
Impact of 10- and 13-valent pneumococcal conjugate vaccines on invasive pneumococcal disease in children under five years of age: results of a European multicentre study

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Disclosure

- Epiconcept employee
- SpIDnet (**SpIDnet: *Streptococcus pneumoniae* Invasive Disease network**) project - funded by ECDC

SplDnet project

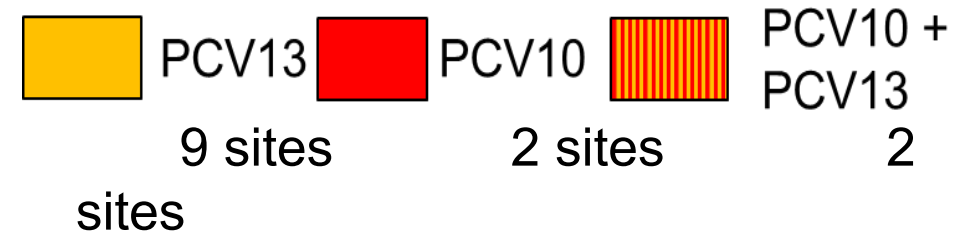
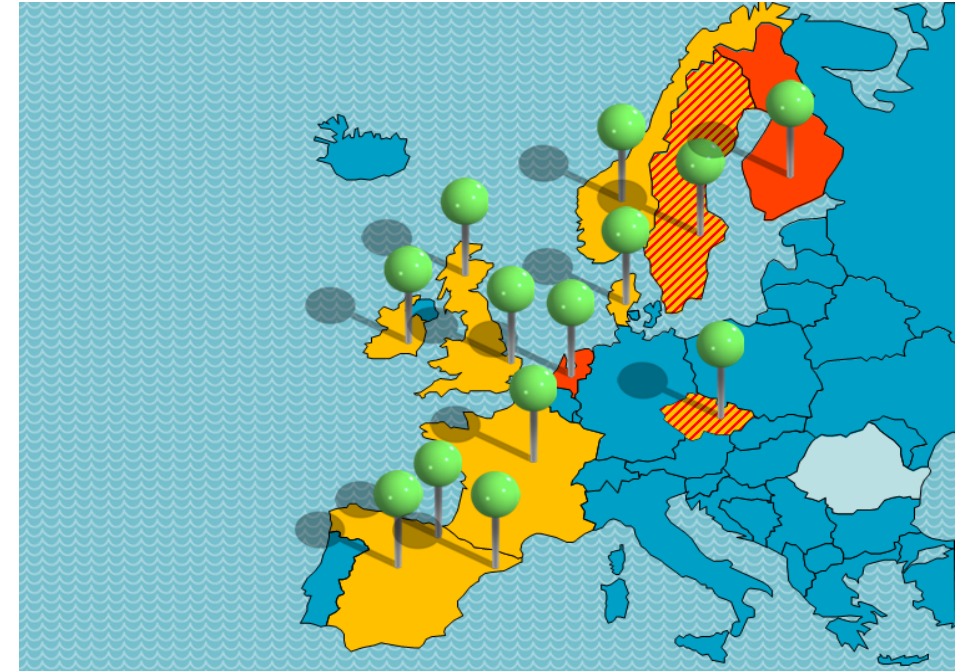
Background

Enhanced Invasive Pneumococcal Disease (IPD) surveillance in children < 5 years

- Set up in 2012, enlarged in 2015
- Further expanded in 2016
- ≈10 mil. children <5 years

Objective

- To measure the **impact** of the vaccination with pneumococcal conjugate vaccines (PCV) on IPD in children < 5 years pooling data from PCV13 sites (n=9) versus sites using PCV10 alone or mixed with PCV13 (n=4) in their vaccination programmes



PCV10/13 impact on IPD incidence: **Methods**

Study design

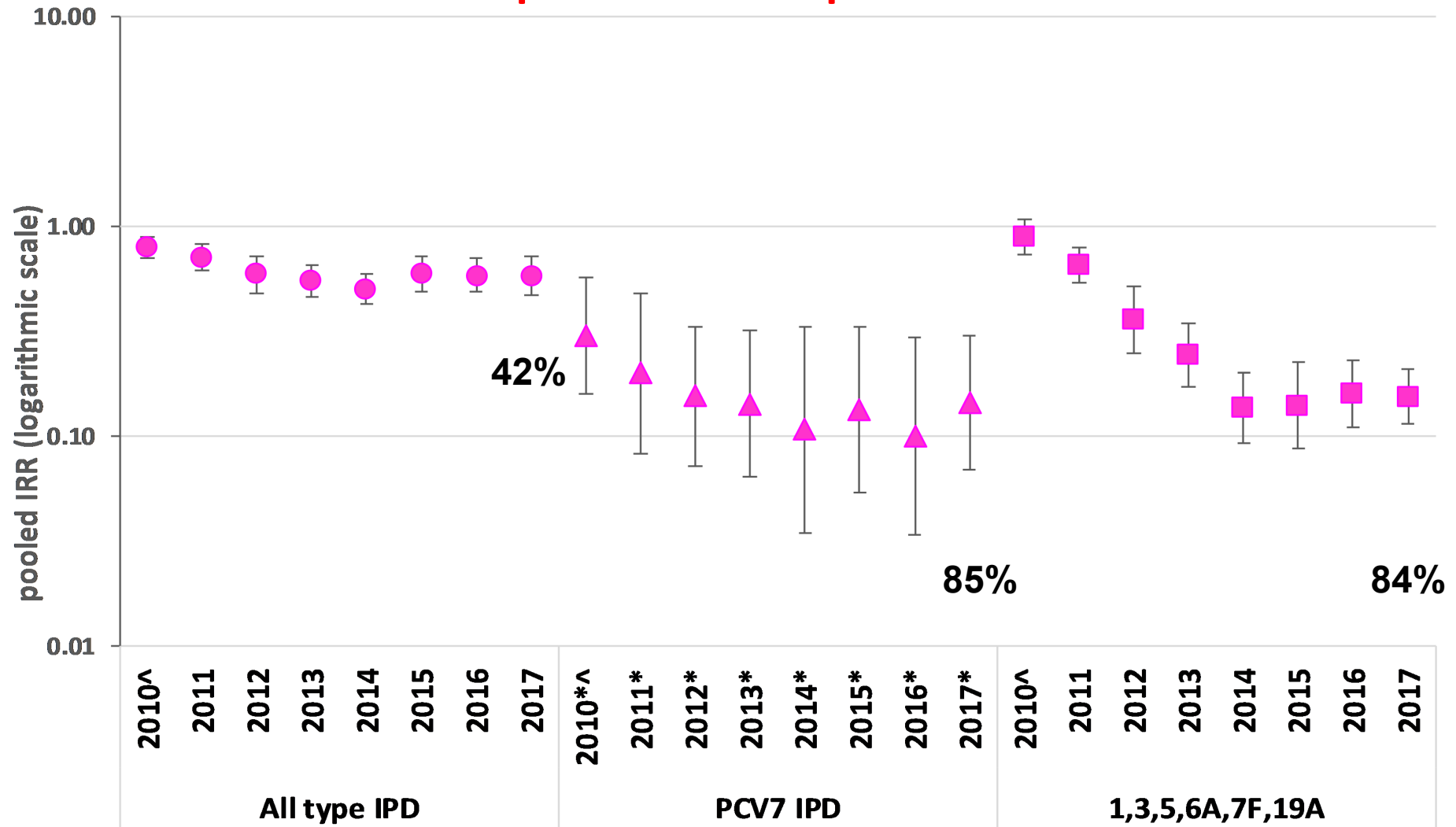
- Before/after study: retrospective data (13 sites)
 - **Cases:** Confirmed IPD by serotype category in children < 5 years
 - **Denominators:** Population by site and year in children < 5 years

Analysis

- **IPD incidence/site:** imputed for missing serotypes (13 sites) and adjusted for surveillance sensitivity (three sites)
- **Incidence rate ratios (IRR):** each PCV10/13 year vs average incidence in PCV7 years (range 0-6 years)/site
- **Pooled IRR, heterogeneity (Tau^2):** random effects meta-analysis
 - Sites using PCV13 (9 sites) vs sites using PCV10+/-PCV13 (4 sites)
- **Effect calculation:** $(1 - \text{pooled IRR}) * 100$

Ratio of IPD incidence in children < 5 years after PCV13 introduction (n=9 sites)

compared to PCV7 period

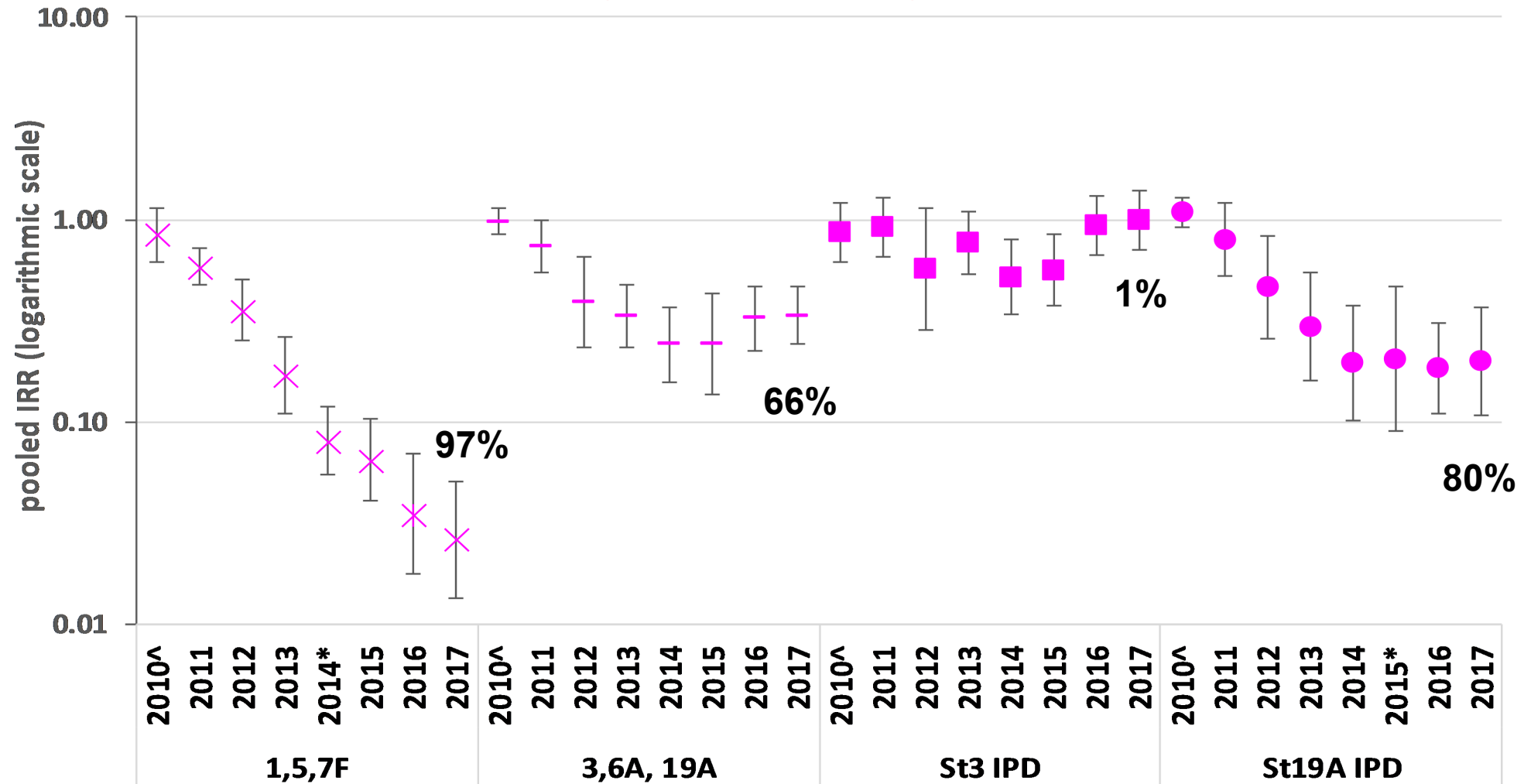


*Tau²>0.5; IRR= incidence rate ratio

^ Transition year

Ratio of IPD incidence in children < 5 years after PCV13 introduction (n=9 sites)

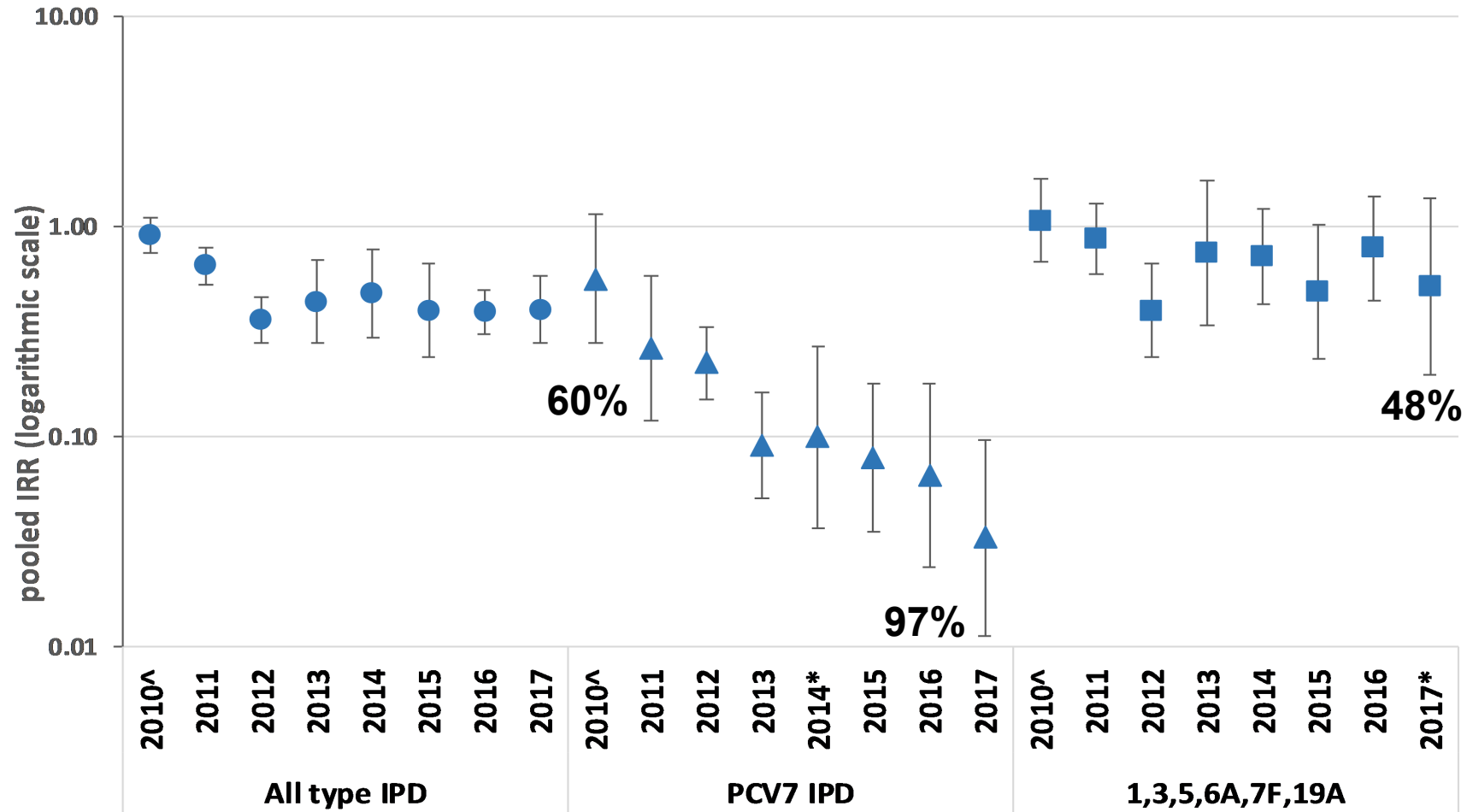
compared to PCV7 period



*Tau²>0.5; IRR= incidence rate ratio;

^ Transition year

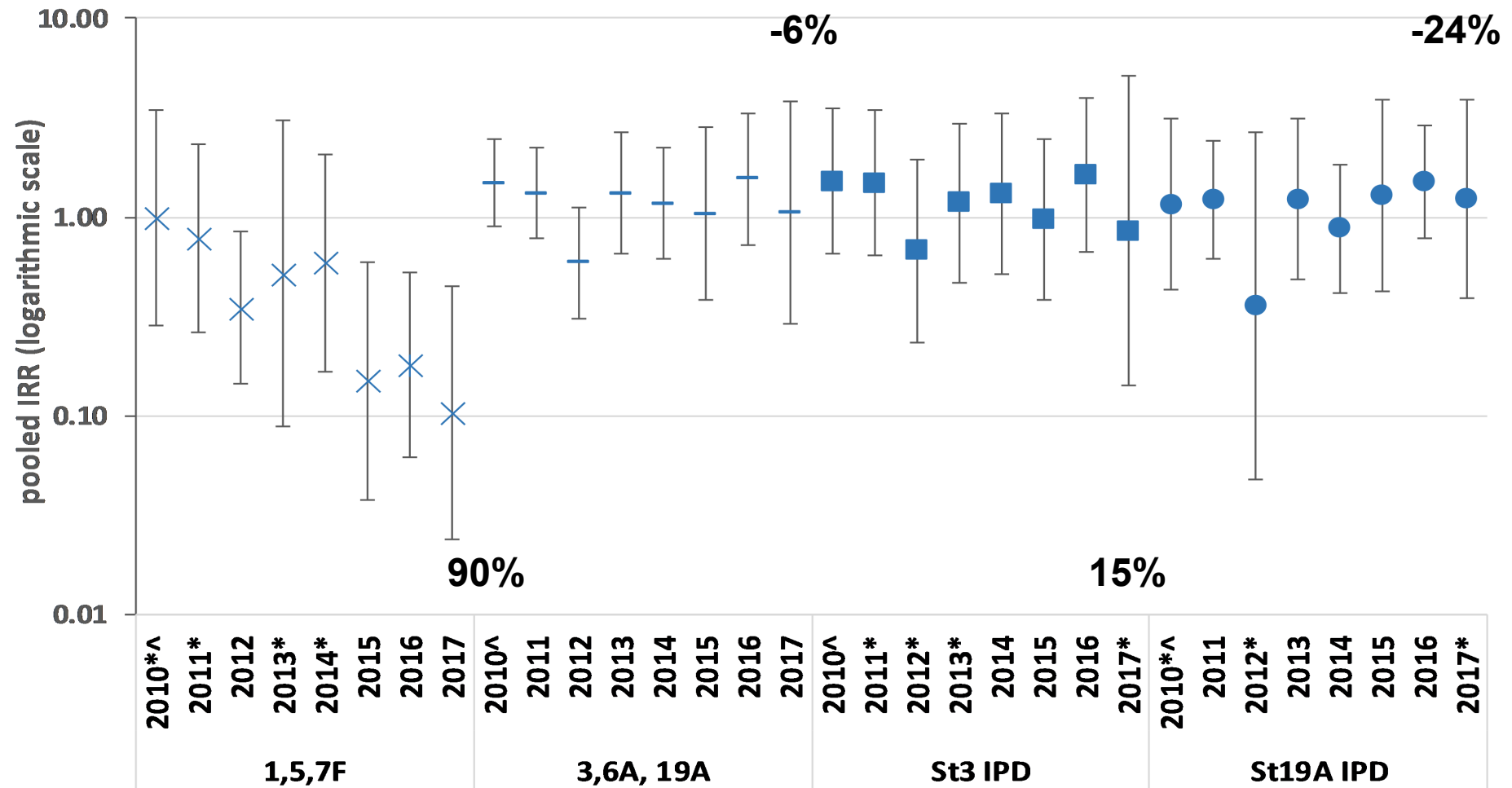
Ratio of IPD incidence in children < 5 years after **PCV10+/-PCV13** introduction, SplDnet+ (n=4 sites) compared to **PCV7** period



*Tau²>0.5; IRR= incidence rate ratio

^ Transition year

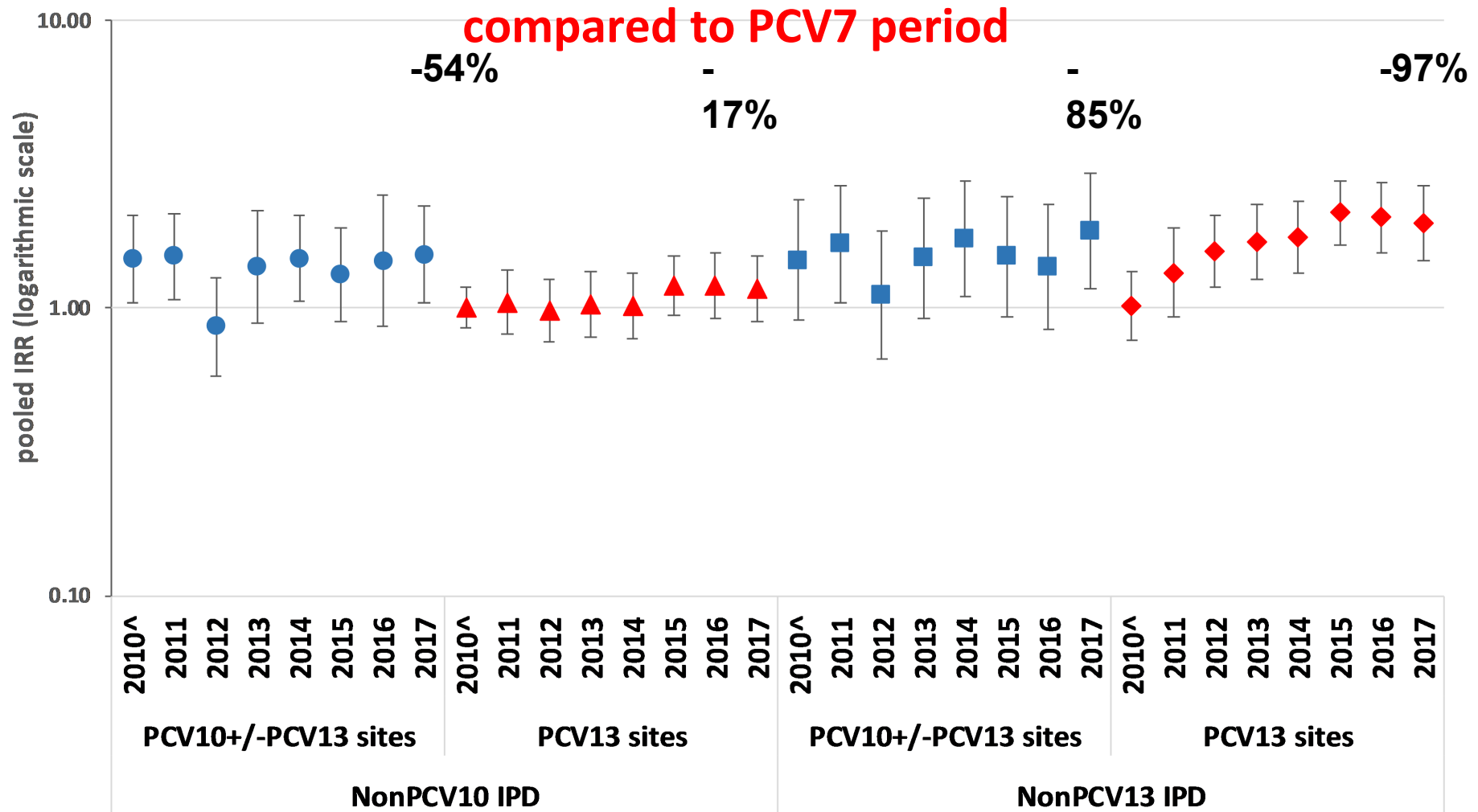
Ratio of IPD incidence in children < 5 years after **PCV10+/-PCV13** introduction, SpIDnet+ (n=4 sites) compared to PCV7 period



* $\tau^2 > 0.5$; IRR= incidence rate ratio;

[^] Transition year

Ratio of IPD incidence in children < 5 years after introduction of vaccines: **nonPCV10 IPD vs nonPCV13** **IPD**



*Tau²>0.5; IRR= incidence rate ratio ^ Transition year

Discussion and Conclusion

Assumptions and Limitations

- Pre and post-PCV10/13 health practices, epidemiology and surveillance did not change
- Heterogeneity across sites: random effect analysis
- PCV10+/-PCV13 group: one PCV10 site and the two PCV10+/-PCV13 sites had limited PCV7 use (0-1 year)
- Need for serotype-specific data

Conclusions

- Decrease in the PCV7 and 1, 5, 7F **vaccine serotypes incidence** relatively similar
- No impact on **serotype 3 incidence** in PCV13 sites and no change for PCV10+/-PCV13 sites
- **19A incidence** declines in the PCV13 sites but not in the PCV10+/-PCV13 sites
- The increase in the **nonPCV13 incidence** is similar, the impact on **nonPCV10** seems favourable to PCV13 sites
- The decrease of all-type IPD incidence seems larger in PCV10+/-PCV13 sites explained by
 - Less number of years of PCV use
 - Use of PCV13 in the sites with mix PCV10 and PCV13 vaccination

➔ continuous surveillance in all age groups is needed in preparation of PCV15 and PCV20 introduction

SplDnet+ team

At the surveillance sites:

Professionals from participating hospitals and laboratories in each site

Finland: H. Rinta-Kokko, J. Jokinen, P. Nuorti

At the ECDC: E. Colzani, L.

At Epiconcept:

Thank you!

Děkuji!

Tak!

Merci!

Takk!

Dank je!

Obrigada!

Multumesc!

Gracias!

Tack!

Kiitos!