


## Impact of a meningococcal B vaccine on gonorrhoea in New Zealand

Janine Paynter on behalf of the project team – Helen Petousis-Harris, Felicity Goodyear-Smith, Peter Saxton, Jane Morgan and Steve Black  
Also Dr Fiona Radcliff and her team


**CONECTUS**  
 Working together for maternal, child and family health

## Disclosure

This research has been funded by Novartis Vaccines & Diagnostics AG (now a member of the GSK group of companies, due to the acquisition by GSK group of companies of the non-influenza Novartis' Vaccines division) and sponsored by Auckland UniServices Ltd

## The story begins with the Meningococcal vaccination programme...

- ◆ Epidemic caused by meningococcal B bacteria
- ◆ Vaccine developed using the OMV of New Zealand strain of the *Neisseria meningitidis* Group B
- ◆ Vaccination programme 2004-2008 with everyone under 20 years old eligible from 2004-2006.
  - ◆ over 300 cases in 2001 to less than 30 cases in 2010. (Ministry of Health website)



## A scientist wondered something after reading something about the Meningococcal B vaccine programme evaluation...

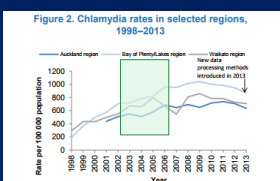
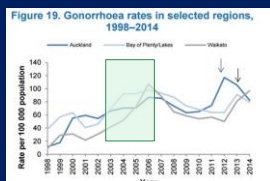
- ◆ Professor Steven Black
- ◆ Examined MeNZ B effectiveness against invasive pneumococcal disease (60-70%)
- ◆ Impact on another species of *Neisseria*????

Poisson Regression Modelling of the Effectiveness of the Meningococcal B Vaccine (MeNZB)  
Updated results to December 2008

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PO Box 280, Wellington

31 October 2011

There was a strange anomaly in incidence of gonorrhoea compared to another similar STI in New Zealand after the MeNZB programme...



Health Intelligence Team, Institute of Environmental Science and Research Limited

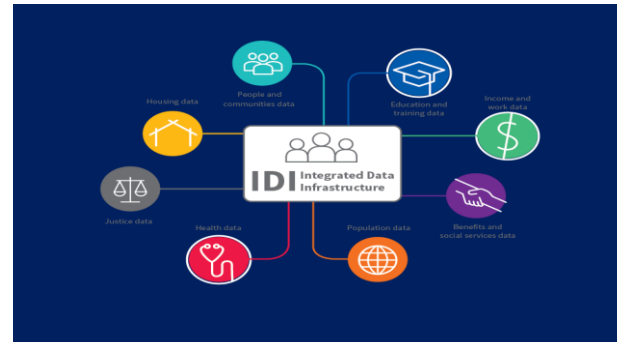
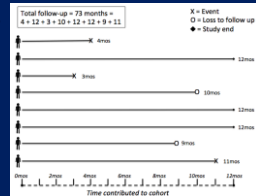
## We conducted a case –control study...



- ◆ Used Ministry of health data – the national immunisation register and NHI demographic data
- ◆ Vaccination status, ethnicity, deprivation, sex and age
- ◆ Sexual health clinics from around New Zealand provided data on gonorrhoea and chlamydia diagnosis and confirmation
  - ◆ Vaccine effectiveness estimate of 31% (95% CI 21–39).

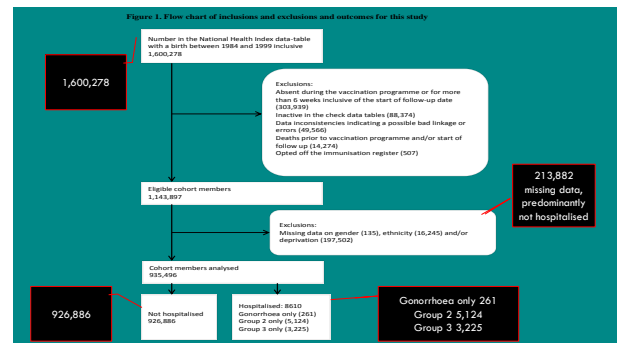
Wondered if it was possible to do a cohort study...

- ❖ Vaccinated versus unvaccinated. Did less vaccinated young adults get hospitalised with gonorrhoea?
- ❖ Except many young people like to travel
- ❖ Not knowing who has stayed and who has travelled for a substantial period of time is a problem. However....

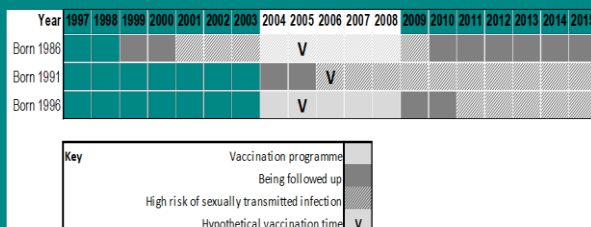


#### Disclaimer:

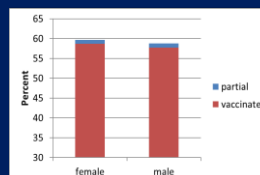
Access to the data presented was managed by Statistics New Zealand under strict micro-data access protocols and in accordance with the security and confidentiality provisions of the Statistic Act 1975. Our findings are not Official Statistics. The opinions, findings, recommendations, and conclusions expressed are those of the author(s)/researchers, not Statistics NZ.



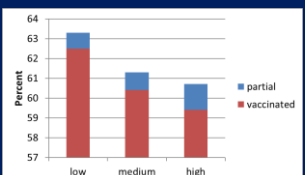
#### Risk of STI throughout follow-up for cohort



#### Gender by vaccination



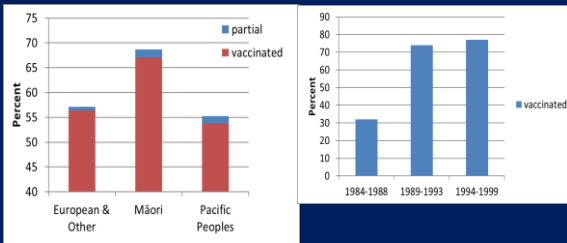
#### Deprivation by vaccination



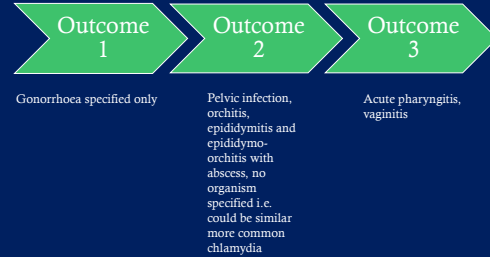
NB Y axis scales different in order to highlight partially vaccinated differences

### Ethnicity by vaccination

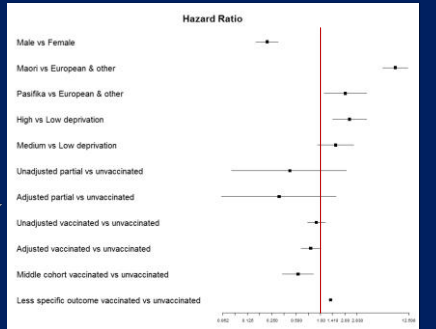
### Age group by vaccination



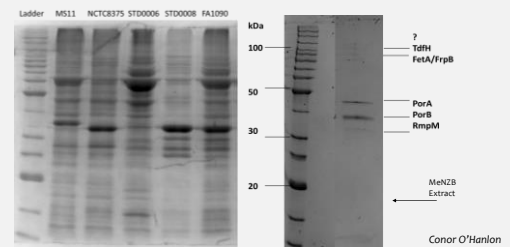
### Decreasing specificity as indicated with ICD10 codes



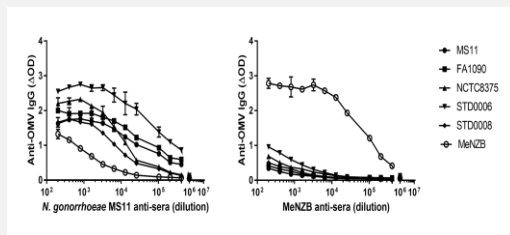
Result summary:  
Left of red line is less risk of hospitalisation for the category left of the “vs”



### Extracts of OMVs from *N. gonorrhoeae*



### Cross-reactivity with MeNZB anti-sera and gonococcal OMVs



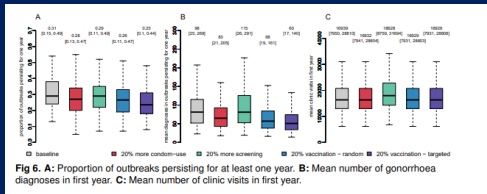
Conor O'Hanlon

### Cross-reactivity with MeNZB anti-sera and gonococcal OMVs



## Modelling impact of vaccine using dynamic power law sexual network model

Immunisation... "shows great promise"... "even if the vaccine was only partially effective or applied to only a random subset of the population."



A dynamic power-law sexual network model of gonorrhoea outbreaks

Lilith K Whittles,  
Peter J White,  
Xavier Didelot

preprint first  
posted online May.  
18, 2018; doi:  
<http://dx.doi.org/10.1101/322875>.

## Conclusions of Canadian research

A decrease in *Ng* IR among individuals 20 years and less was observed during the post-vaccination period whereas it increased in those older than 20 years.

During the same period, *Ct* infections increased in both age groups.

Are those paradoxal trends related to 4CMenB or to another factor?

Longtin J, Dion R, Simard M, Betala Belinga JF, Longtin Y, Lefebvre B, Labbé AC, Deceuninck G, De Wals P.

Institut national de santé publique du Québec, Université Laval, CISSS du Saguenay-Lac-Saint-Jean, Jewish General Hospital.

## In summary:

- ◆ The cohort study supports the findings of the original case control study i.e. there is evidence of a small to moderate reduction in gonorrhoea hospitalisation attributable to the McNZB (meningococcal B OMV vaccine).
- ◆ The vaccine effectiveness estimate for the overall cohort is 24% (95% CI 1-42%) and 47% (95% C 18-66%) for those vaccinated as teenagers and who were likely to be at risk of an STI throughout most of follow up.
- ◆ Preliminary laboratory studies led by Dr Fiona Radcliff investigating protein similarity and antibody responses in mice also indicate potential for cross protection.
- ◆ Canadian work hints at an effect.
- ◆ Modelling indicates even a modest vaccine effect could be very useful
- ◆ THANK YOU