Space-Time clusters analysis of cases of whooping cough-Barcelona, Spain, 2000-2011

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Whooping Cough

TABLE 2. Number of Pertussis Cases Reported to World Health Organization, Per Region

Region	1975	1980	1985	1990	1995	2000	2001	Total Global
Africa	297,537	367,961	240,249	89,515	16,274	52,008	50,386	1,113,930
Americas	106,926	123,783	56,018	38,031	22,477	16,265	11,236	374,736
Eastern Mediterranean	149,695	171,686	111,939	27,447	3643	2144	4256	470,810
Europe	74,062	90,546	184,808	96,548	79,230	52,388	24,948	602,530
South-East Asia	364,283	399,310	224,541	156,028	27,487	34,930	37,813	1,244,392
Western Pacific	1,886,243	829,263	244,865	35,675	15,076	25,301	32,201	3,068,624
Global total	2,878,746	1,982,549	1,062,420	443,244	164,187	183,036	160,840	6,875,022

Tan T,Trindade E, Skowronski D. **Epidemiology of Pertussis.** *Pediatric Infect Dis J. 2005;24:10-18.*

Endemic Worldwide

Upper Respitarory Tract

Widespread vaccination

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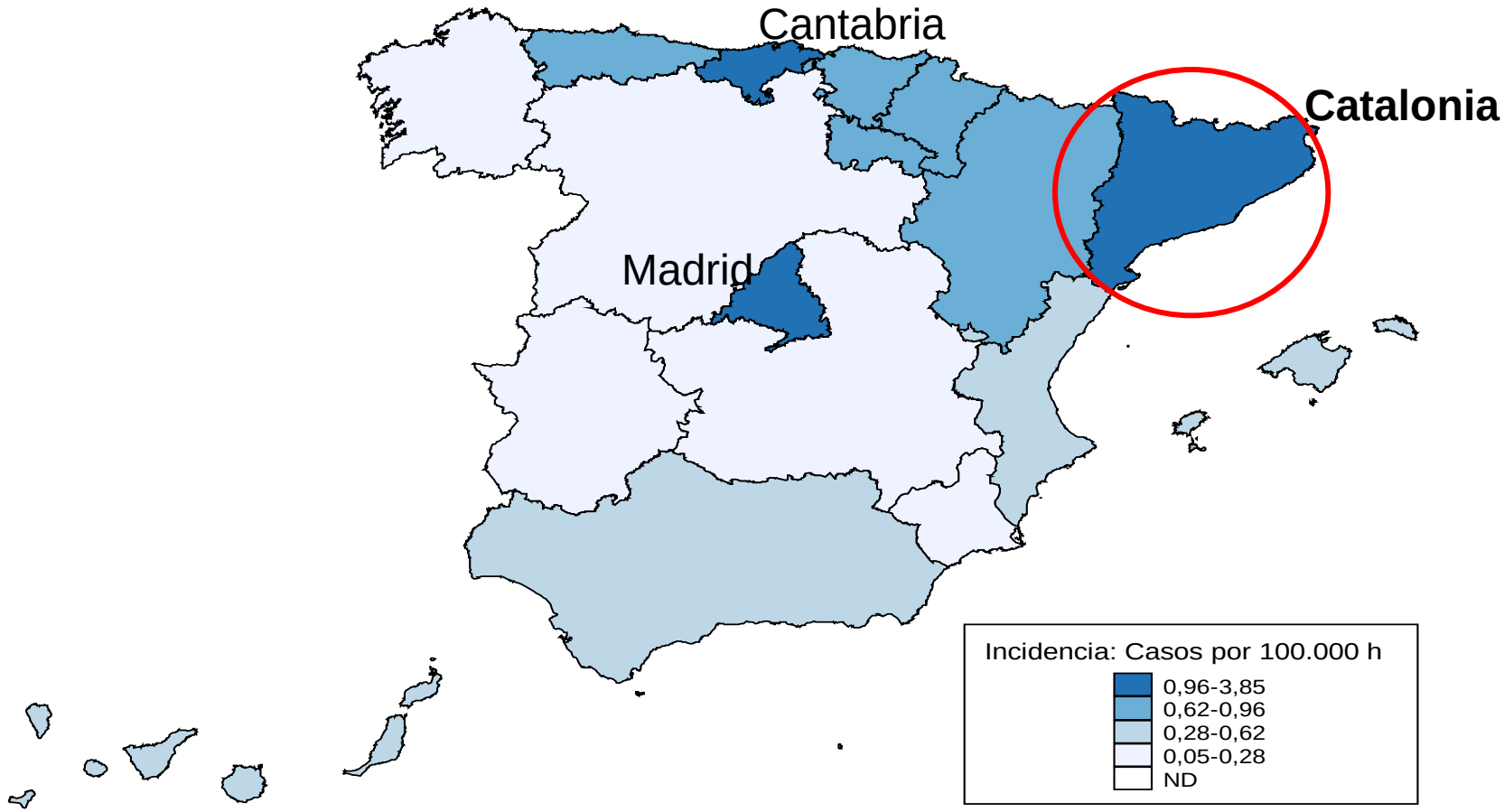
Whooping cough Surveillance in Spain

Vigilancia de Tos ferina. España, 2009

Incidencia por Comunidades Autónomas. Semanas 1-52



Fuente: Enfermedades de Declaración Obligatoria (EDO)

1997, National Epidemiological Surveillance Network (RENAVE) Agregated ⟶ Cases Reported

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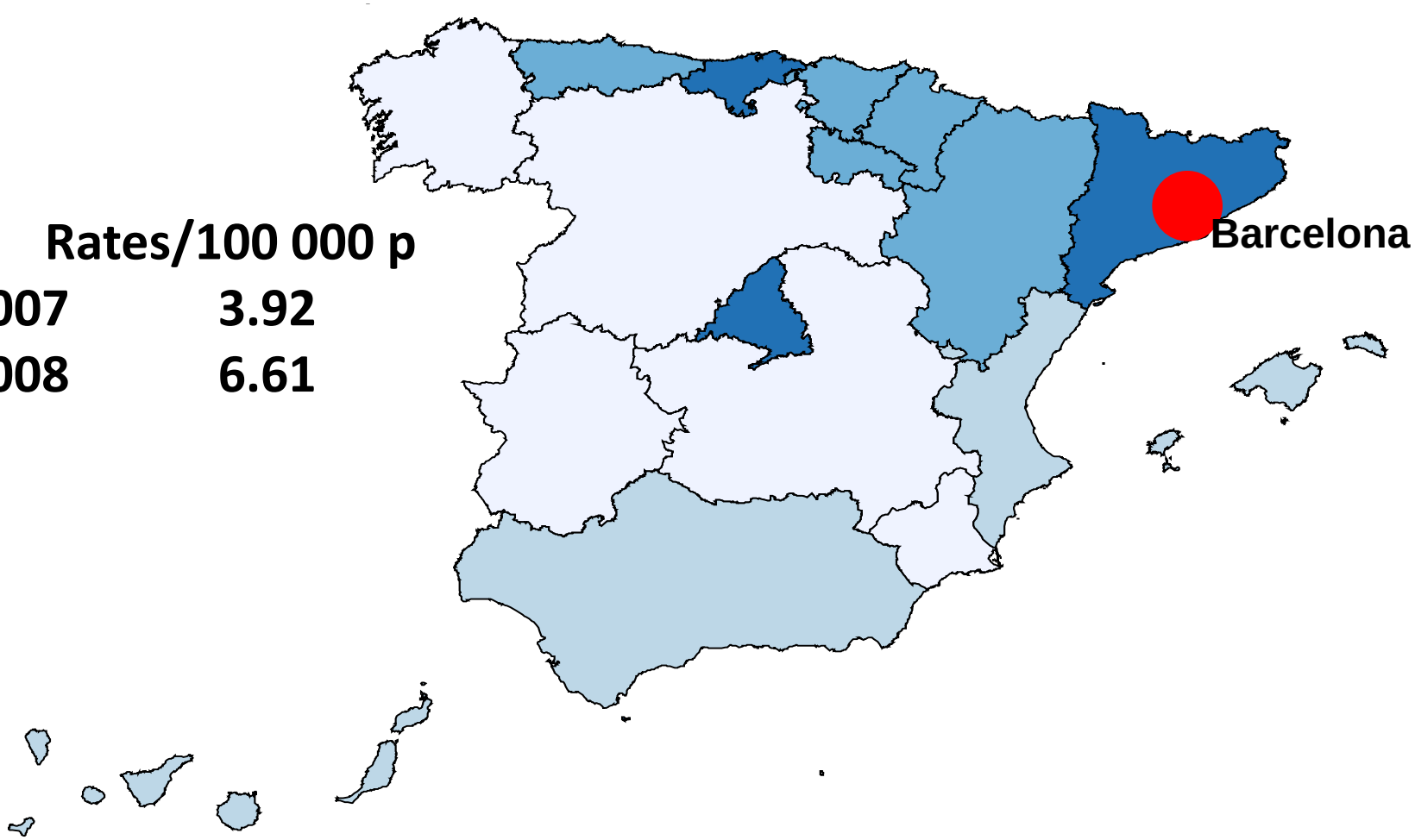
Whooping cough Surveillance in Catalonia-Barcelona

	Rates/100 000 p
2007	3.92
2008	6.61



Fuente: Enfermedades de Declaración Obligatoria (EDO)

Catalonia (Barcelona) ⟶ Global increasing of cases

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Impact

National

Local

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Objective

To identify space-time clusters of whooping cough in the period 2000-2011 in order to identify high risk areas in Barcelona

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Methods

Design: **Retrospective Space-Time analysis**

Case definition: **All cases of whooping cough individual reported to the Public Health Agency of Barcelona during the study period**

Population: **census of 2006 of the National Statistics Institute stratified by age and sex and census tracts**

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Methods

Scan Statistic analysis assuming a Poisson distribution

Temporal and Spatial Criteria: **7 days and 500 meters maximum distance**

Maps have been developed:

- **Most likely cluster (with maximum likelihood ratio). Others clusters with statistical significance ($p<0.05$)**

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Results

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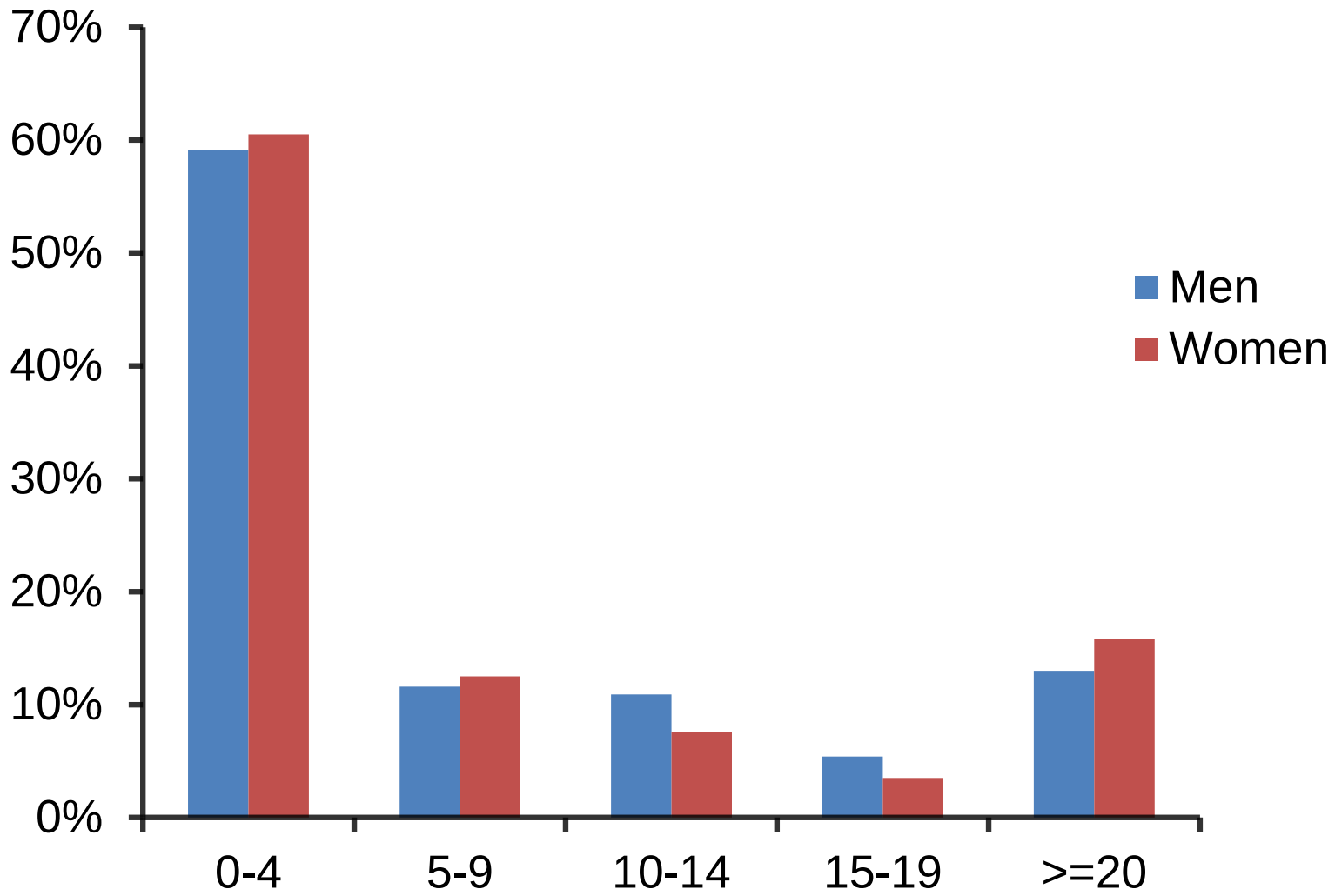
Distribution of cases of whooping cough by sex and age groups, Barcelona, Spain-2000-2011



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Age Groups (Years)

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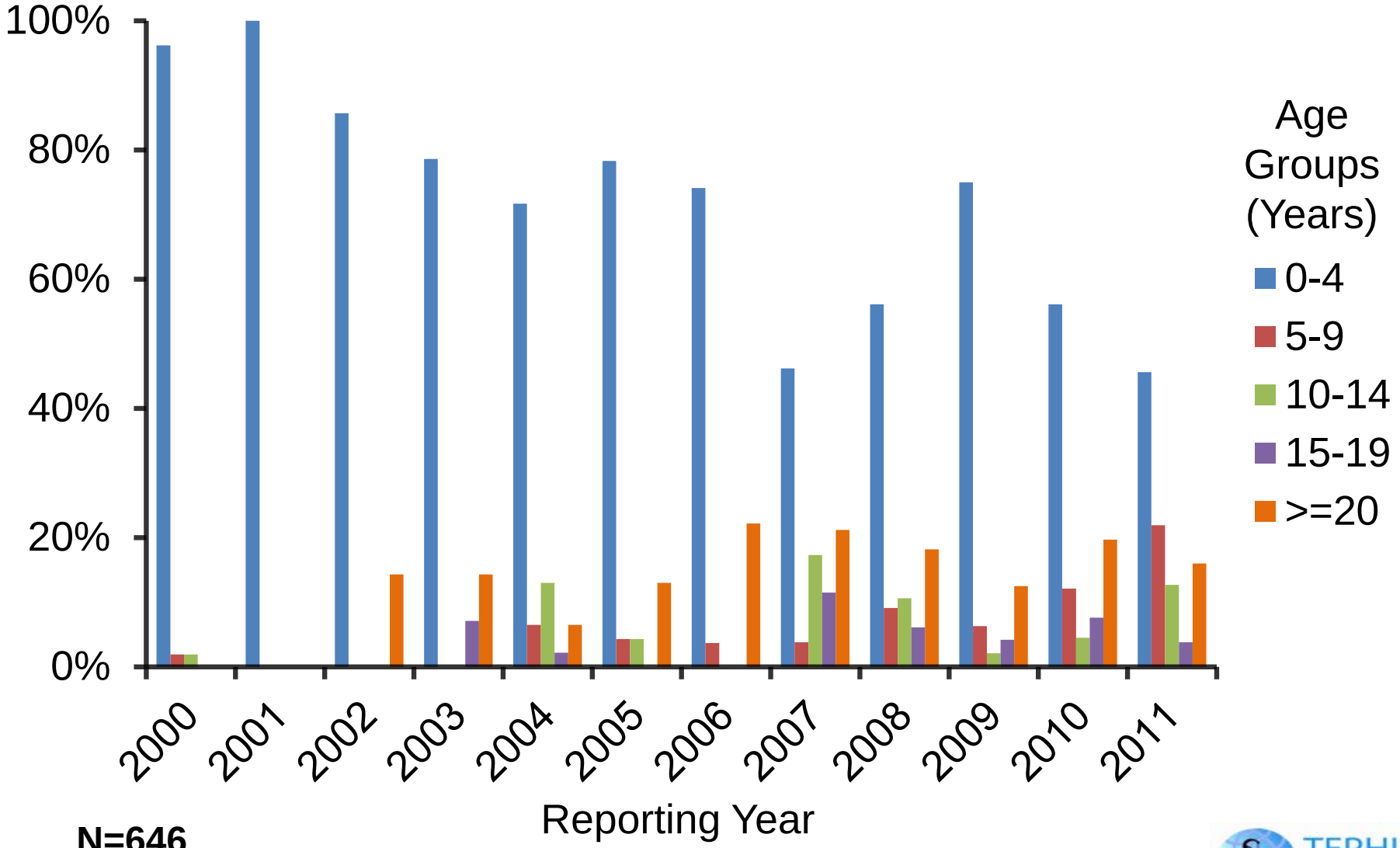
Annual distribution of cases of whooping cough by age groups, Barcelona, Spain-2000-2011



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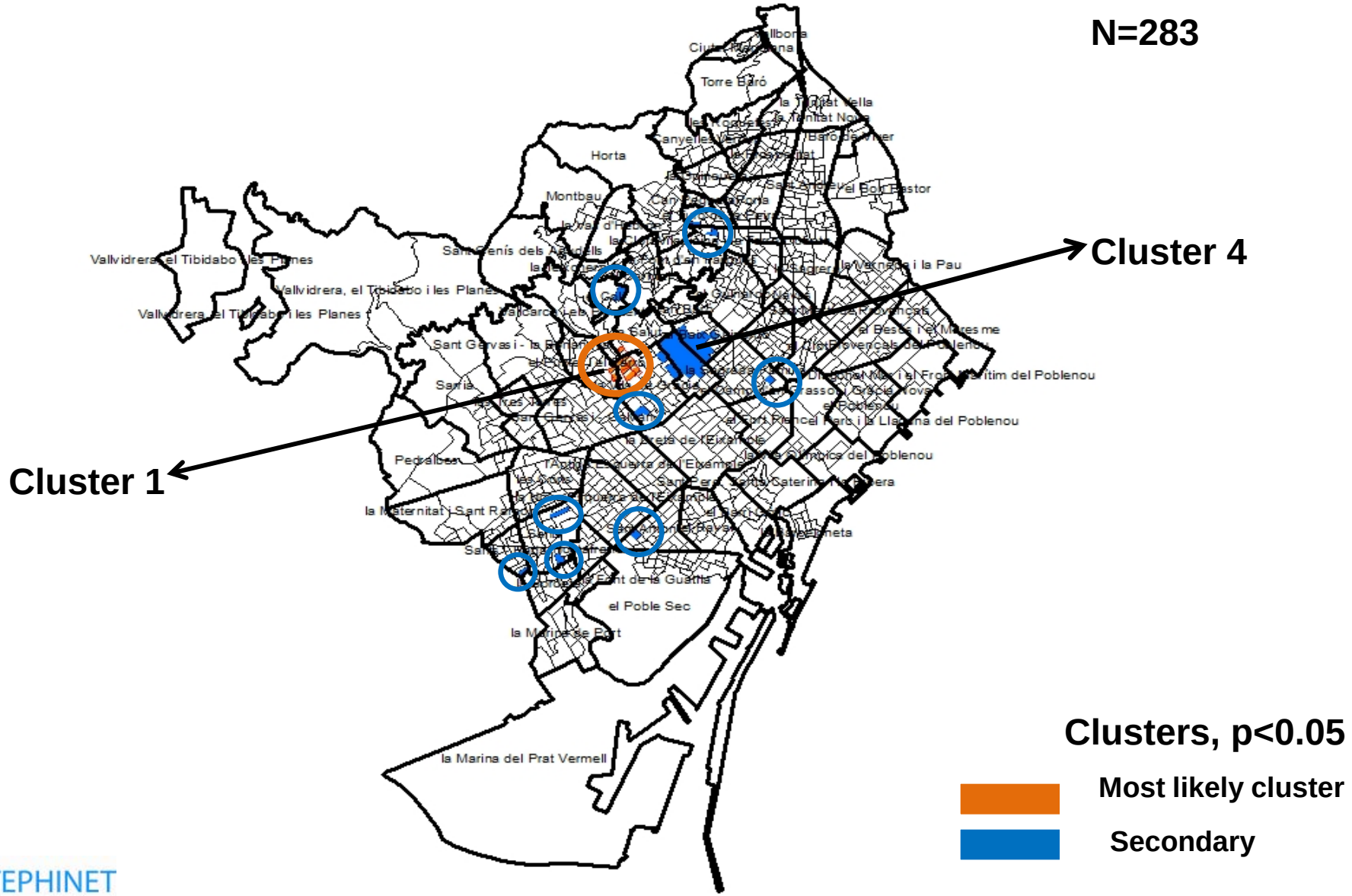
Space-Time distribution of Clusters of whooping cough, Barcelona-Spain, 2000-2011



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Space-Time distribution of Clusters of whooping cough- Barcelona, Spain, 2000-2011

Clusters	Date	Observed	Expected	P-value	NCT
1	*17/8/2011-23/8/2011*	*5*	*0.0021*	*0.0000026*	*5*
2	30/3/2011-5/4/2011	3	0.00045	0.0007	1
3	7/11/2007-13/11/2007	3	0.00063	0.0012	1
4	29/6/2011-5/7/2011	4	0.011	0.0050	25
5	22/9/2010-28/9/2010	3	0.0017	0.0059	1
6	6/8/2003-12/8/2003	3	0.0034	0.018	1
7	15/6/2011-21/6/2011	2	0.00045	0.019	1
8	11/2/2004-17/2/2004	2	0.00050	0.025	1
9	14/7/2010-20/7/2010	2	0.00054	0.030	1
10	28/1/2004-3/2/2004	2	0.00061	0.040	1
11	26/9/2007-2/10/2007	2	0.00064	0.044	1
12	11/5/2011-17/5/2011	2	0.00066	0.046	1

NCT, Number Census Tracts included

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Strengths

You can study the entire population or a representative sample

More power in generalising

Limitations

Susceptible to selection bias

We included only cases with complete epidemiological and space-time information

Conclusions

We identified 12 Space-time clusters

The most likely cluster:

- included 5 census tracts
- was not reported as an outbreak

Spatial statistics methods:

- are useful to identify outbreaks not reported to the surveillance system
- can be complementary tools in epidemiological surveillance systems

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Recommendations

Enhanced surveillance of whooping cough in regions with high incidence rates

Better control of immunization of persons aged 0 to 18 in high incidence areas

Understanding of person-to-person inter-individual contact patterns and the spread of epidemics

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C S B Consorci Sanitari de Barcelona

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Thank You !!!