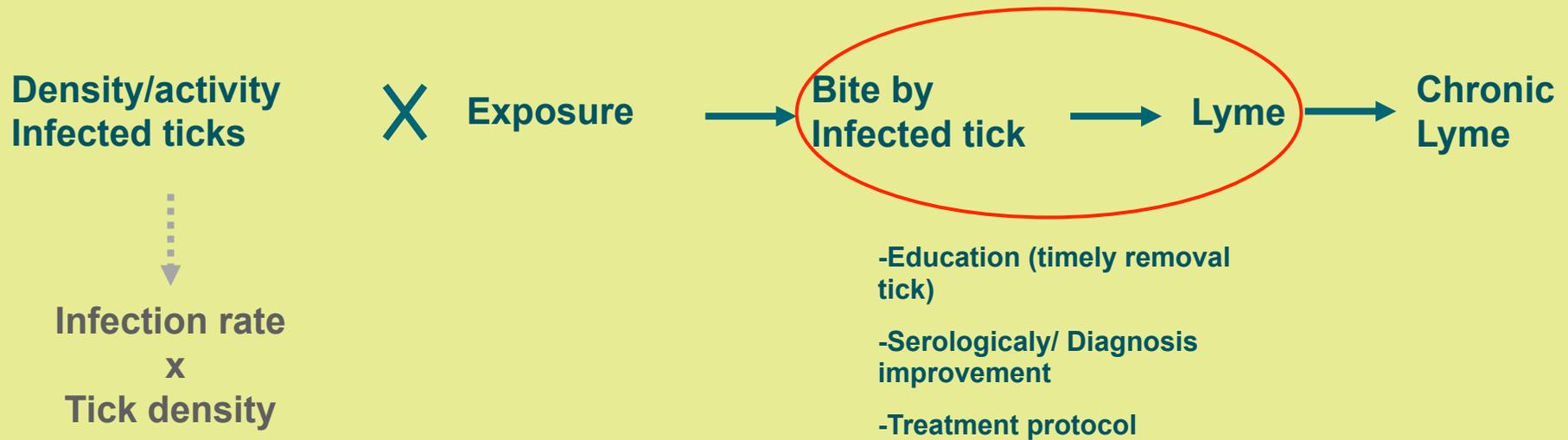
UU RIVM CVI CMV DWHC

1st annual meeting 1-3 June 2010, Antwerp

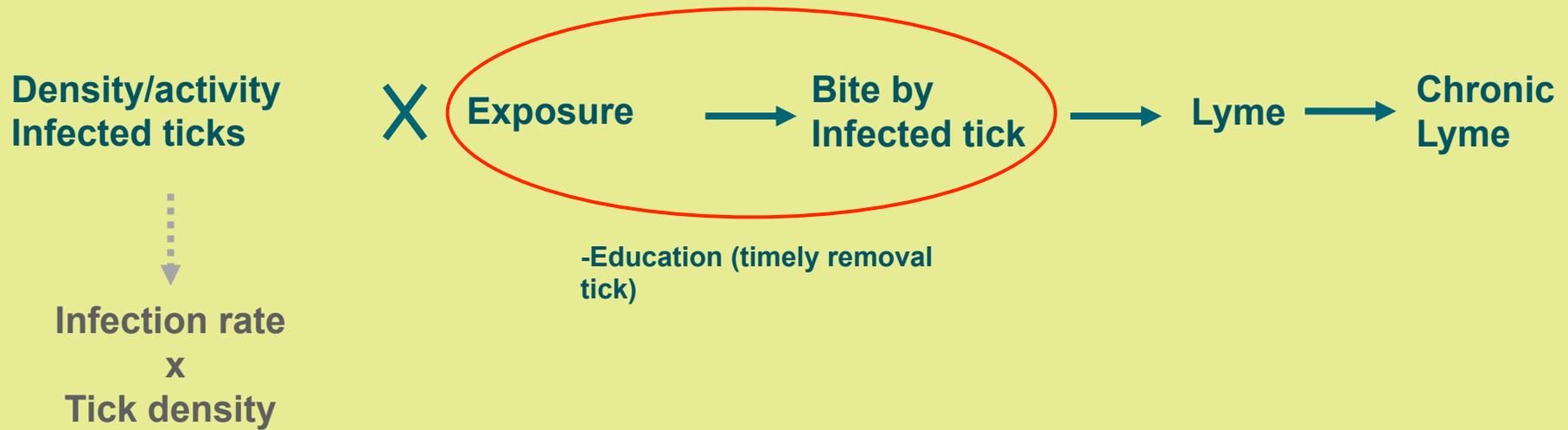
Lyme: Intervention



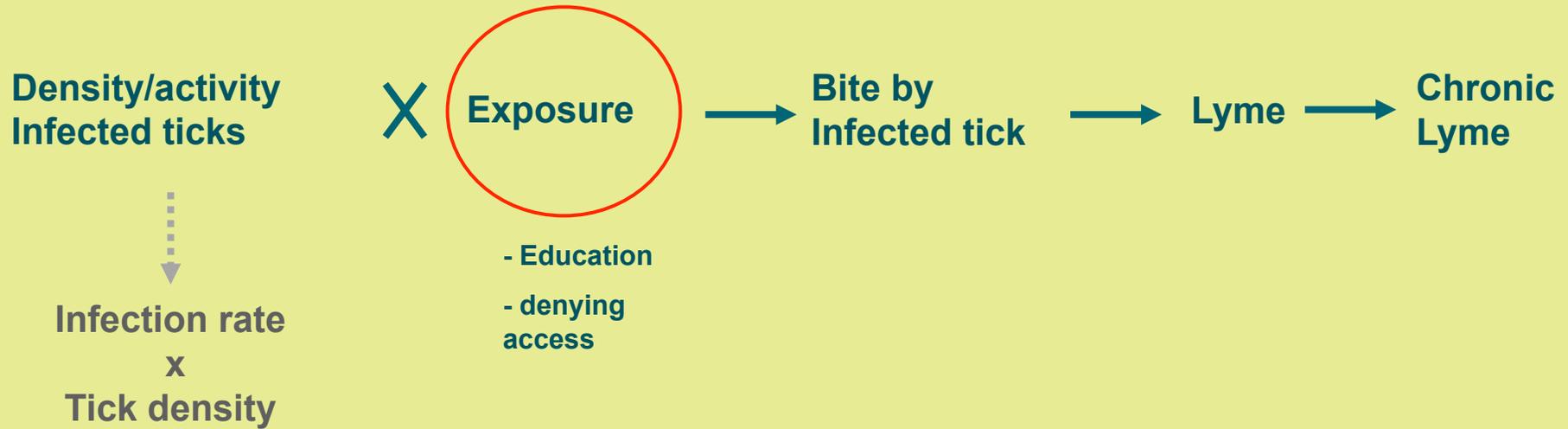
Lyme: Intervention



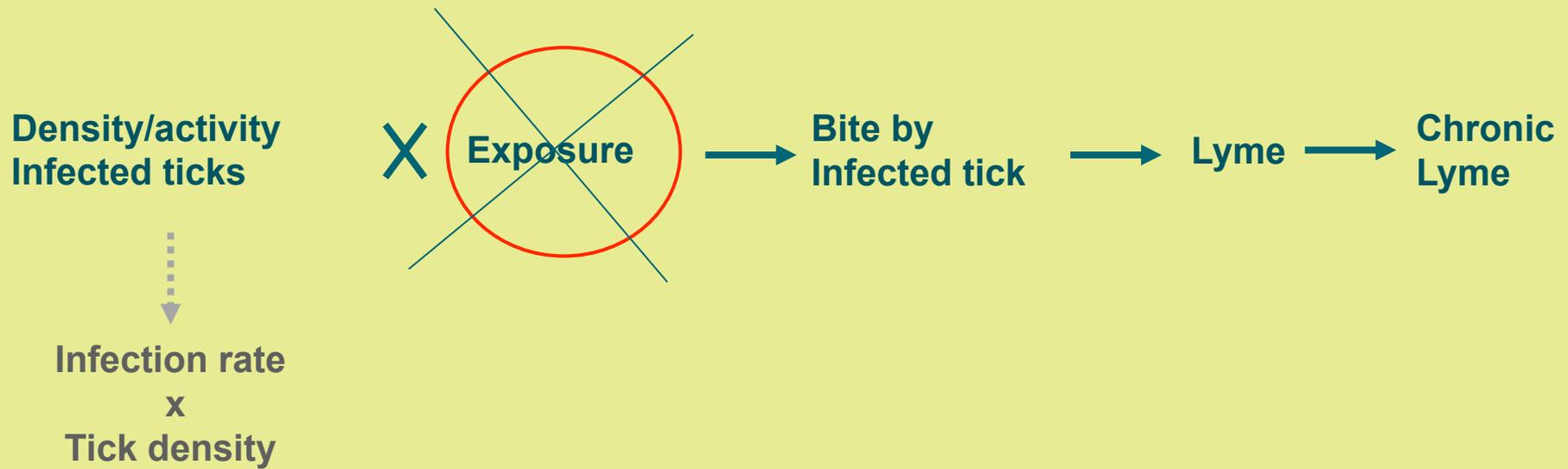
Lyme: Intervention



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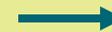
Density/activity
Infected ticks



Exposure



Bite by
Infected tick



Lyme



Chronic
Lyme

- Vector control
- Game management
- Reservoir vaccines

The end

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