

Wastewater treatment plants as sources of Legionellosis and possible interventions in the Netherlands

Side Event - Legionnaires' disease surveillance and prevention in the pan-European region

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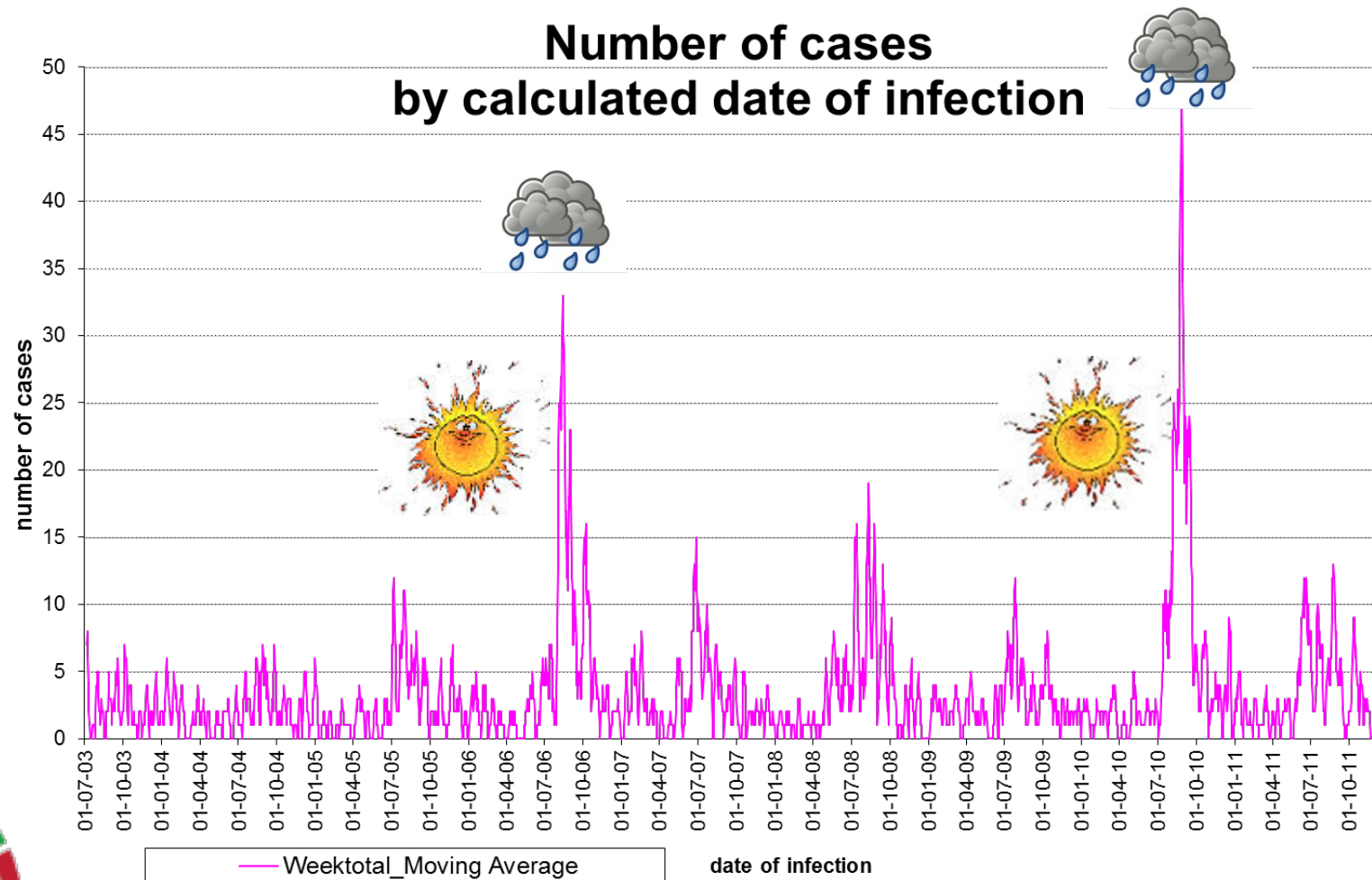
5th session

Meeting of the Parties to the
Protocol on Water and Health

19-21 November | Belgrade | Serbia



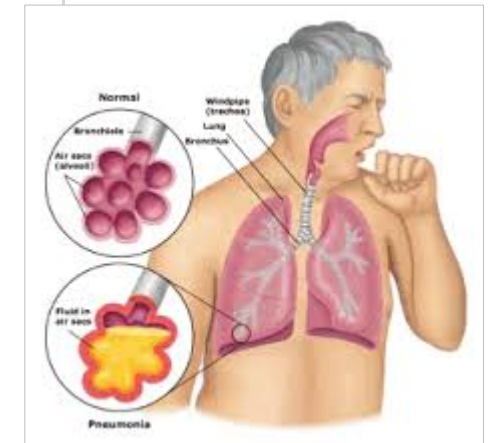
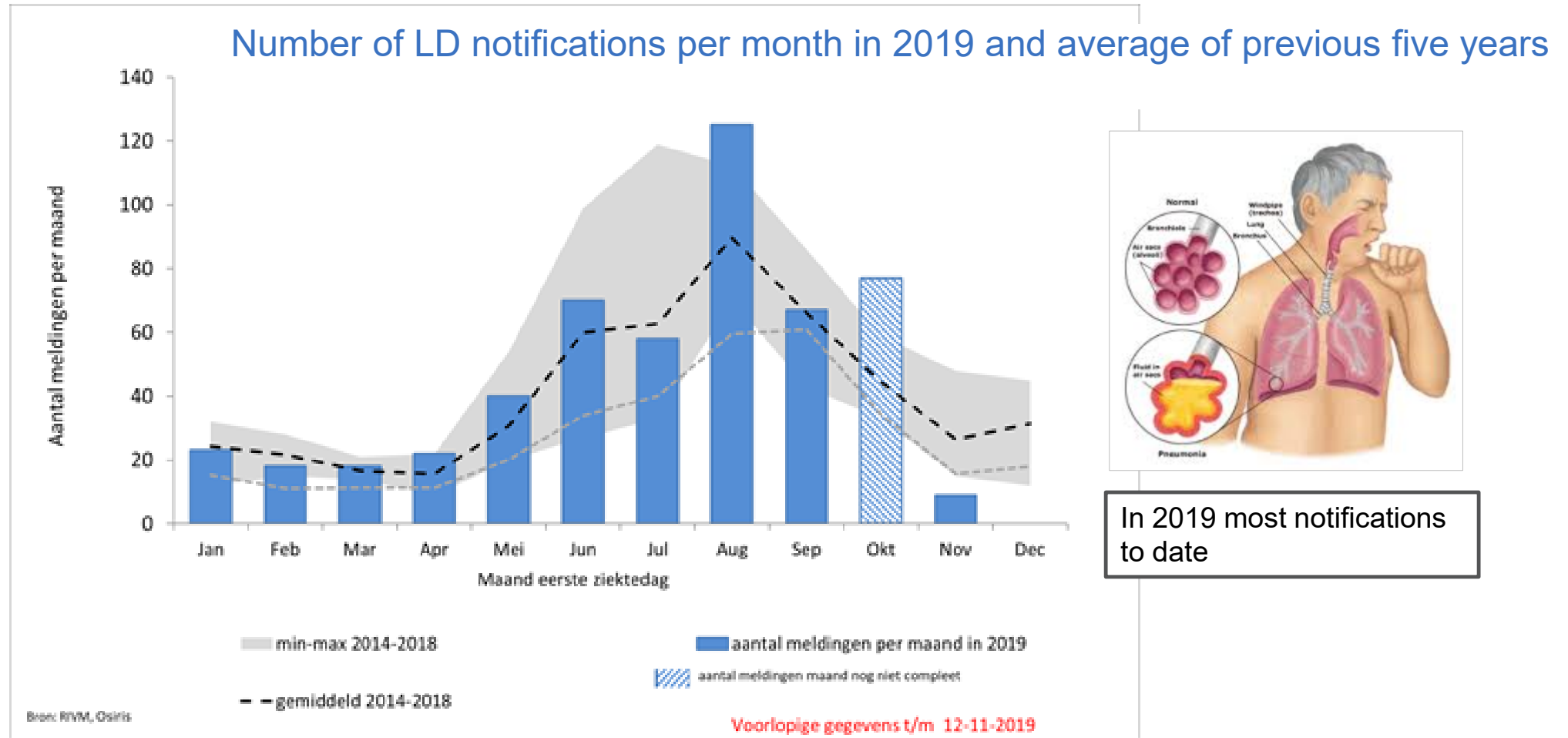
Legionnaires' Disease associated with warm, wet weather



Brandsema et al., 2014 Epidemiol Infect 142: 2360-2371;
 Karagiannis et al. Epid Infect 2009 137(2):181-7;
 Beauté et al. Epid Infect 2016 30:1-11



Current Legionnaires' Disease incidence 2019



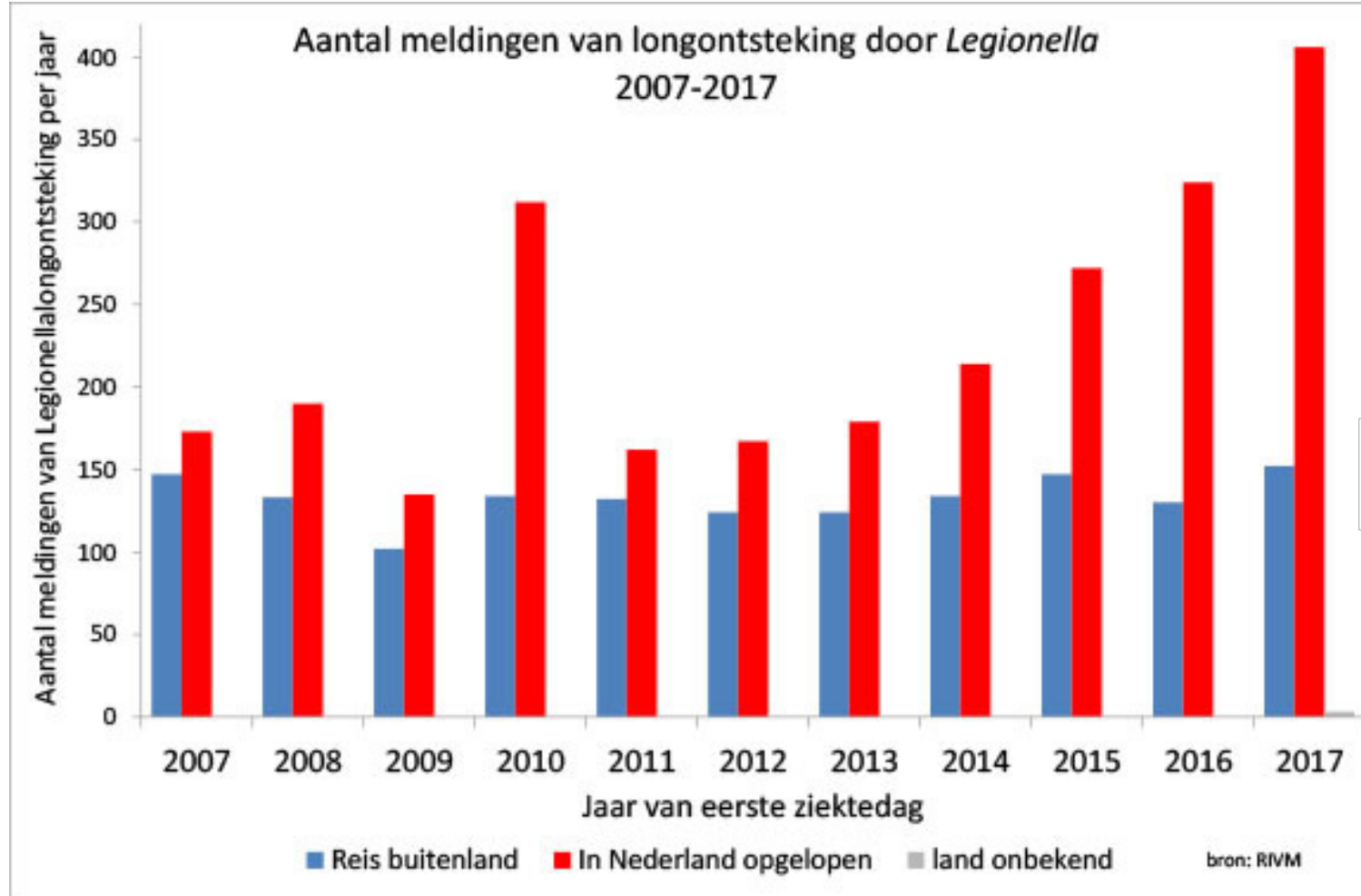
In 2019 most notifications to date



<https://www.rivm.nl/legionella>



Increasing number of endemic Legionnaires' Disease cases



In majority of cases source unknown

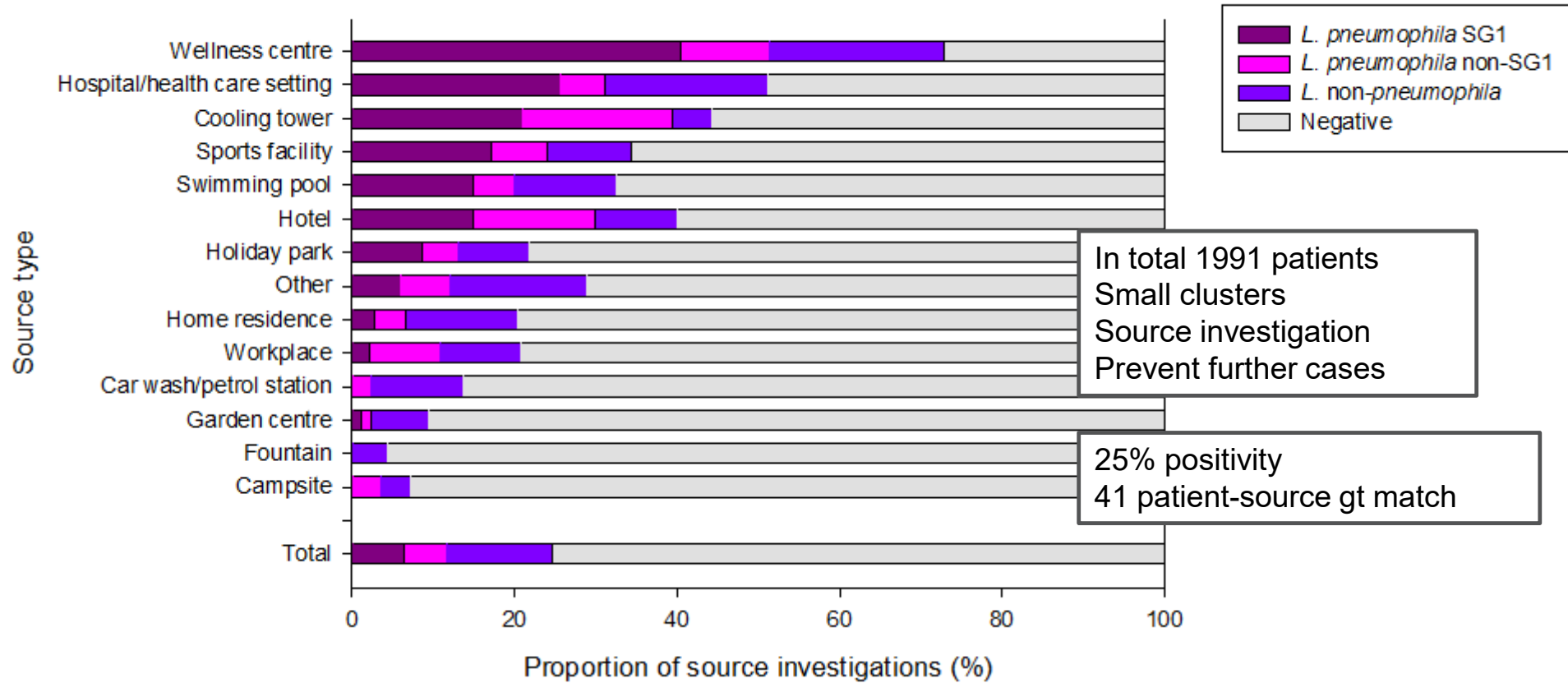


Reukers et al. 2018 RIVM rapport 2018-0049



Source investigation 2002-2012 – National program

Sampling results of 1484 potential sources of infection

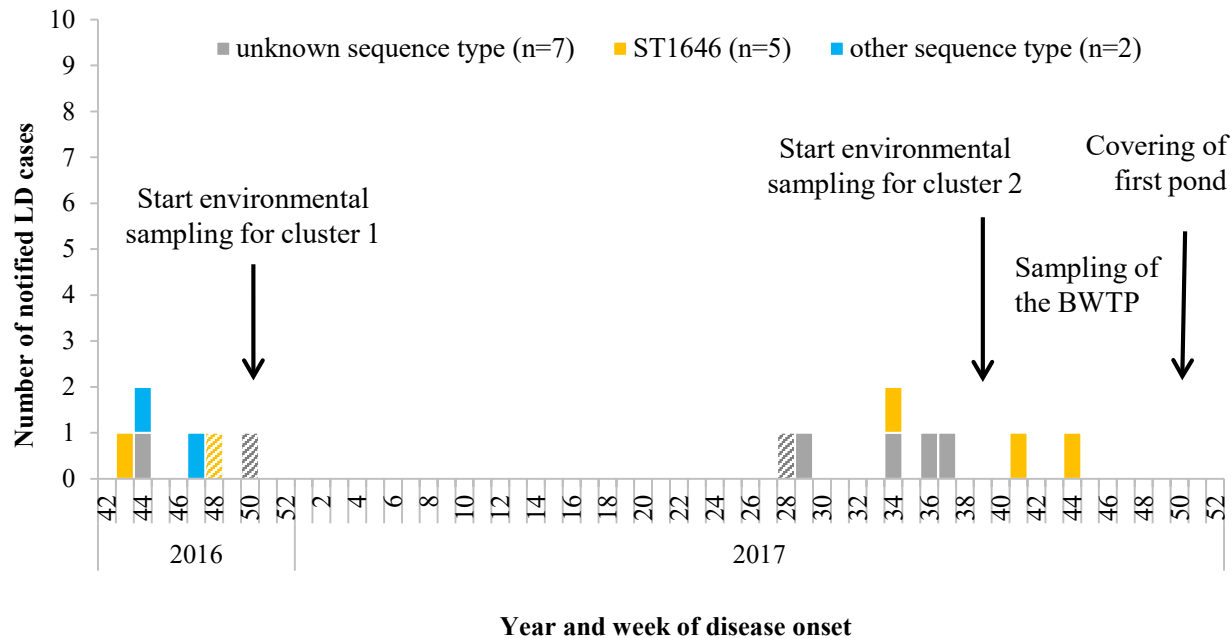


Den Boer et al., 2015 Emerg Infect Dis 21: 1167-1173



Source investigations in Boxtel and Son

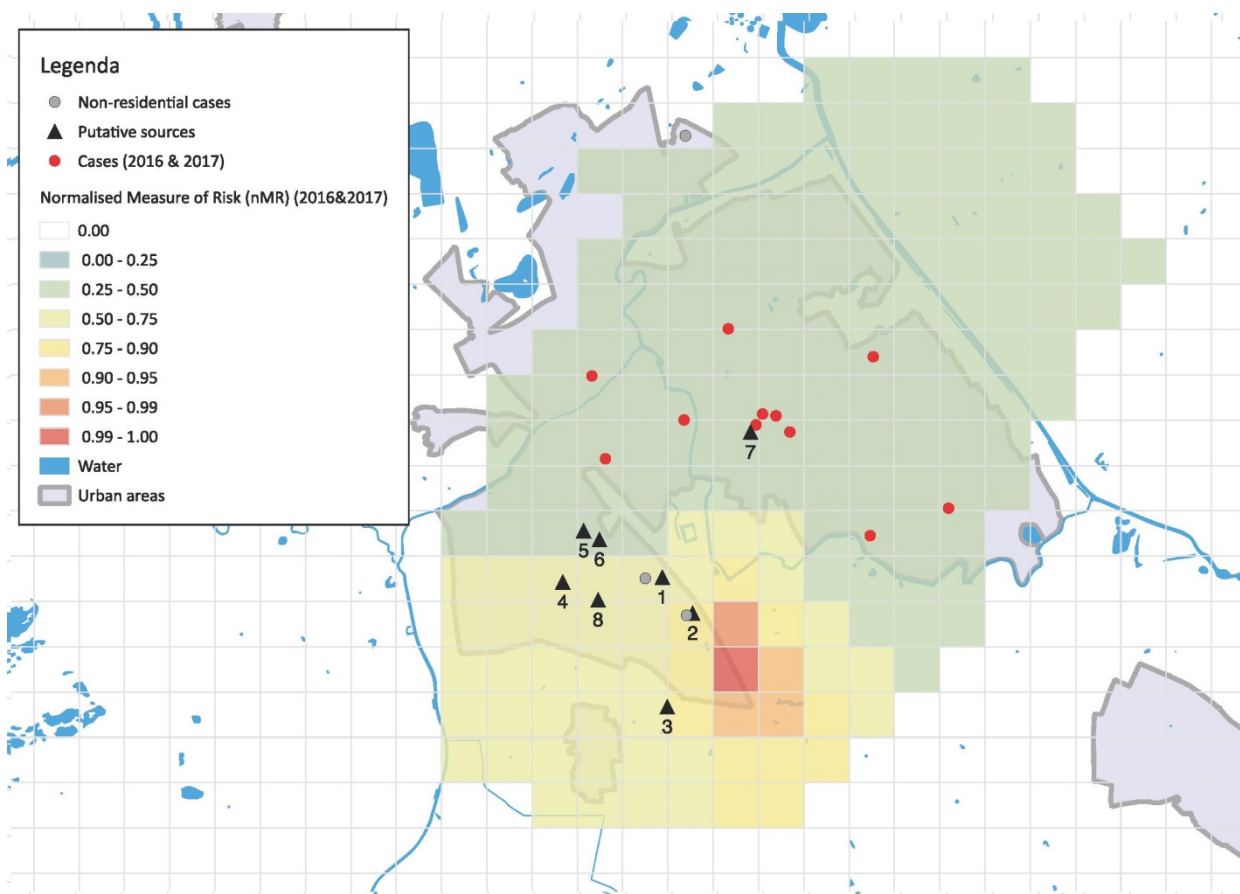
- In 2016 (cluster 1) included 4 residents of Boxtel (■) and two non-residents working in the industrial area of the town (//)
 - symptom onset between 28 October and 11 December 2016
- In 2017 (cluster 2) 8 more cases were reported
 - symptom onset between 10 July and 3 November 2017



- Median age 72 (51-93) years
- 8/14 cases male
- 7/14 smokers
- 11/14 had underlying comorbidities
- All hospitalized
- And discharged after recovery.



Spatial model for source identification



Putative sources

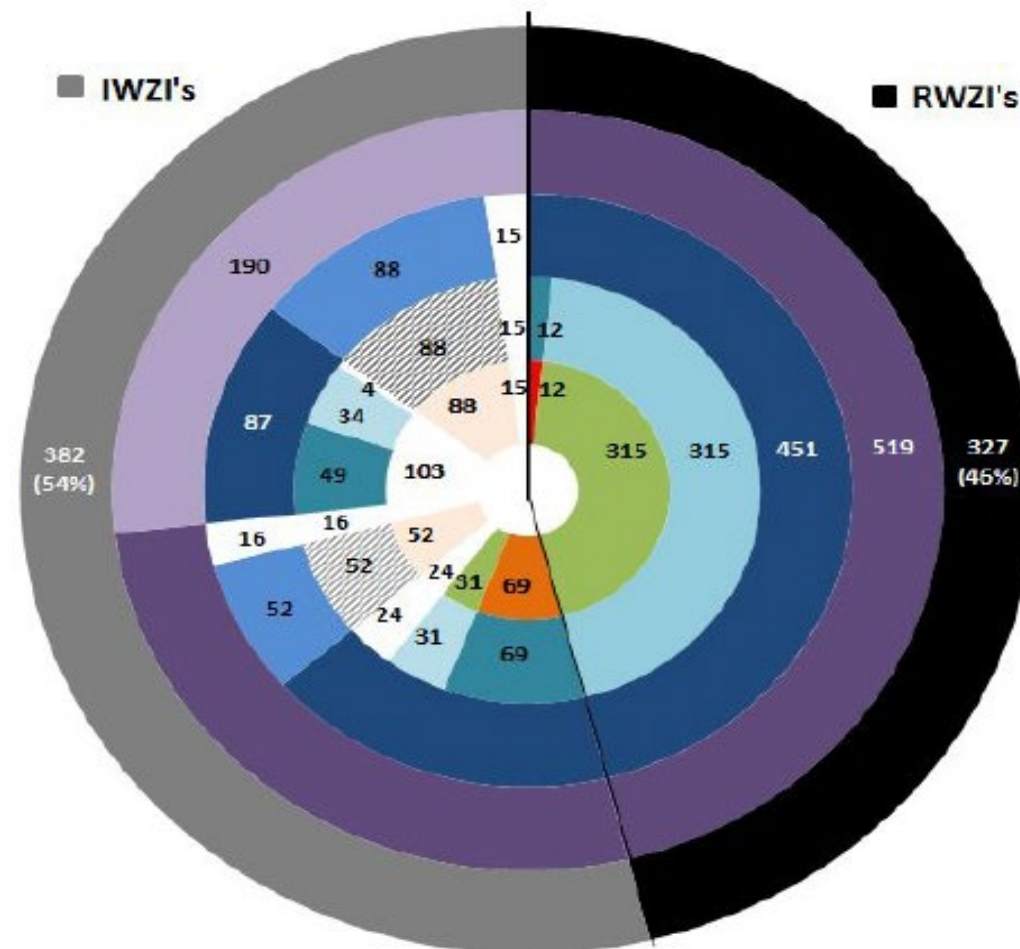
- Patient's homes
- Fountain
- Wet cooling towers
- misting device for dust control at the industrial area
- Biological wastewater treatment plant
- Municipal sewage treatment
- River Dommel



Identification and application of risk factors

- Higher risk when
 - Wastewater temperature range 30-38 °C
 - Nutrient rich wastewater
 - Aerated process

Type industrie	Temperatuur (deel)proces	Beluchting	Verspreiding via lucht	Verspreiding via effluent
<ul style="list-style-type: none"> • Levensmiddelen • Papier en hout • Petrochemie 	30 – 38 °C	Ja	Zeer aannemelijk	Zeer aannemelijk
		Nee	Aannemelijk	Zeer aannemelijk
<ul style="list-style-type: none"> • Deconstructiebedrijven • Rioolwaterzuivering * 	25 -29 °C of 39 – 45 °C	Ja	Aannemelijk	Aannemelijk
		Nee	Mogelijk	Aannemelijk
	<25 °C of >45 °C	Ja	Mogelijk	Mogelijk
		Nee	Niet aannemelijk	Mogelijk



Possible interventions to prevent wastewater associated cases

- Perform system assessment of wastewater treatment processes to identify high risk plants
- Implement a monitoring program for investigation of Legionella in water and air samples – in future simple or online parameters
- Spatial modelling for source identification in case of clusters
- Implement measures to prevent growth in and spread of legionella bacteria from high risk wastewater treatment plants thereby preventing further cases – evaluation of effectiveness of measures ongoing

