

# *Mycoplasma pneumoniae* infections across Europe and Israel (2011-2016)

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Experience / Care



ESGMAC

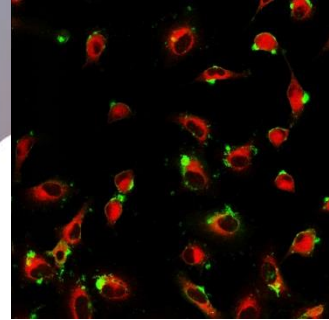
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ESCMID STUDY GROUP  
FOR MYCOPLASMA  
AND CHLAMYDIA INFECTIONS



# Introduction

- One of the smallest self-replicating bacteria with a genome size of only 816 kbp and the absence of a cell wall
- Worldwide occurrence, epidemics every 4-7 years
- Common cause of CAP and other RTI
- Occasional cause of encephalitis and other neurologic syndromes
- Detection by using PCR and/or serology and/or culture
- Macrolides are first choice for treatment especially in children
- Tetracyclines and fluoroquinolones not recommended for children due to the risk of severe adverse events



*Mycoplasma pneumoniae* infecting A549 cells © Roger Dumke

# Aims of the study

- To determine the diagnostic methods used to determine *M. pneumoniae* status.
- To investigate the availability of macrolide resistance data.
- To investigate seasonality in *M. pneumoniae* epidemics, association between age and prevalence and the effect of geographical location and timing of epidemics.

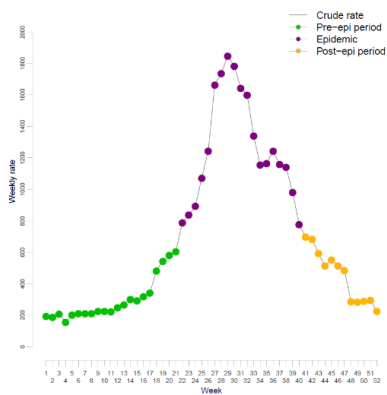
# Materials and Methods

- Retrospective questionnaire sent to 18 countries across Europe and Israel requesting details on the number of *M. pneumoniae* positive samples from January 2011 to April 2016.
- Information requested: methods of detection, number of positives stratified by age group and week as well as macrolide resistance monitoring.
- The Moving Epidemic Method was used to determine epidemic periods across the countries for the five periods under investigation

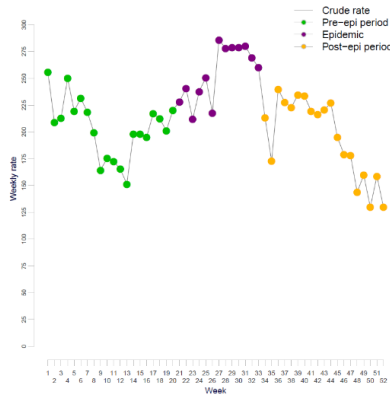
# Results

- 12/18 countries (BE, DK, FR, DE, GB, GR, HU, IE, IL, NO, SLO, SE) supplied data on *M. pneumoniae* infections: 95,666 positive samples.
- NAAT the most commonly used method for detecting *M. pneumoniae* status (10/12 countries, n=47.055 vs 40.418 by serology):
  - Exclusively NAAT: Denmark, Israel
  - Exclusively serology: Greece, Ireland
  - NAAT and serology: UK, Germany, Hungary, Norway, Sweden
  - NAAT and culture: Slovenia
  - NAAT, culture, serology: Belgium and France
- Routine macrolide resistance monitoring is not systematically in place: ranging from no monitoring (Sweden, Israel), to only at the request of the physicians (Slovenia), only at the NRC (Belgium), to systematic monitoring (France): 0 - 5,2% in BE

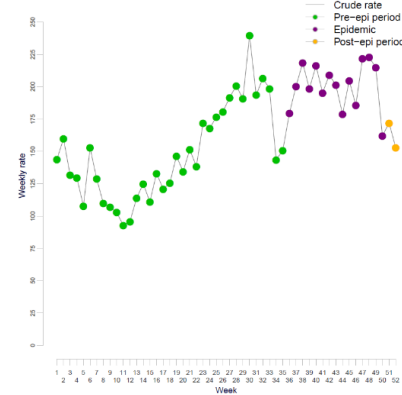
# Combined data from 12 countries identified three epidemic periods during 2011/12, 2014/15 and 2015/16



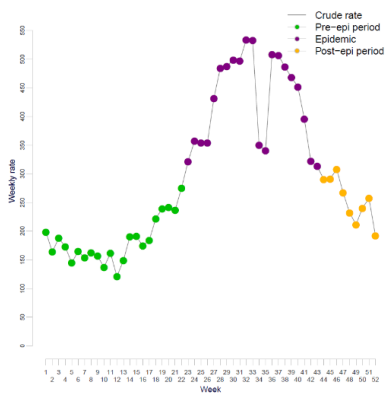
Week 19 2011 – week 18 2012



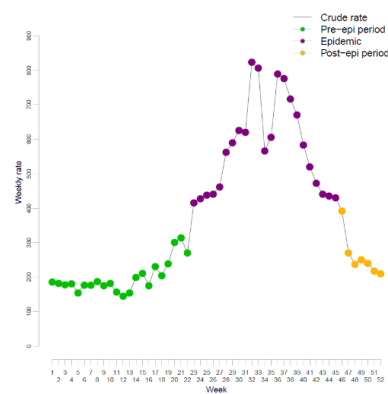
Week 19 2012 – week 18 2013



Week 19 2013 – week 18 2014

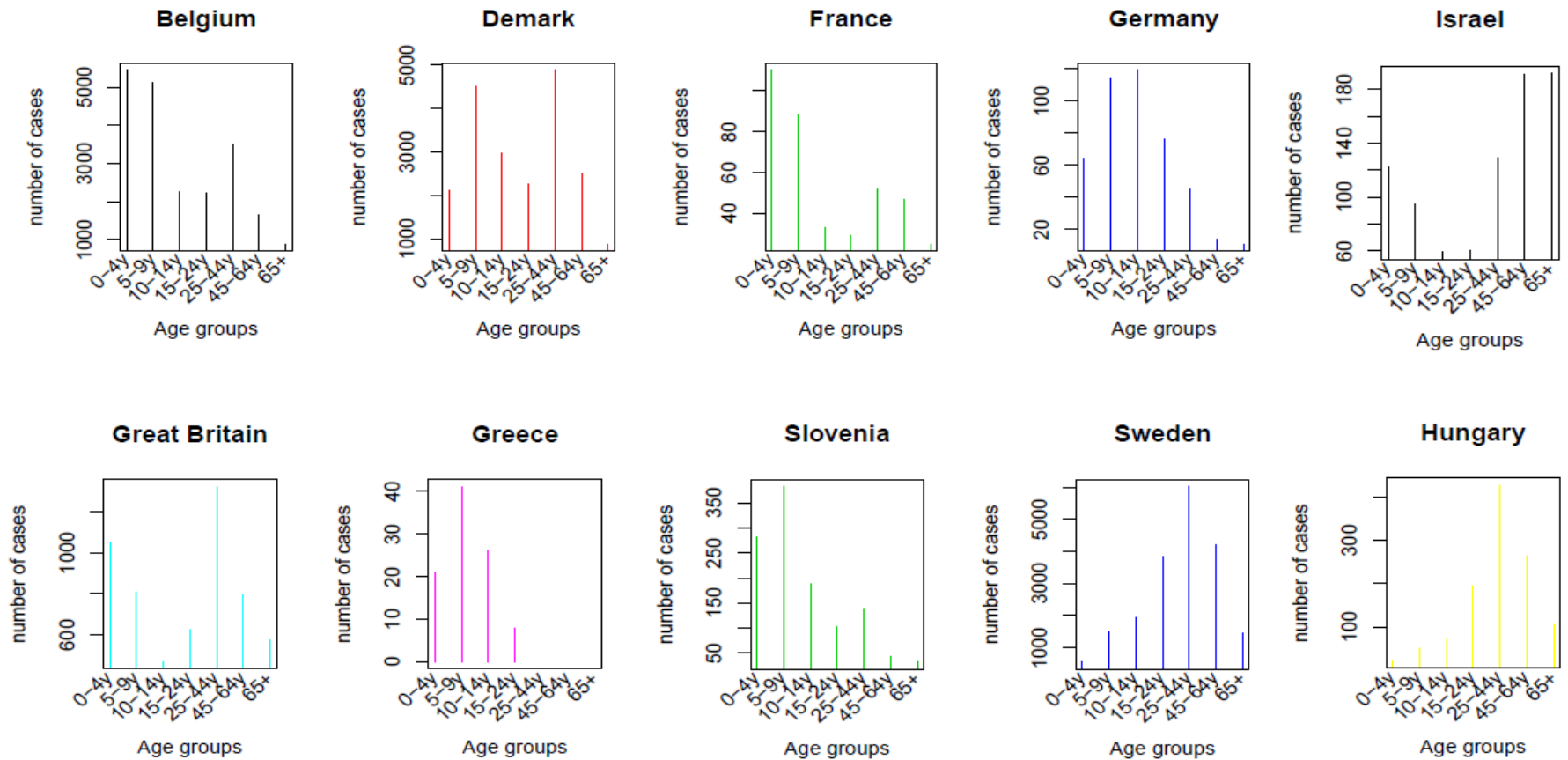


Week 19 2014 – week 18 2015



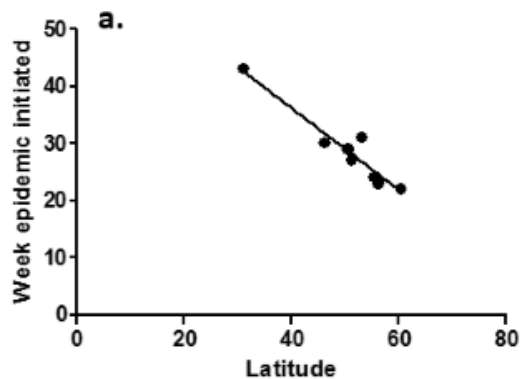
Week 19 2015 – week 17 2016

# Age distribution of *M. pneumoniae* positive samples

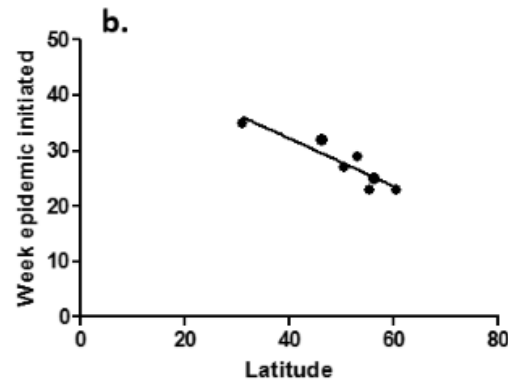


Four countries (DE, GR, IE and SLO) showed skewing of positive samples to younger patients (<10 y old), two countries (HU, SE) showed skewing towards older patients (>25 y old). Five countries reported a bimodal distribution (BE, DK, GB, FR, and IL). Data obtained from NO was not sub-categorised by age. Data was not available from IE for ages 25 and above. Differences could be due to sampling bias between countries.

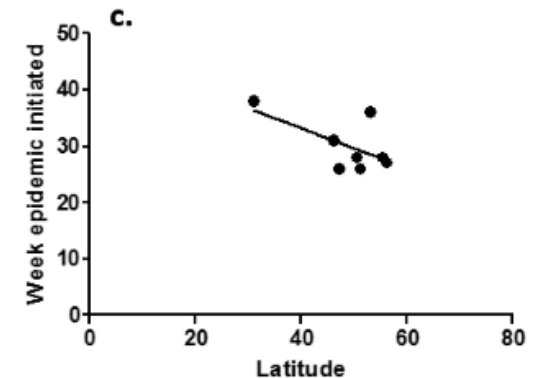
# Association country latitude and week number start epidemic



2011-2012



2014-2015



2015-2016

→ Epidemic periods commenced in a wave from Northern countries through to the Southern countries. A statistically significant association between the week in which the country epidemic began and latitude was seen in (A.) 2011/12 ( $p < 0.005$   $r^2 = 0.92$ ) and (B.) 2014/15 ( $p < 0.005$ .  $r^2 = 0.84$ ).

No significant association was seen in (C.) 2015/16 ( $p = 0.1$ .  $r^2 = 0.38$ ).



# Conclusions

- The largest collection of *M. pneumoniae* data to date detailing
  - methods for detection,
  - lack of macrolide resistance monitoring,
  - trends in age distribution
  - an association between epidemics and latitude.
- Combined data from 12 countries identified three epidemic periods during 2011/12, 2014/15 and 2015/16
- Epidemic movement from north to south
- Guidelines for testing may be beneficial by highlighting infections in all age-groups and a systematic process for case monitoring and macrolide resistance may be of future benefit to identify epidemic waves and resistance across Europe.

# Acknowledgment

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