

Epidemiology, risk assessment and prevalence of tick-borne pathogens in Northern Europe

-

The Tick-Borne Diseases STING-study



Peter Wilhelmsson, Ph.D.

Division of Medical Microbiology, Department of Clinical and Experimental Medicine, Linköping University, Linköping, Sweden

Division of Medical Services, Department of Clinical Microbiology, Ryhov County Hospital, Jönköping, Sweden



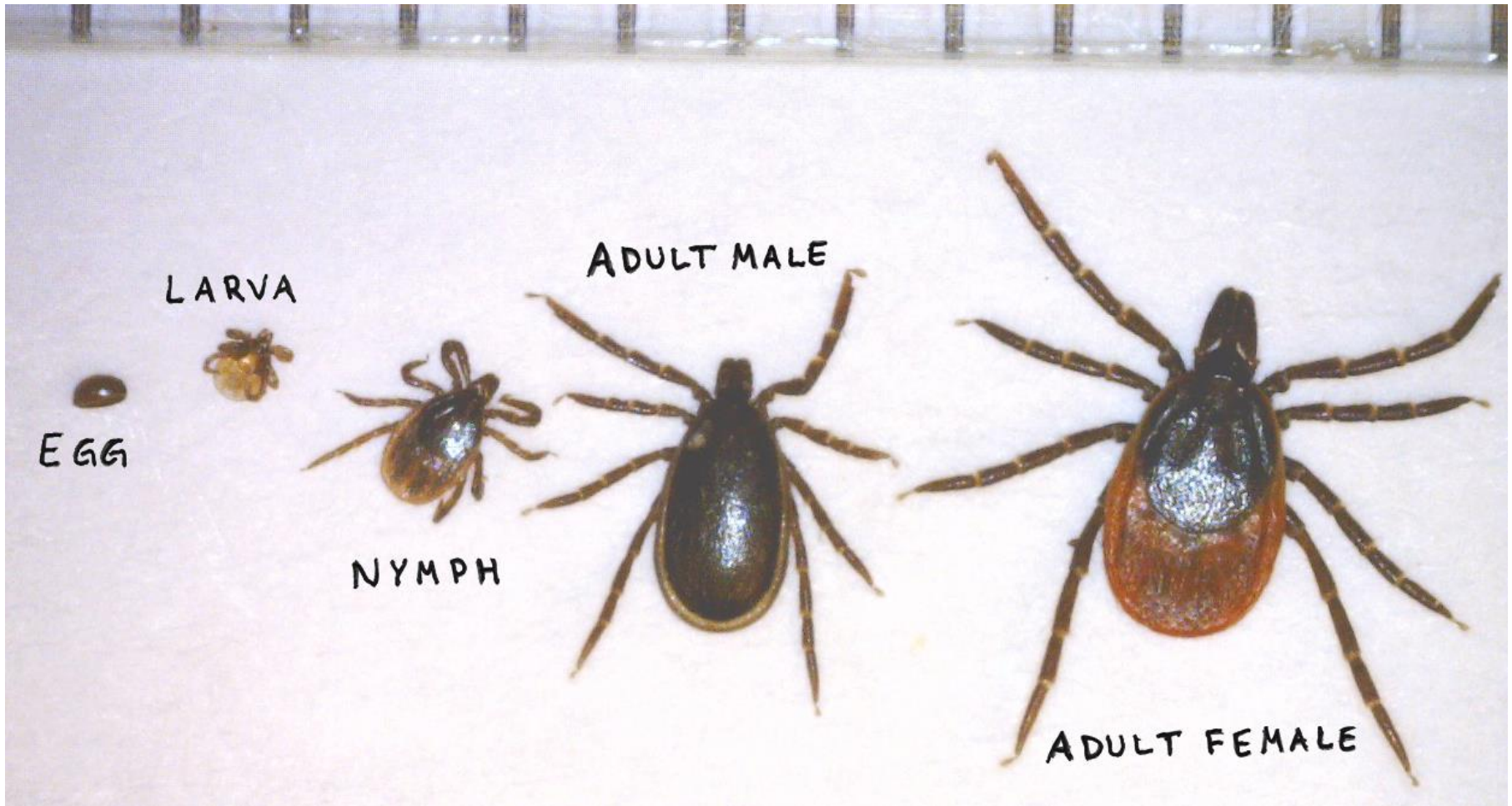
Linköping University
expanding reality



Region
Jönköpings län

Life stages of the *Ixodes ricinus* tick

1 mm



Ixodes ricinus expands its distribution



Emergence of tick-borne diseases

Lyme borreliosis

Borrelia burgdorferi sensu lato

Tick-borne encephalitis

Tick-borne encephalitis virus

Ehrlichiosis

Anaplasma phagocytophilum

Rickettsiosis

Rickettsia spp.

Neoehrlichiosis

Candidatus Neoehrlichia mikurensis

Babesiosis

Babesia spp.

Bartonellosis

Bartonella spp.

Tularemia

Francisella tularensis

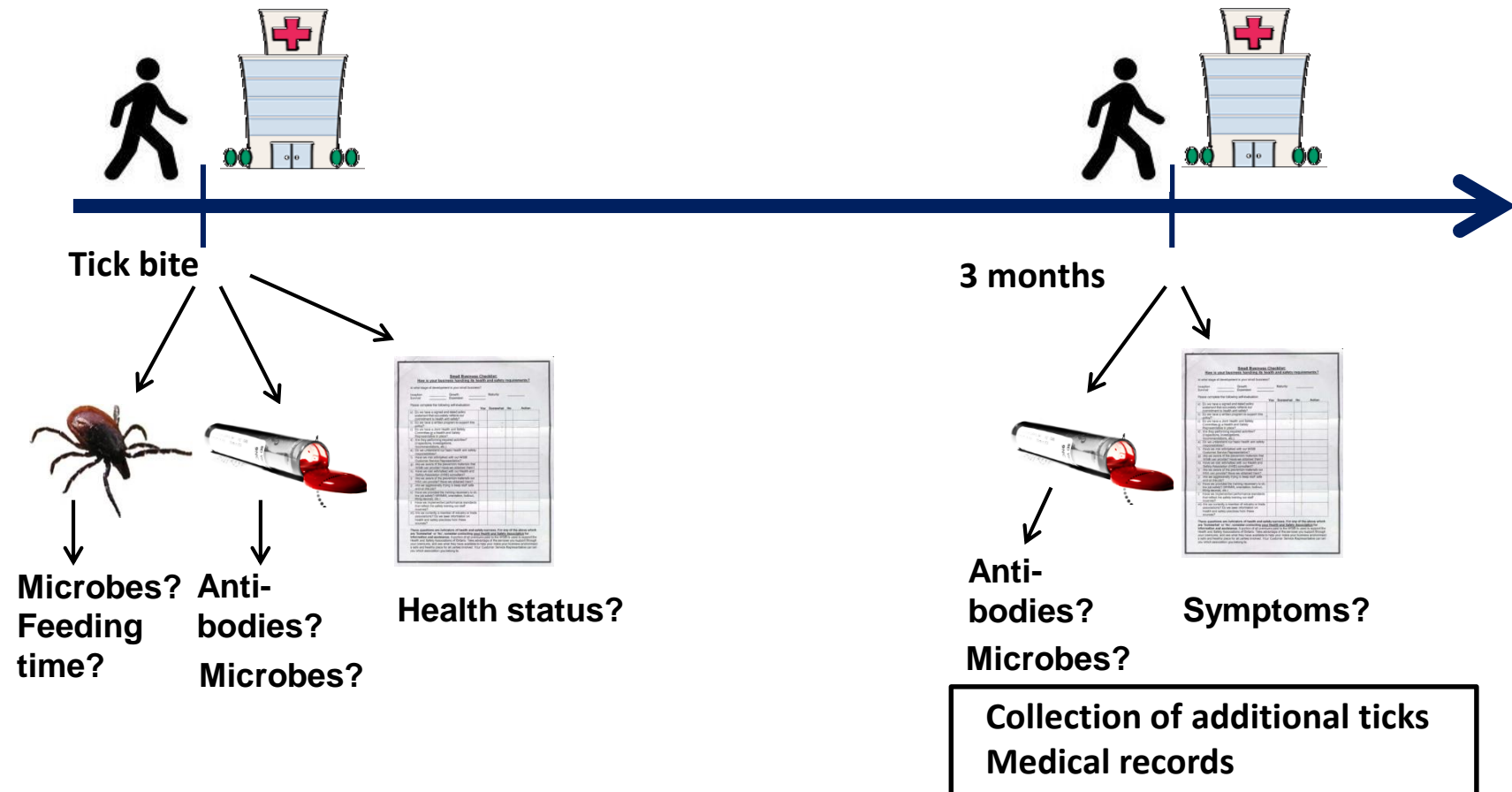
Toxoplasmosis

Toxoplasma gondii

Why investigate the incidence of tick-borne infections in humans?

- Increasing tick density and spread
- A trend towards higher number of tick-borne infections
- Fear of ticks and tick-borne infections
- Poor knowledge about the risk of pathogen transmission after a tick bite

The TBD STING-study design



Results

The TBD STING-study

2007-2015

>60 primary healthcare centres

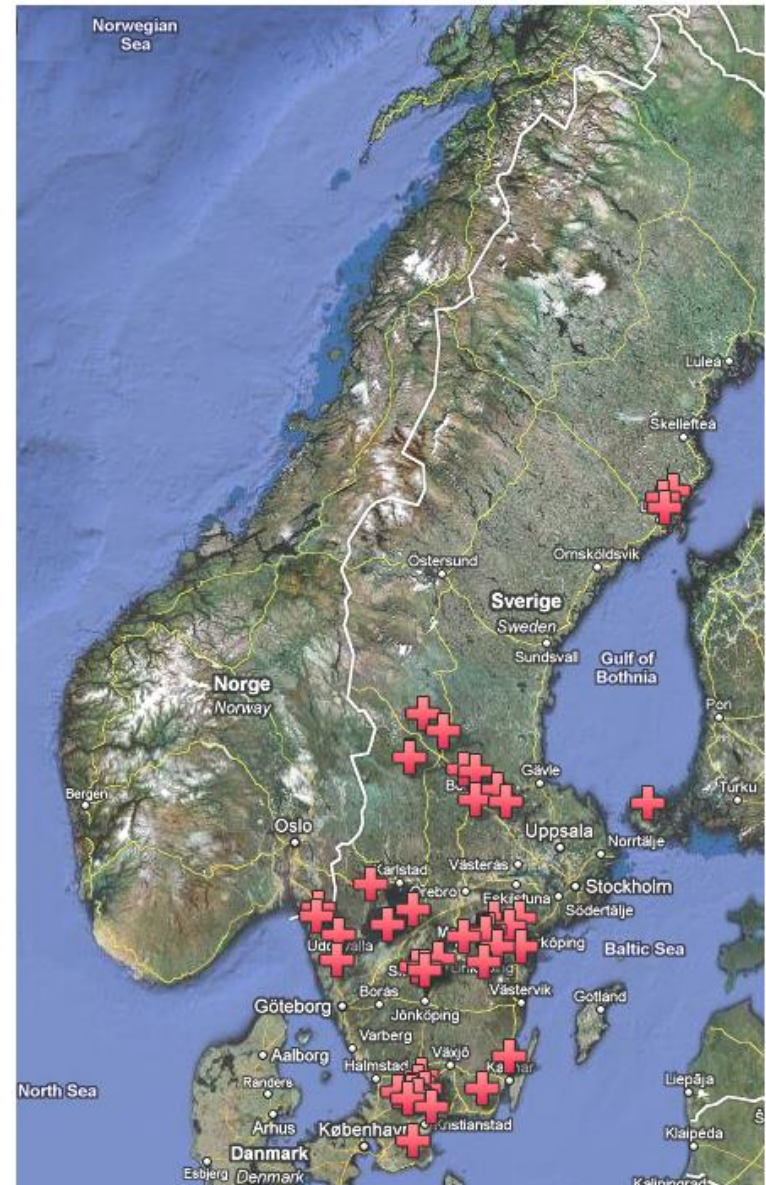
~10 000 ticks

~5 500 tick bitten individuals

65% women

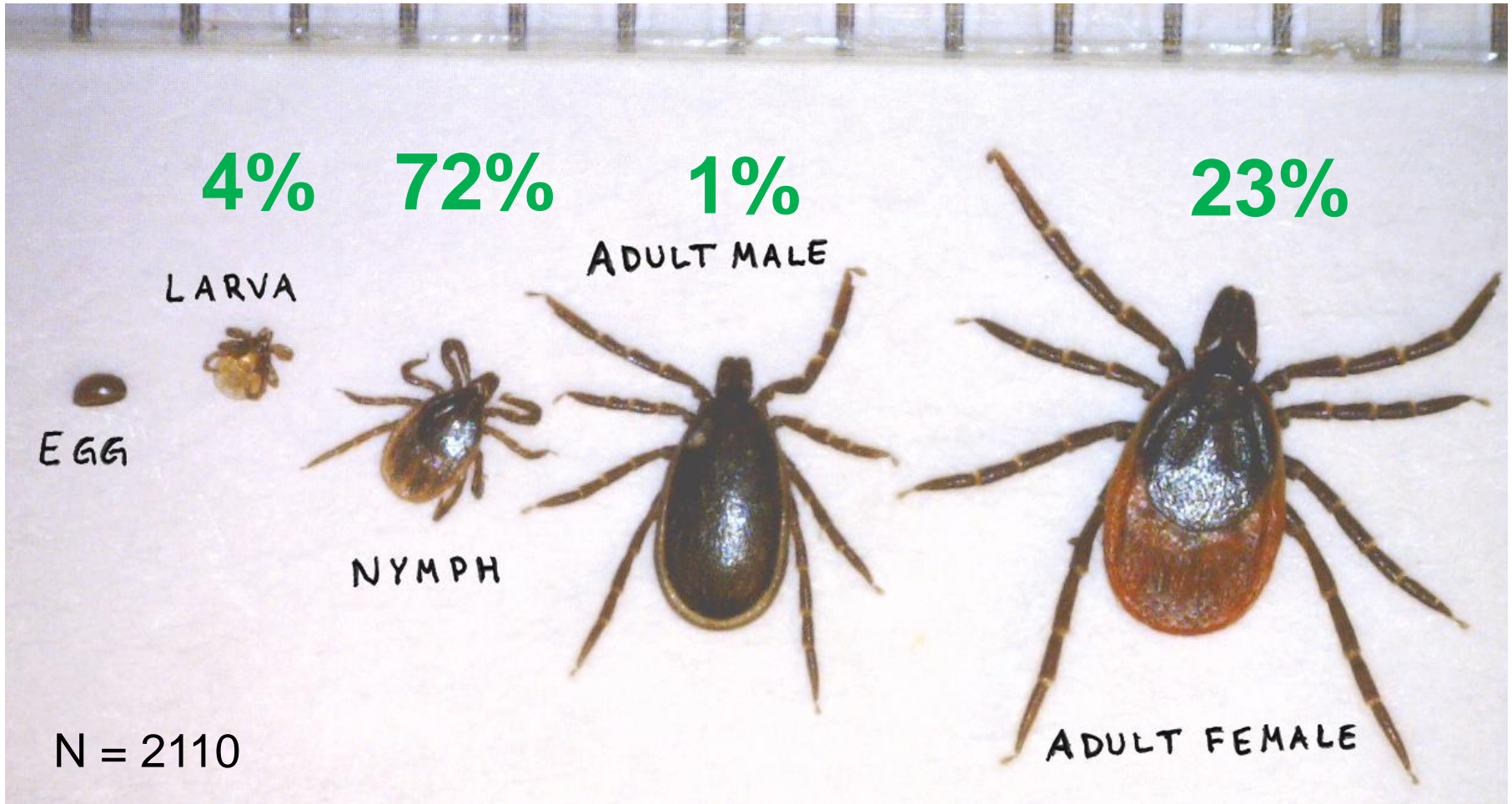
median age 63 years

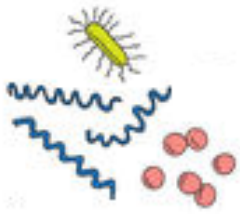
(range 19-92)



Collected ticks

1 mm
↔





Pathogen	Prevalence	Infections	Diagnosis
<i>Borrelia</i> spp.	26% (554/2154)	5% (78/1546)	2.1% (33/1546)
<i>Rickettsia</i> spp.	8.3% (39/472)	20% (44/218)	None
<i>Babesia</i> spp.	3.1% (65/2098)	0% (0/159)	None
<i>A. phagocytophilum</i>	1.2% (31/2553)	1.1% (1/90)	None
TBE-virus	0.23% (5/2167)	0.1% (2/1886)	None
<i>Francisella</i> spp.	0% (0/2098)	N/A	N/A
<i>Bartonella</i> spp.	0% (0/967)	N/A	N/A
<i>Toxoplasma gondii</i>	0% (0/961)	N/A	N/A

**The risk of contracting infection
after a tick bite is**

LOW

The TBD STING-study

Linköping University

Per-Eric Lindgren
Pia Forsberg
Christina Ekerfelt
Johanna Sjöwall
Linda Fryland
Peter Wilhelmsson
Liselott Lindvall
Lisa Gunnarsson
Mari-Anne Åkeson
Karin Söderman
Pontus Lindblom
Matilda Lövmär
Samuel Cronhjort

The Scandinavian network

Anna J Henningsson
Dag Nyman (Åland)
Marika Nordberg (Åland)
Sven Bergström
Barbro Hedin Skogman
Johan Berglund
Katharina Ornstein
Anders Lindblom
Kenneth Nilsson
Ivar Tjernberg
Peter Nolskog
Mats Haglund
Clas Ahlm
Knut Eirik Eliassen (Norway)
Harald Reiso (Norway)

and other collaborating partners

Financial support

The Swedish Research Council
EU Interreg, ScandTick Innovation
Linköping University
County Council of Östergötland
The Medical Research Council of
Southeast Sweden
Wilhelm and Else Stockmann Foundation
Foundation for Åland Medical Research of
the Åland Culture Foundation
Region Jönköping County



2,4296mm

1,2549mm