

# (Human) surveillance of tick-borne diseases in Belgium

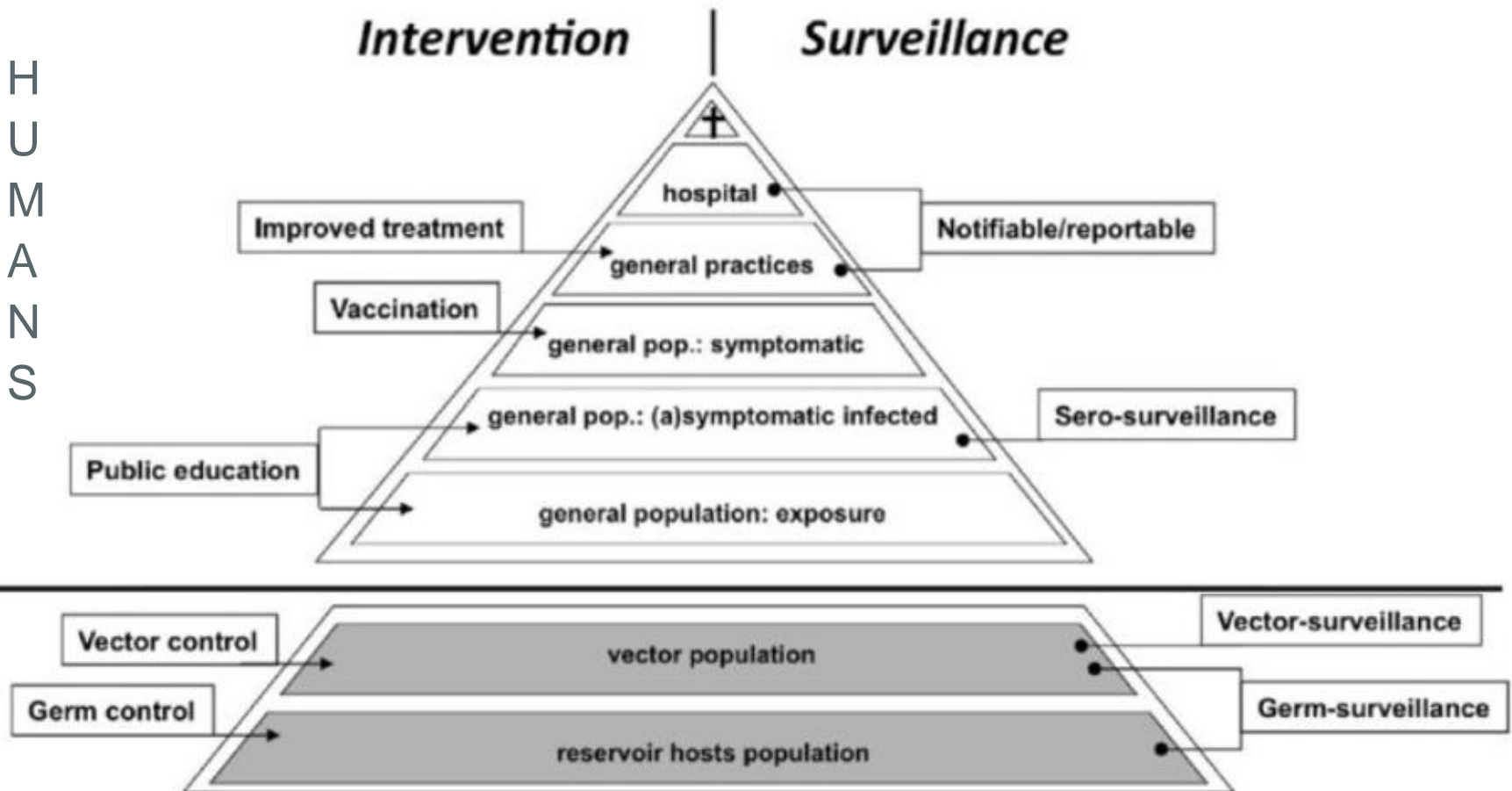
**Tinne Lernout**

**Epidemiology of infectious diseases**

ASCID symposium, 14 November 2017

# Surveillance pyramid for VBD

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# TICKS

# Number of people consulting a GP for a tick bite

Annual incidence of consultation rate (and 95% CI) for tick bite per 10 000 persons, sentinel network of GPs

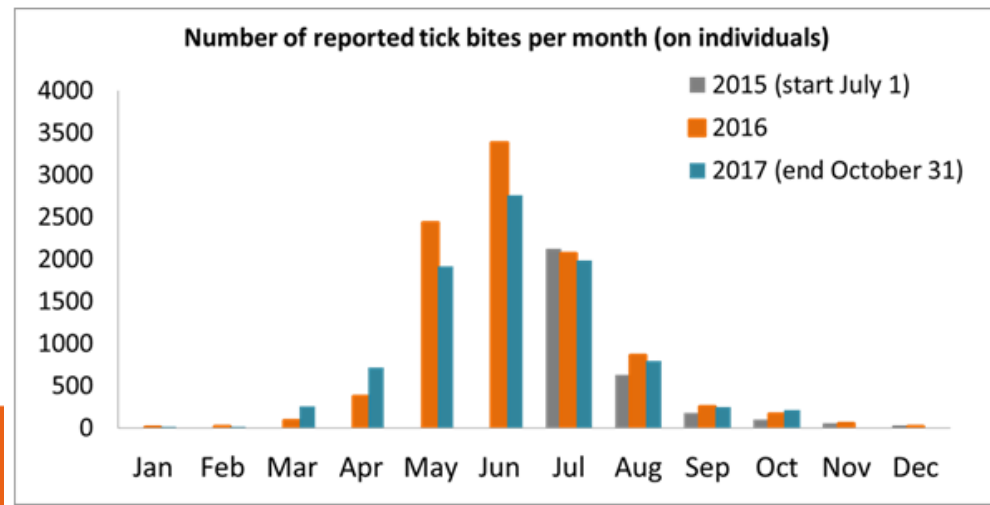
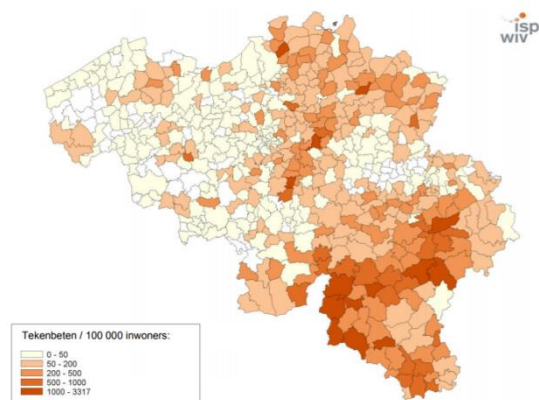
Time period	2003-2004	2008-2009	2015-2016
Consultation for tick bite	18.6 (17.2-20.0)	18.6 (17.3-20.1)	17.6 (16.1-19.2)

→ Estimated 18 000 to 21 000 consultations for tick bite / year

# TekenNet/TiquesNet

- Launch website June 2015 and app in May 2016

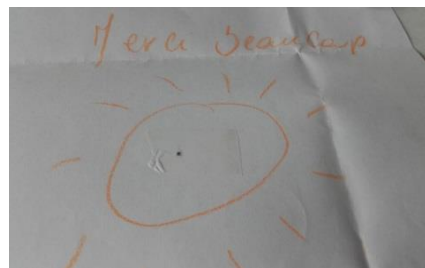
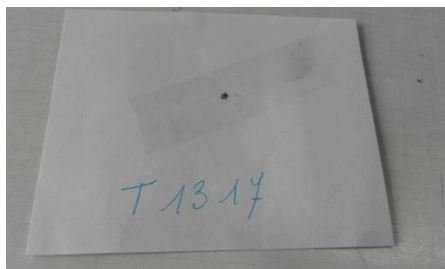
Figuur 1: Geografische spreiding van aantal opgelopen tekenbeten per 100 000 inwoners per gemeente in België, januari - december 2016



[tekennet.wiv-isp.be](http://tekennet.wiv-isp.be)

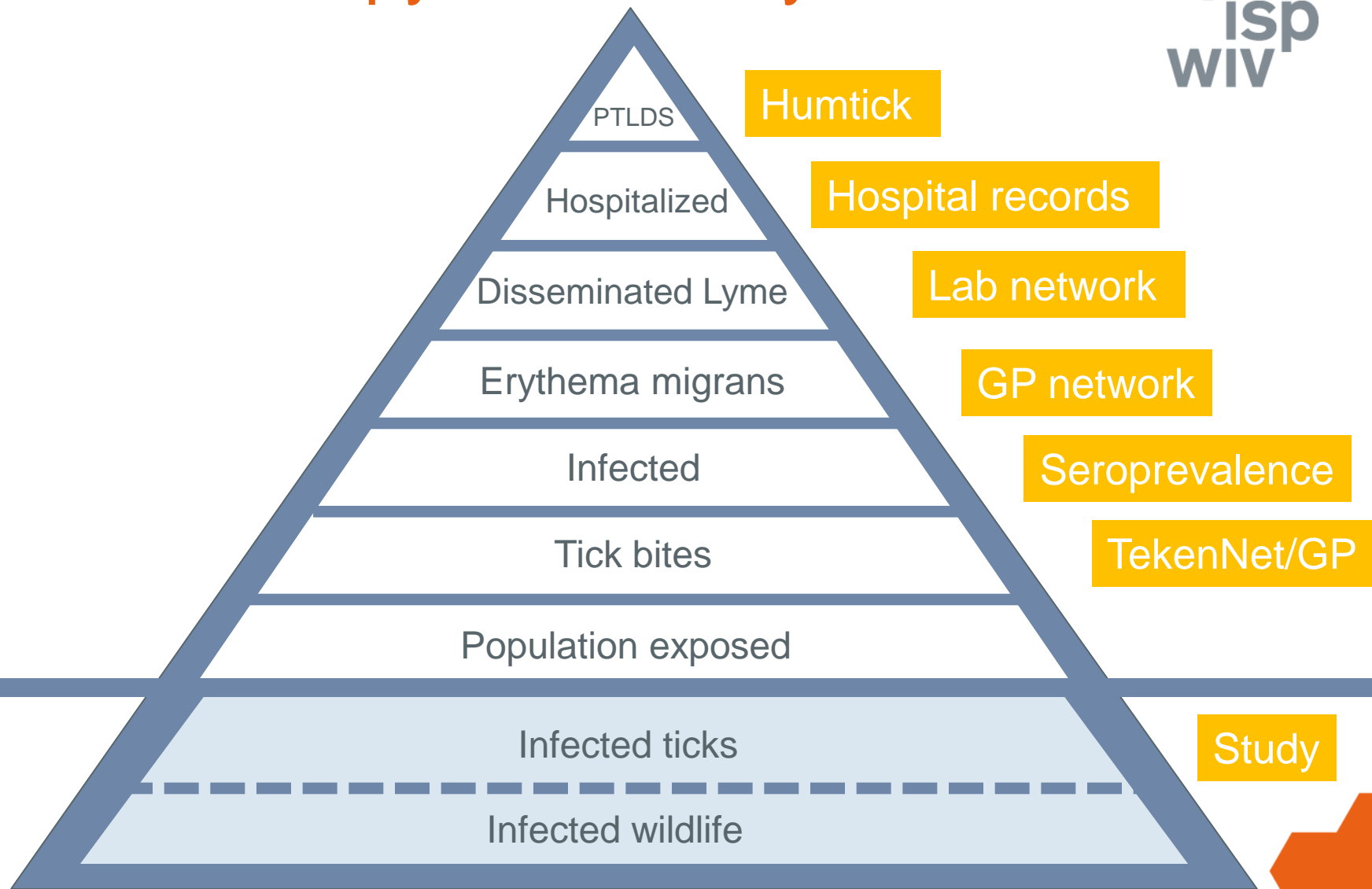
# Prevalence pathogens in ticks

- Collection of ticks on humans from April – October 2017, through TekenNet
- Multiplex PCR (RIVM) for different pathogens (*B. burgdorferi* s.l., *Anaplasma* spp., *Rickettsia* spp., *C. Neoehrlichia mikurensis*, *B. miyamotoi* and *Babesia* spp.)
- > 3000 ticks collected, 1000-1500 will be tested



# LYME BORRELIOSIS

# Surveillance pyramid for Lyme





# Ticks

- Localized studies report prevalence of infection in (questing) ticks/nymphs between 2.8 and 37 %
- National study ongoing

## References:

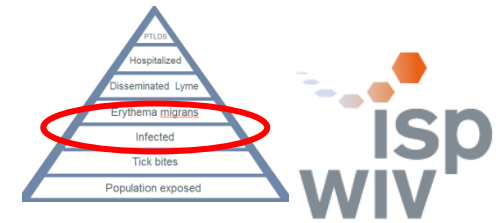
Heylen et al. Environ Microbiol. 2013 Feb;15(2):663-73

Jansen L. ITG. Stagerapport 2016 – Deblauwe et al. Poster presented at AZG.

Kesteman et al. Acta Clin Belg. 2010 Sep-Oct;65(5):319-22

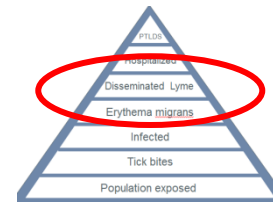
Ruyts et al. Parasitology. 2016 Sep;143(10):1310-9

# Seroprevalence study 2016

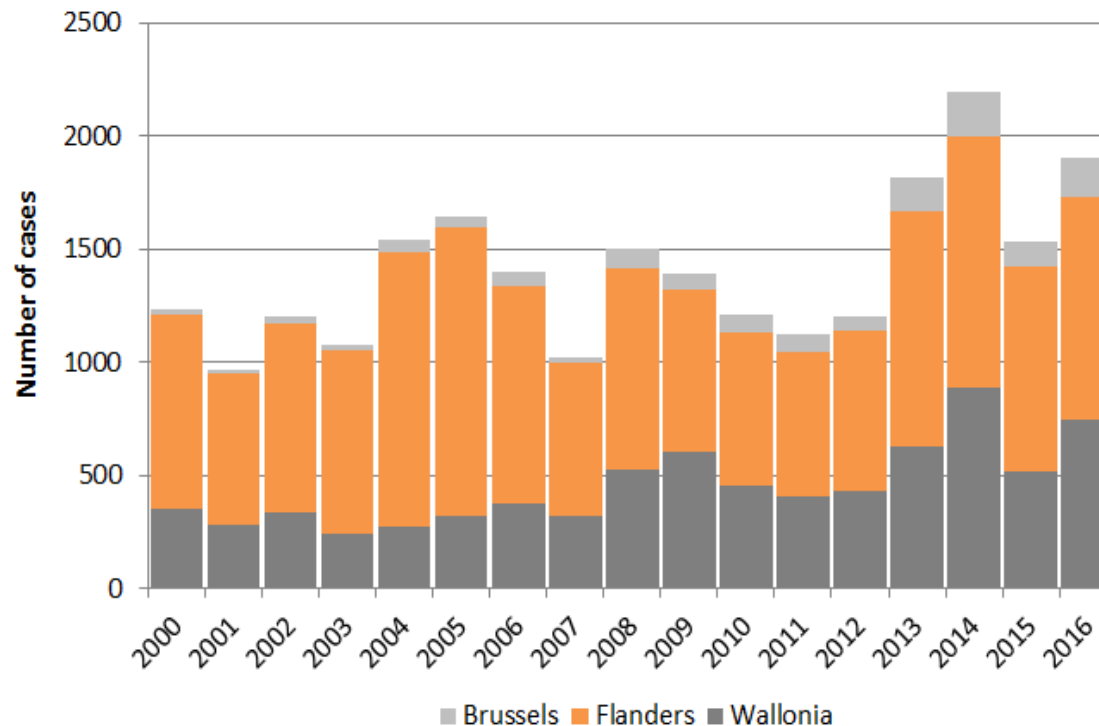


- Residual samples (n=3 215) representative of the Belgian population, collected in 2013-2014 by 27 labs
- *Borrelia burgdorferi* s.l. IgG antibody reactivity by Elisa (Liaison XL) followed by confirmation test (Western Blot) at NRC Lyme (UCL)
- Adjusted\* overall seroprevalence of 1.06% (95% CI: 0.67-1.67)
- Estimations on healthy individuals/blood donors in Europe range between 1.6% (Slovakia) and 9.5% (Germany)

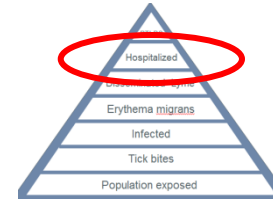
# Network of laboratories



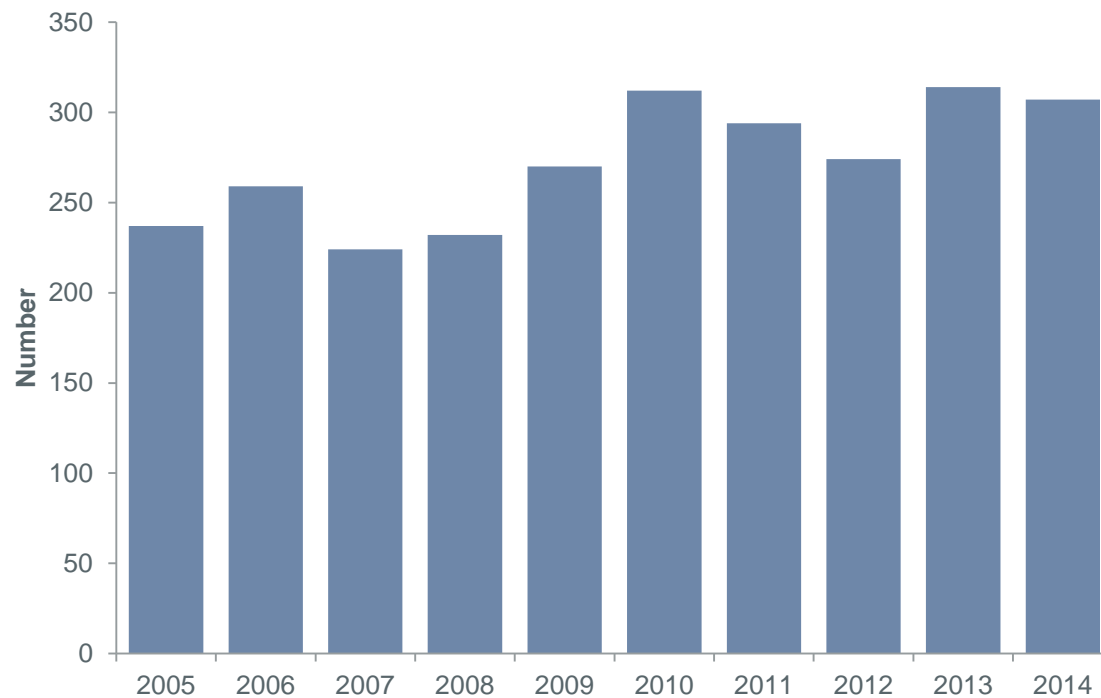
Number of positive serological results by week, sentinel network of laboratories, 2000-2016



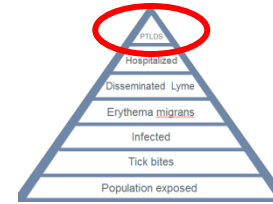
# Minimal hospital data




**Annual number of hospitalisations for Lyme disease (primary diagnosis), 2005-2014, MZG-RHM**



# Humtick



Prospective cohort study (6 to 24 months) on cost/burden of LB and occurrence of PTLDS

	<b>Cohort 1:</b> Erythema Migrans (EM)	<b>Cohort 2:</b> Disseminated Lyme	<b>Control group:</b> No Lyme	<b>Group 3:</b> Other TB infection
<b>Inclusion criteria</b>		Arthritis, Neuroborreliosis Other*	Age & gender matched, no prior Lyme	Fever <1 month after tick bite
<b>Recruitment</b>	GPs	Hospitals	Patients	GPs
<b>Follow-up</b>	Yes	Yes	Yes	No
<b>Blood sample</b>	Yes	/	/	Yes

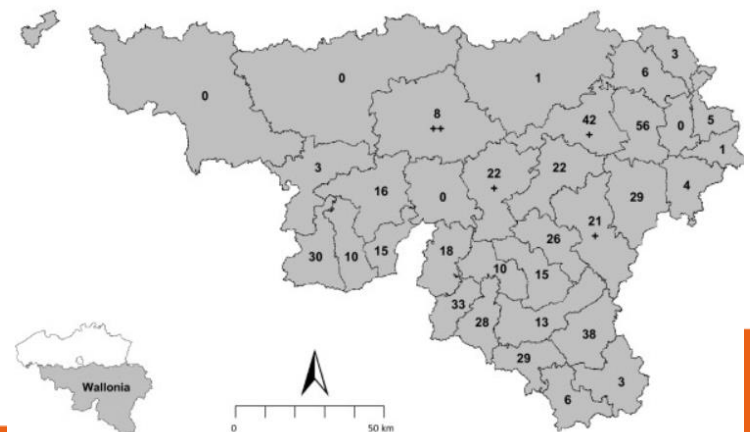
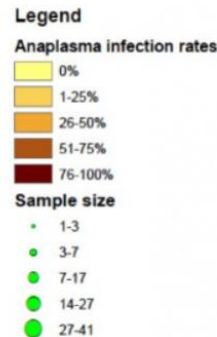
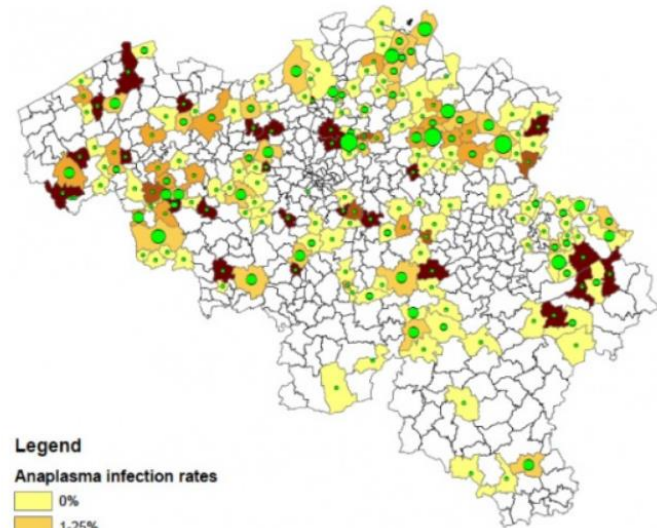
Partners: UCL, NRC Lyme (UCL – UZ Leuven), CHERMID, RIVM

# OTHER TICK-BORNE DISEASES

# Anaplasmosis

## Animal hosts and ticks:

- 19.5% *Ixodes* ticks on 1135 cats and dogs carry *A. phagocytophilum* (2008-2009)
- 22% feeding / 3% questing *Ixodes* ticks (2010)
- 1.2% questing *Ixodes* ticks (2015)
- PCR+ spleen of 1% wild boar in Wallonia (2011)



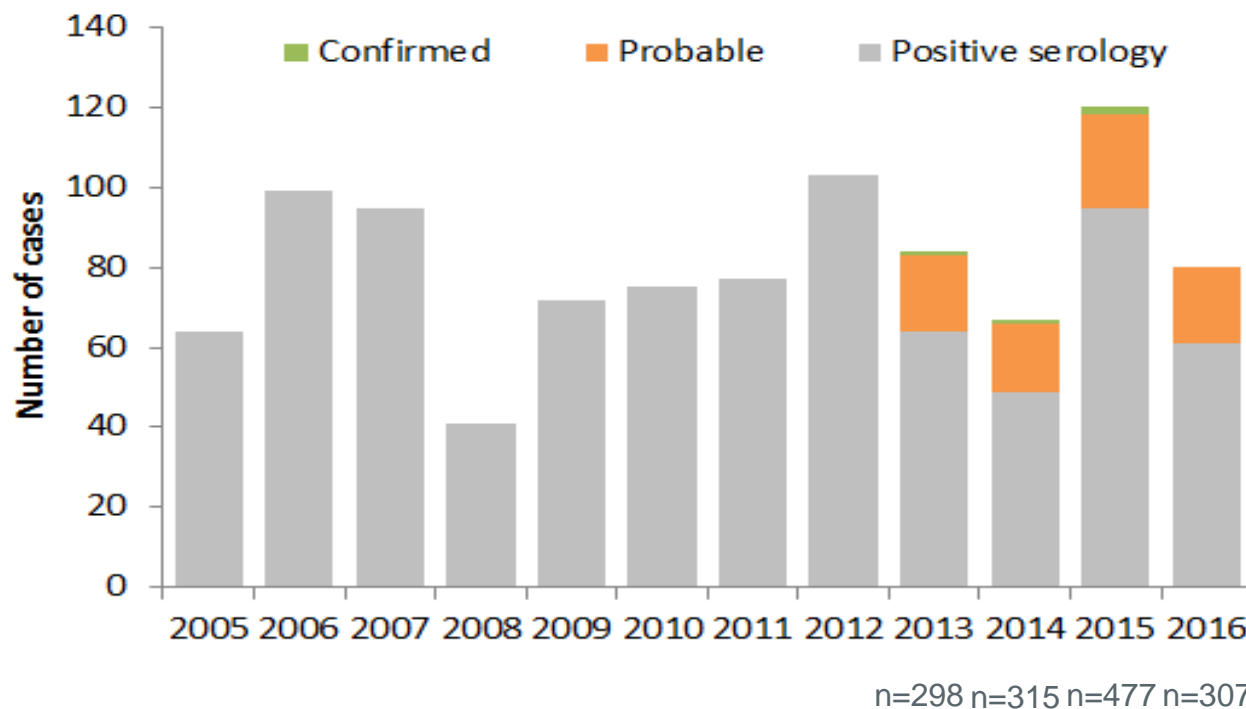
Geographic distribution of wild boars sampled in southern Belgium (Wallonia) in 2011.

# Human

Surveillance by NRC (Military Hospital Queen Astrid)



Annual number of reported (old or recent) infections with *A. phagocytophilum*, Belgium, 2005-2016



Seroprevalence\*: 8.1% in professionals at risk (n=148), 6.2%/ 5.7% in rural (n=209)/urban (n=193) blood donors. Cross reactivity ?

\*De Keukeleire et al. Vector Borne Zoonotic Dis. 2017 Feb;17(2):108-115



# Tick-borne encephalitis

## Animal surveillance

- Roe deer, 2008-2009, Wallonia (n=498): 2 sero+ in 2 areas
- Dogs, 2009, Belgium (n=880): 1 sero+ in West-Vlaanderen
- Cattle, 2010, Belgium (n=650): 17 sero+ and 6 borderline
- Wild boar, 2013, Limburg/Antwerpen and West-Vlaanderen (n=238): 7 sero+ and 3 borderline

# Human

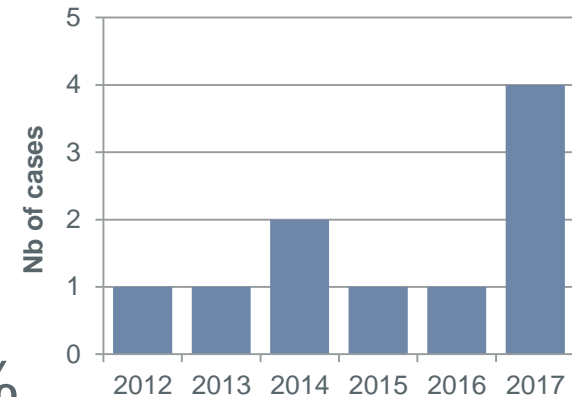
- Surveillance by NRC (ITG) + WIV
- Number of patients tested increased from 44 in 2012 to 127 in 2016
- So far, only imported cases diagnosed

**List of confirmed human cases of acute TBE, 2012-2016**

Year	Age	Sex	Clinical presentation	Vaccination status	Origin of infection	Country of importation
2012	44	M	Influenza-like syndrome	Not vaccinated	Imported	Austria
2013	67	M	Unspecified neurological symptoms	Unknown	Imported	Kyrgyzstan
2014	-	-	-	-	-	-
2015	22	M	Meningoencephalitis	Not vaccinated	Imported	Slovenia
2016	44	F	Unspecified neurological symptoms	Not vaccinated	Imported	Unspecified

# Tularaemia

- Surveillance: Ref Lab (CODA-CERVA)  
+ mandatory notification
- 1950-2011: 3 cases, increase since 2012
- Almost all cases diagnosed by 1 hospital
- Source infection 2012-2016: tick bite 50%
- Seroprevalence study\*:
  - Professionally exposed Wallonia: 2.7%
  - Blood donors Mont Godinne: 0.5%
  - Blood donors Woluwe: 2.1%



# Rickettsioses



## Human

- Mandatory notification (not Brussels) + surveillance by NRC (ITG)
- ~ 20-25 cases per year
- All confirmed recent infections in Belgium are imported (South-Africa, Morocco)
- Species identified in 2016 (n=7): *R. africae* (n=6), *R. conorii* (1)

## Ticks

- 14% *Ixodes* ticks infected with *R. helvetica*

# Other diseases

- Relapsing fever (*Borrelia Miyamotoi*): 1.1 -1.6% in questing ticks
- Babesiosis: antibodies detected against *B. microti*, *B. divergens*, and *Babesia* spp. EU1 in humans / 1.3% in feeding ticks cats/dogs
- *Candidatus* Neoehrlichia mikurensis: 0.4% in questing ticks
  - Study in humans (fever within one month after tick bite): screening for *N. mikurensis*, *A. phagocytophilia*, *B. miyamotoi*, *Rickettsia* spp., *Babesia* spp. (HUMTICK)

# Summary

- **Ticks:** TekenNet/study
- Human surveillance: mainly focus on **Lyme borreliosis**; so far no indication of a marked increase
- **Other diseases:**
  - Surveillance based on NRC/ref labs and mandatory notification
  - Rare or only imported cases (so far...)
  - Study ongoing

# Acknowledgements



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