

**Horizon scanning in NZ
Outbreaks and existing,
emerging (and re-emerging)
infectious disease patterns**

**Dr Tom Kiedrzynski, Communicable
Disease Team, Ministry of Health**

Overview

- Scope

Threats to NZ health

- Vulnerability to infectious diseases (IDs)
- ‘Unusual’ outbreaks
- Emerging or re-emerging local trends
- Diseases specifically linked to importations
- Main agencies involved in the prevention and control policies of IDs
- Conclusions

Scope

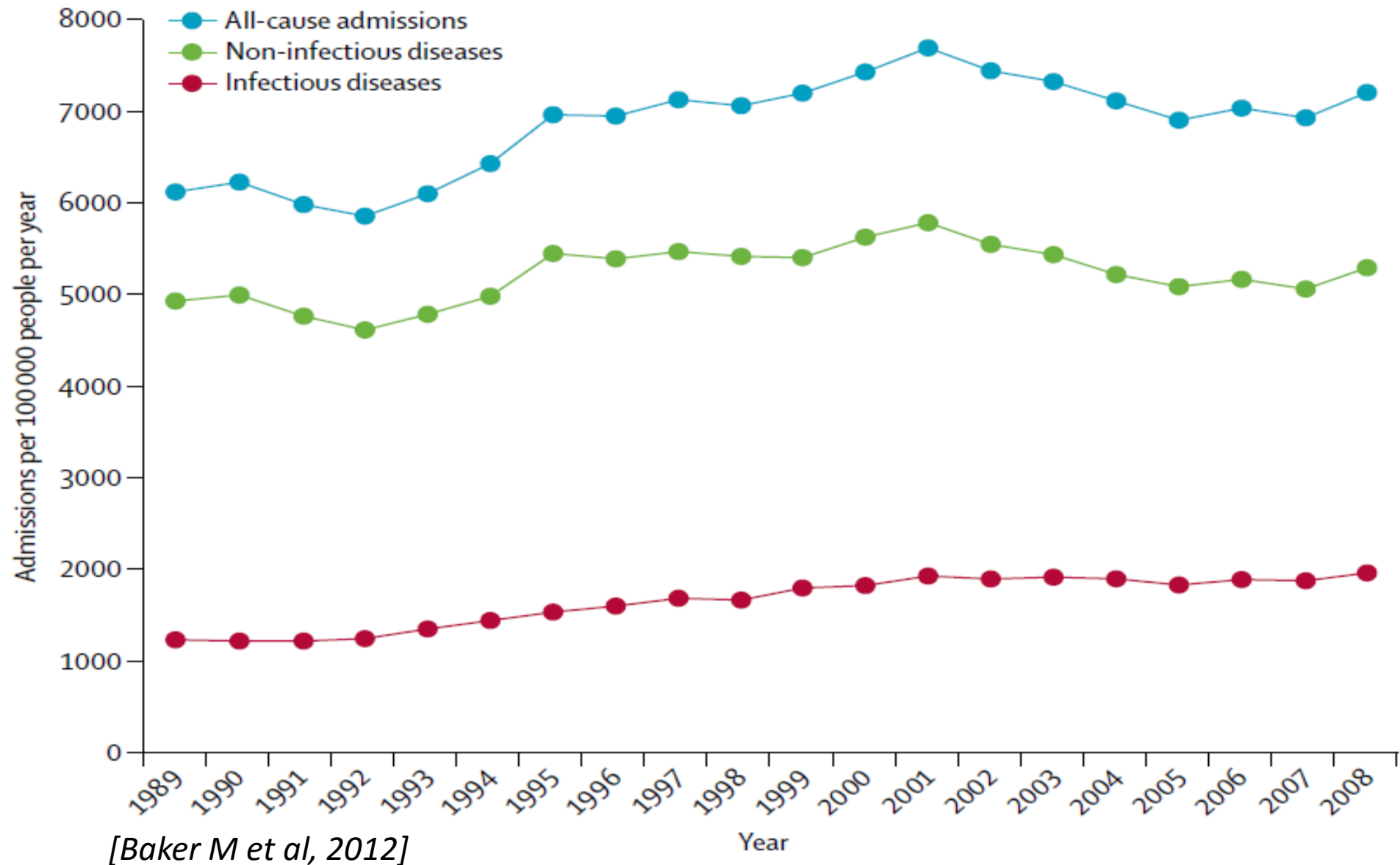
- Local vs global
 - diseases travel with humans and animals
- Existing/potential vulnerability
- IDs that caused unusual outbreaks (unusual because of the high numbers of cases, the pathogen involved or the time of the outbreak) or an unusual increase in number of cases over the last 20 years in NZ
- Emerging trends

Threats to NZ health

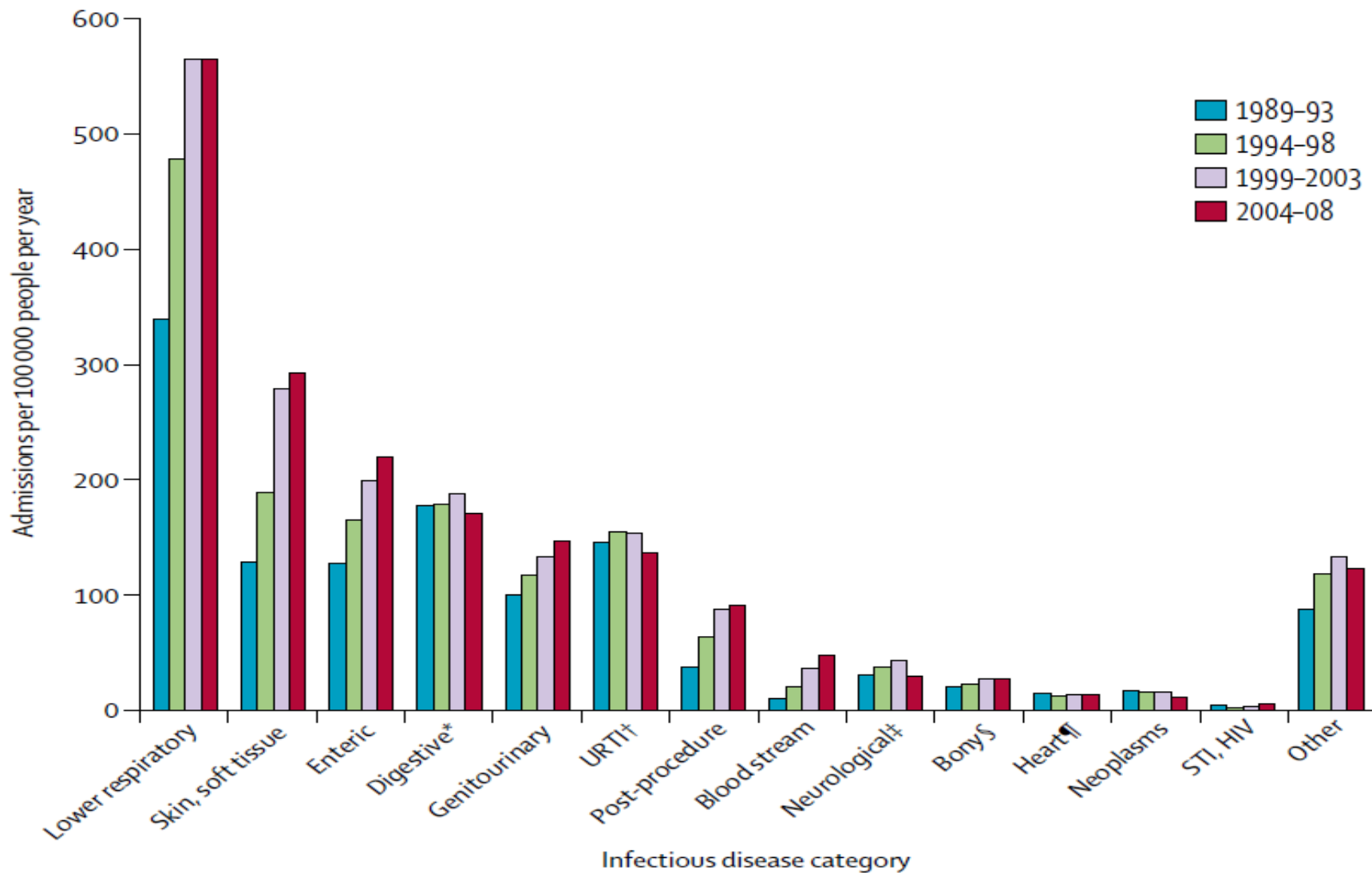
Vulnerability to IDs

- Overall trends and vulnerability patterns in NZ
- Close contact IDs & crowding
- Examples: RF, skin infections, IPD, GE, **Influenza, meningococcal disease**

Annual rate of infectious and non-infectious diseases and all-cause hospital admissions in NZ (1989–2008)



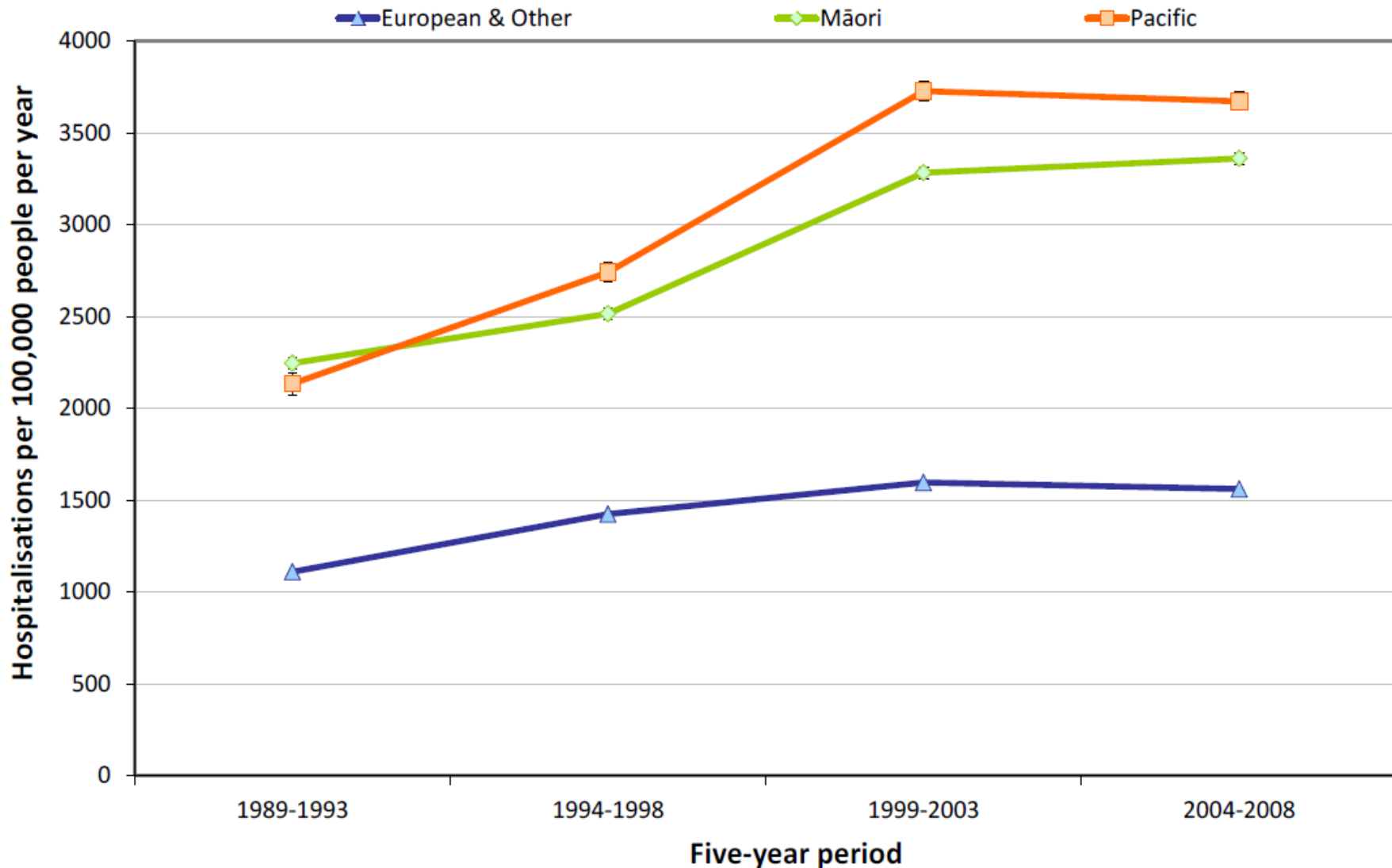
Annual rates of acute hospital admission for major categories of IDs in NZ (1989–2008)



[Baker M et al, 2012]

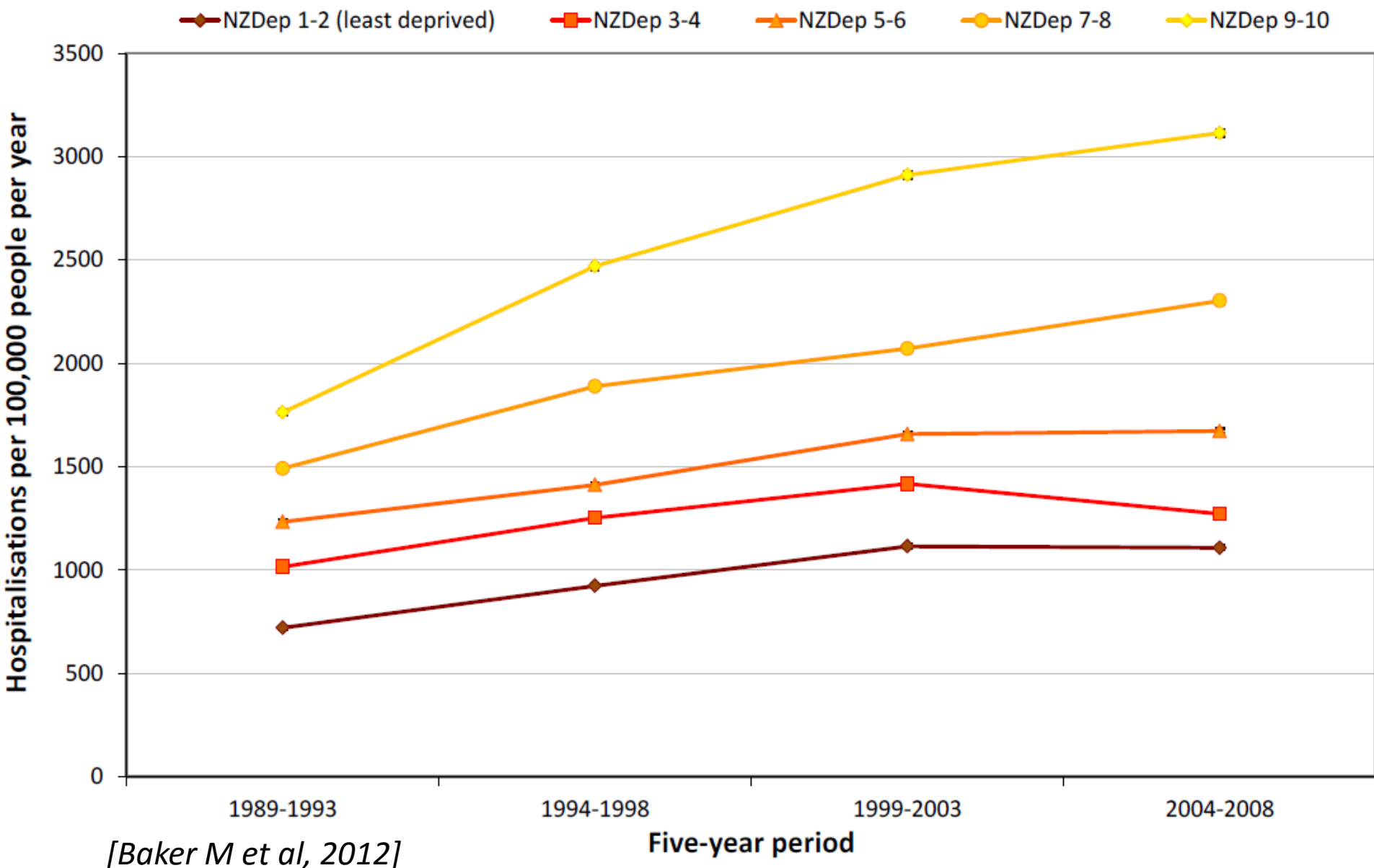
URTI=upper respiratory tract infection. STI=sexually transmitted infection. *Including liver; †including ear; ‡and eye; §bone, joint, and connective tissue; ¶and circulation.

ID hospitalisation rates by ethnic group, NZ 1989–2008 (age-standardised to 2006 Census)

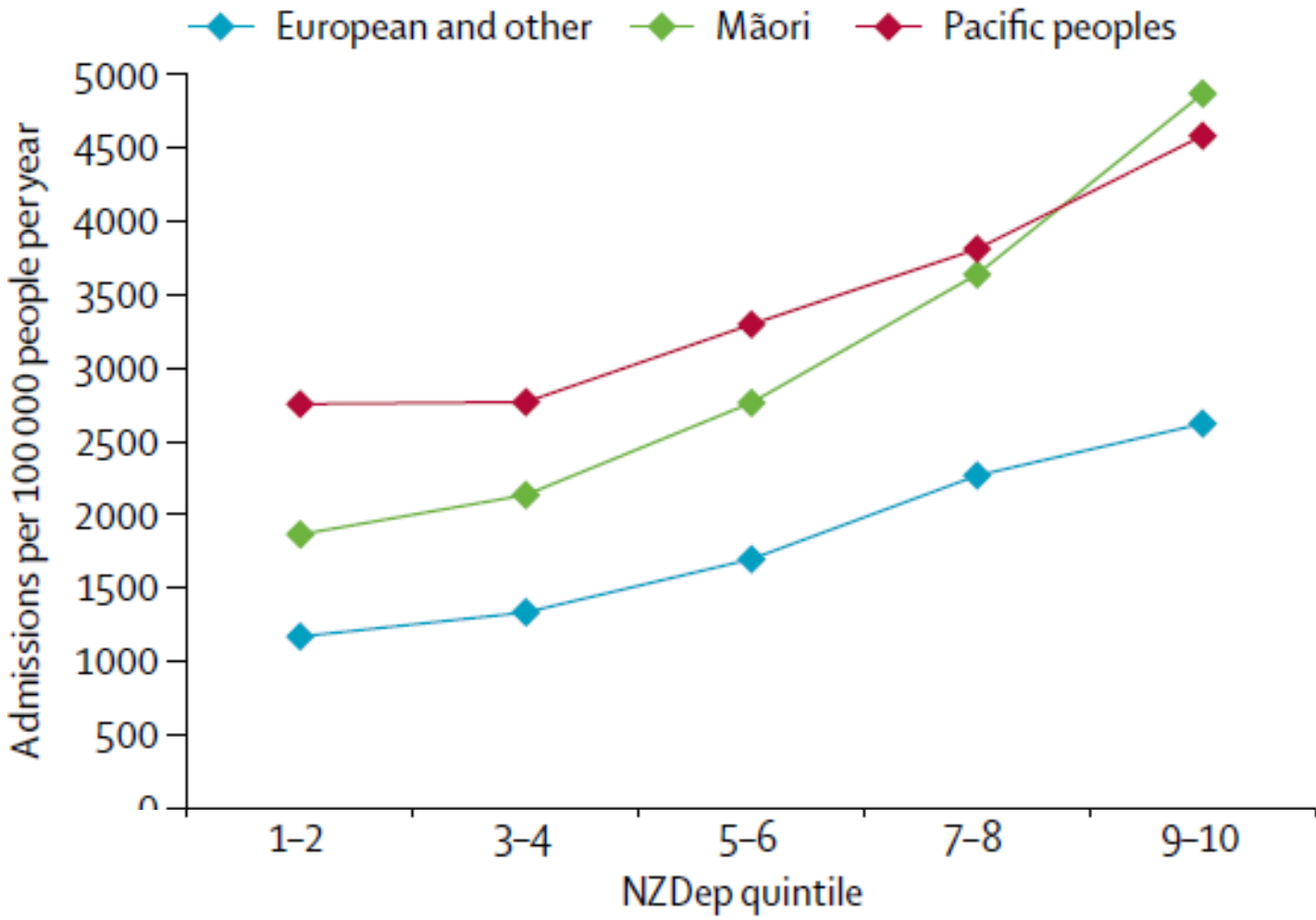


[Baker M et al, 2012]

ID hospitalisation rates by deprivation level (NZDep quintile), NZ 1989–2008 (age-standardised to 2006 Census)

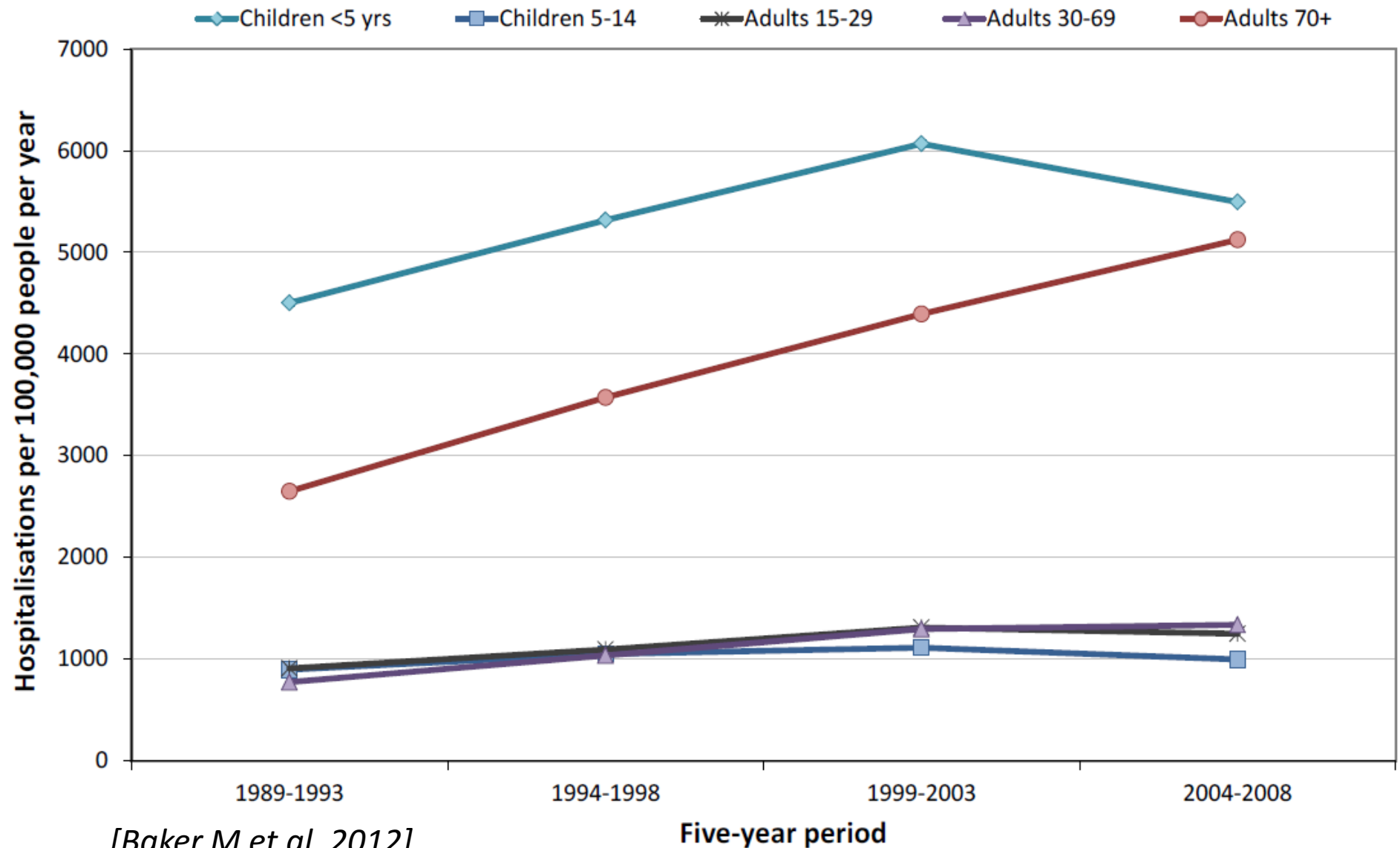


Annual rates of hospital admission for ID for Māori, Pacific peoples, and European and other ethnic groups according to level of deprivation (NZDep quintiles) in NZ (2004–08)



[Baker M et al, 2012]

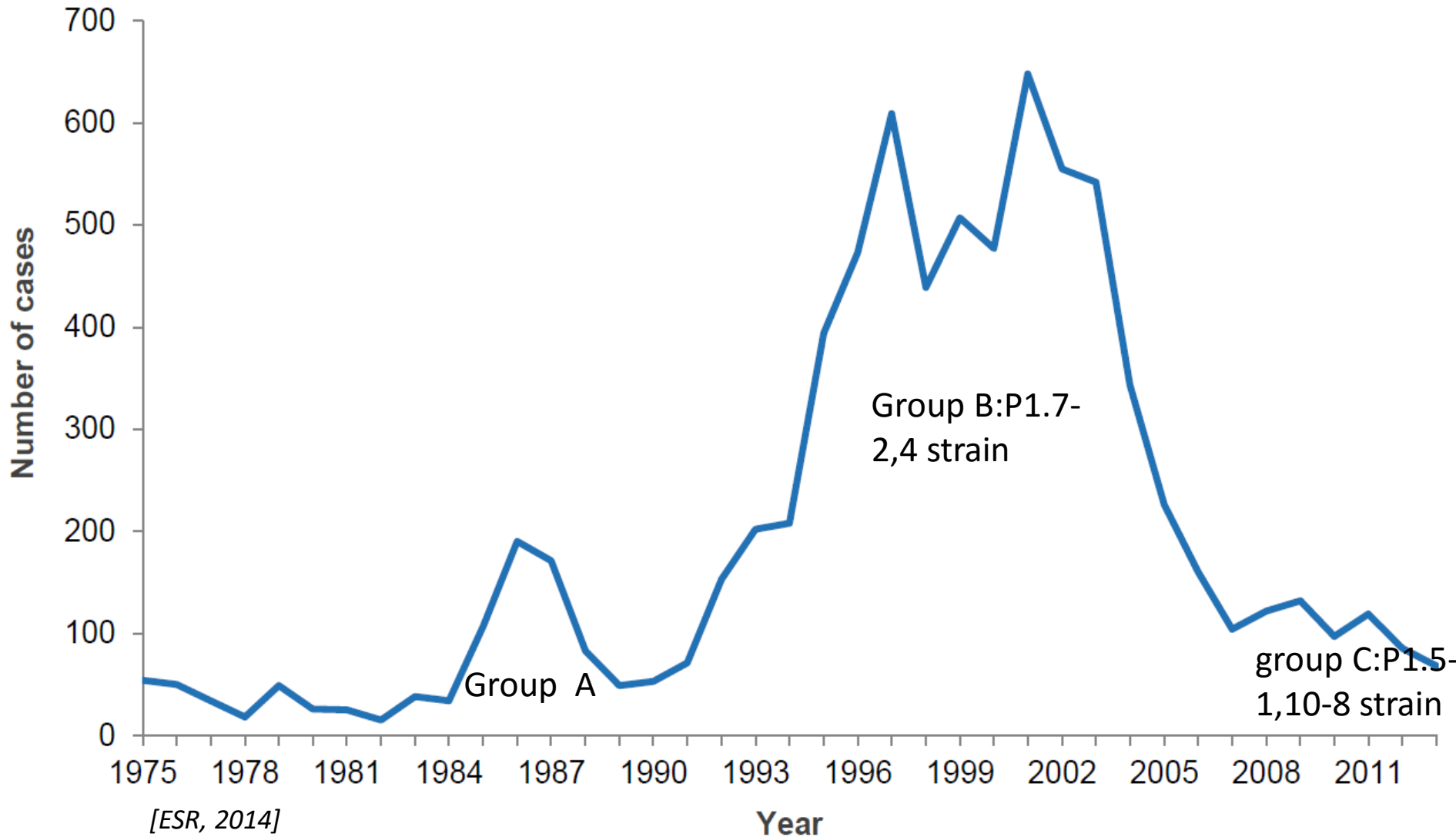
ID hospitalisation rates by age group, NZ 1989–2008



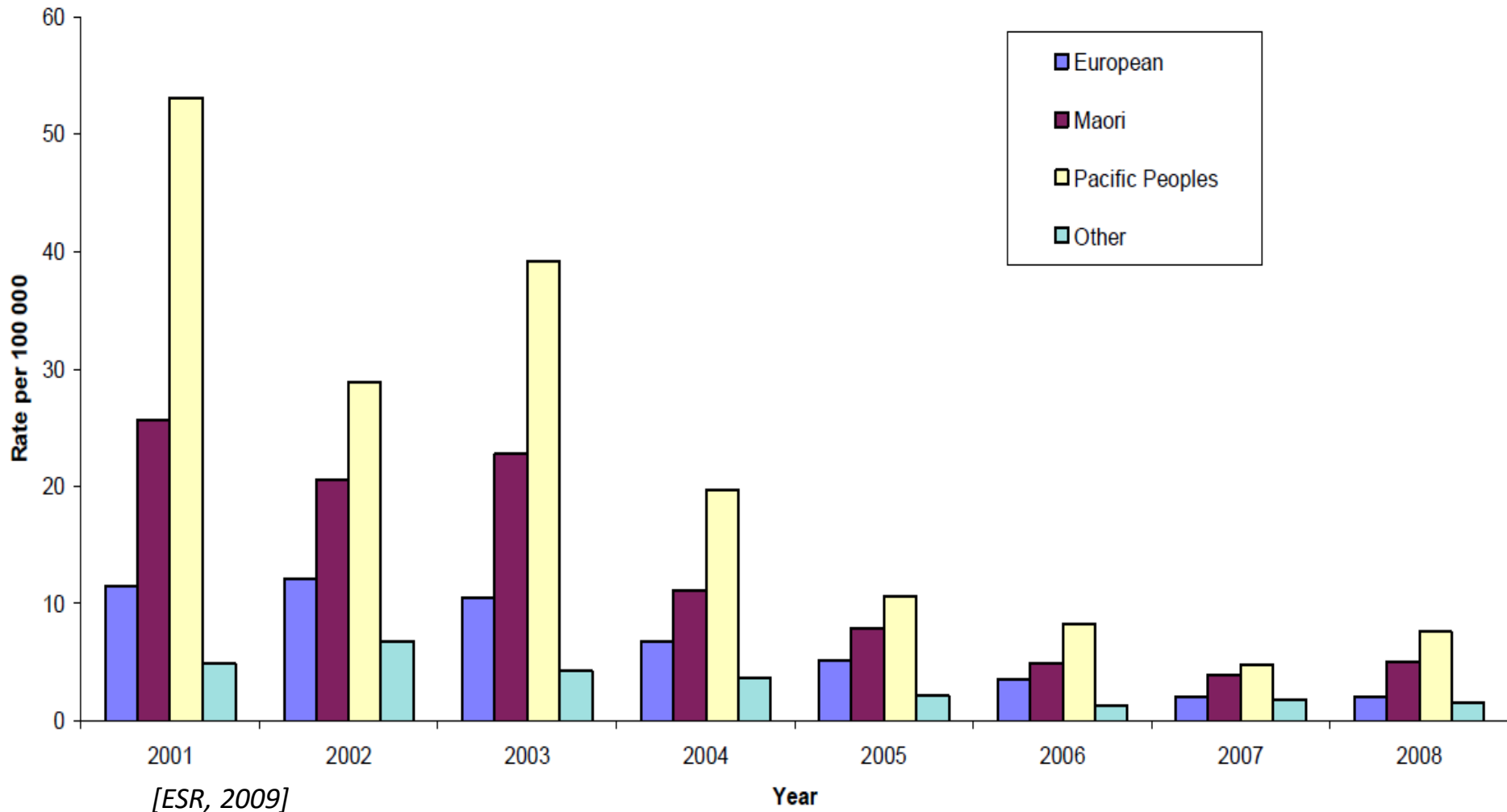
Crowding and IDs

- Meta-analysis reveals a consistent association between crowding and a range of close contact IDs (CCIDs)
- Very large ethnic inequalities within the disease burden.
European/Others < Asian peoples < Māori < Pacific peoples

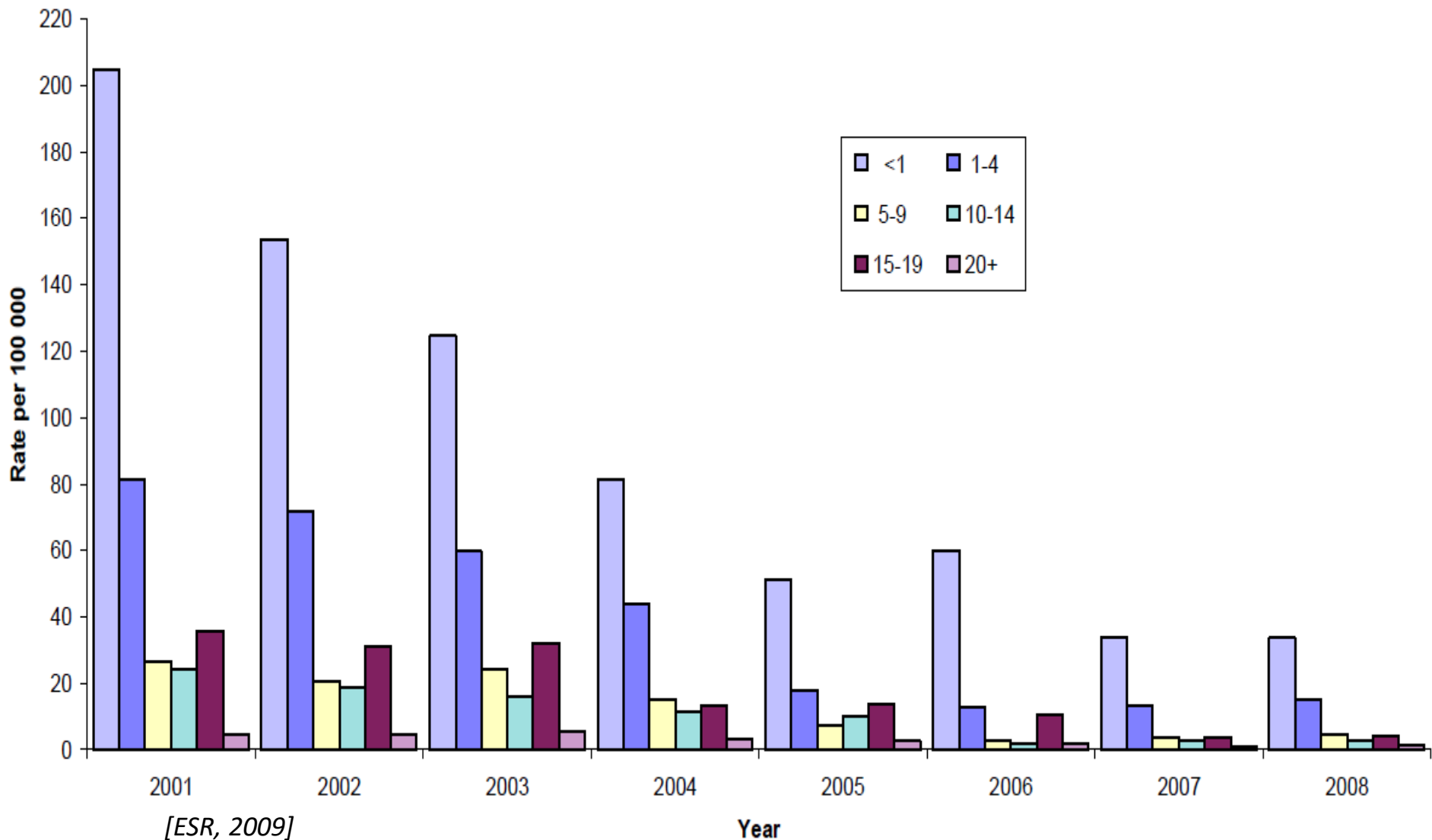
Notified cases of meningococcal disease, 1975–2013



Age standardised rates for total meningococcal disease cases by ethnicity, 2001-2008

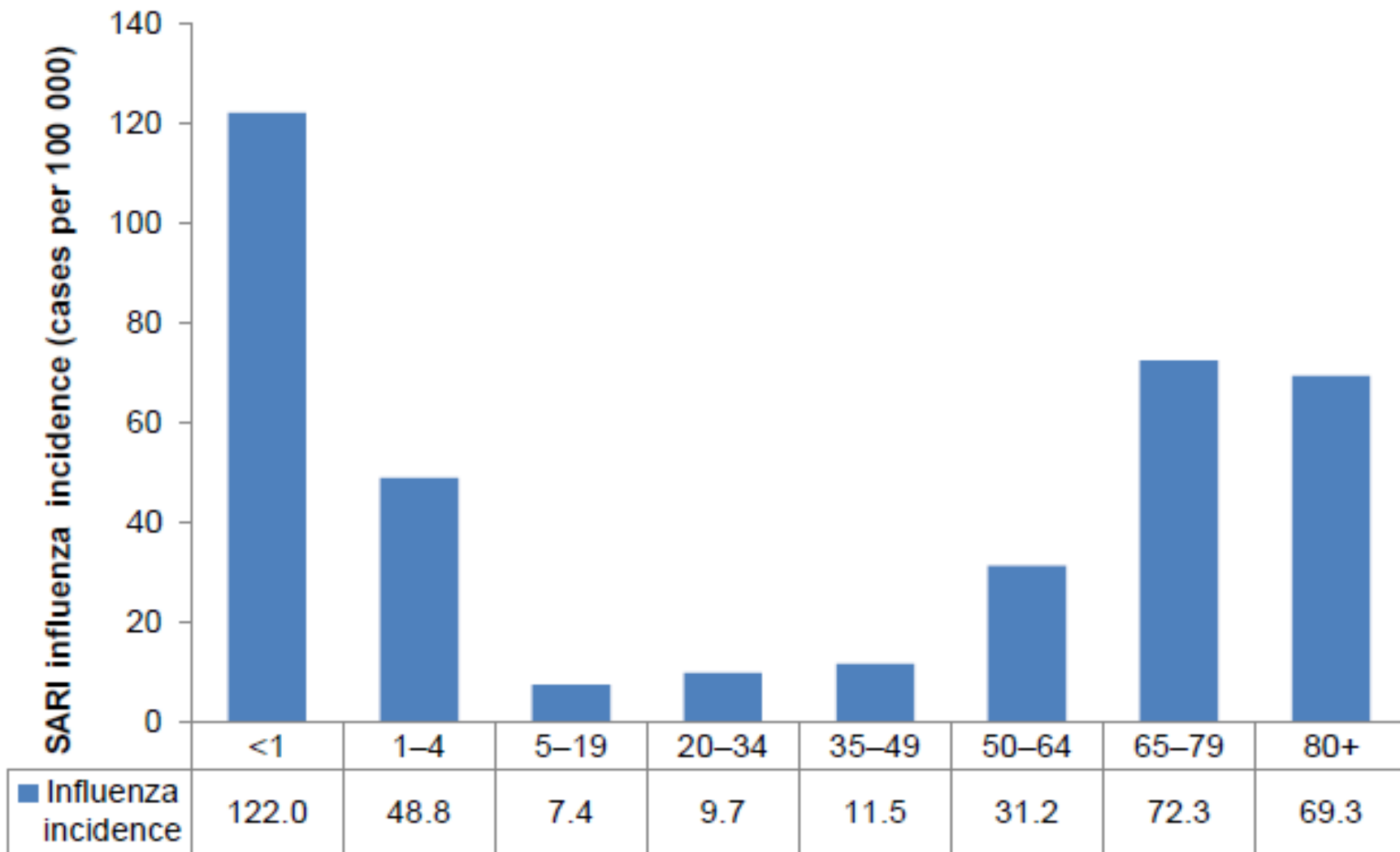


Meningococcal disease rates by age group, 2001- 2008



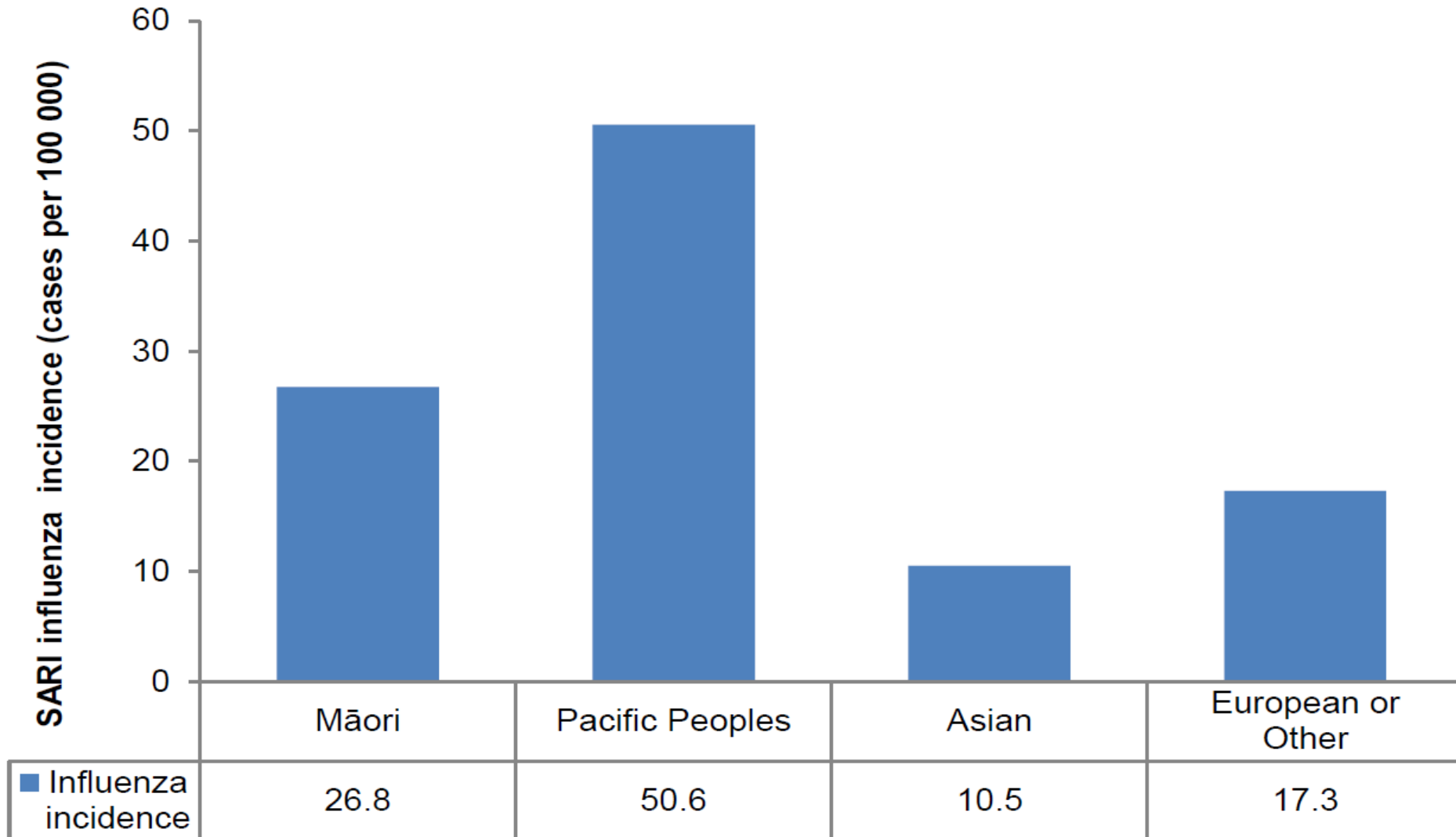
Influenza

Cumulative SARI associated influenza hospitalisation rate by age group
29 Apr to 29 Sep 2013



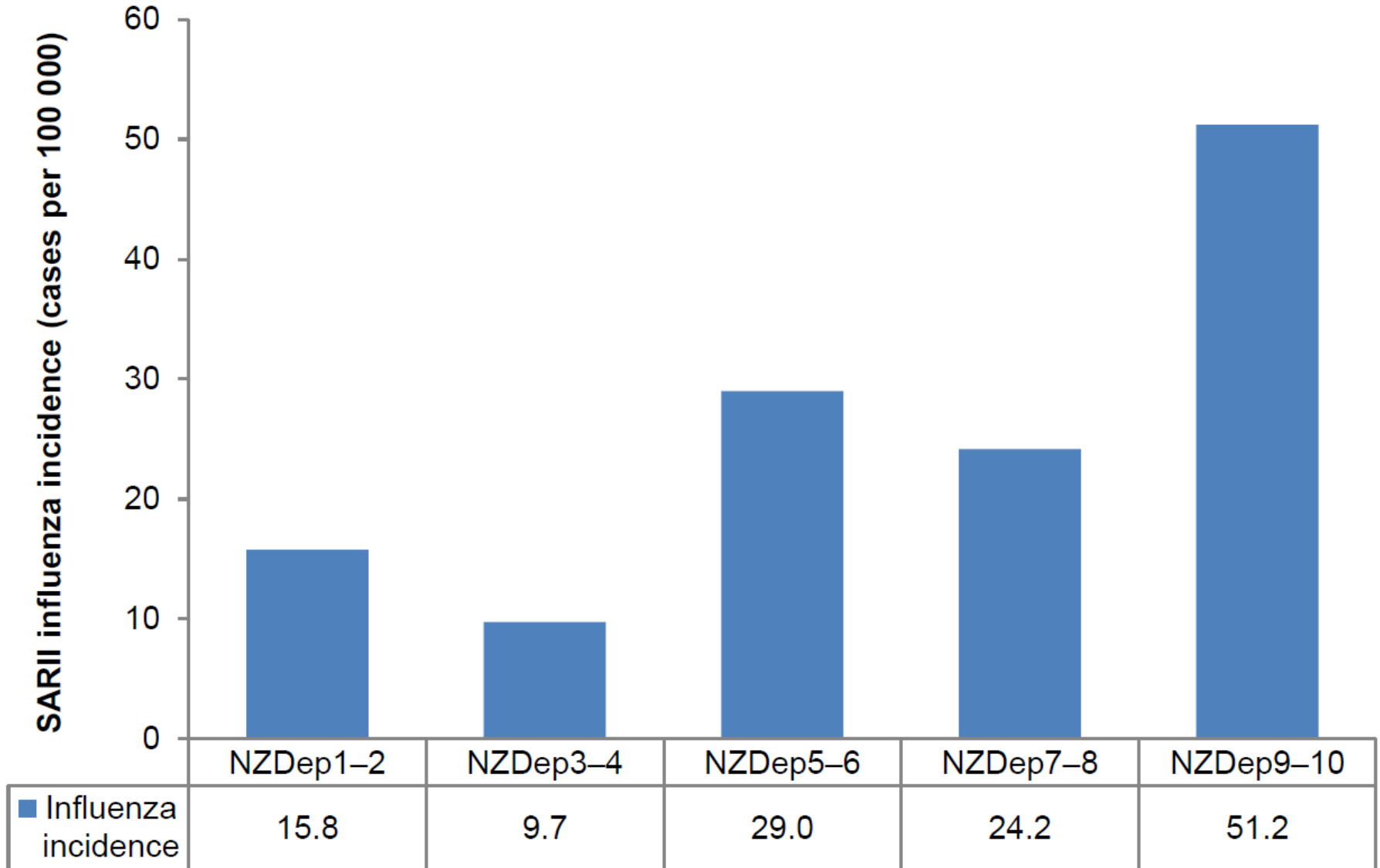
Influenza

**SARI associated influenza hospitalisation rate by ethnic group
29 Apr to 29 Sep 2013**



Influenza

SARI-associated influenza hospitalisation rate by socioeconomic status 29 Apr to 29 Sep 2013

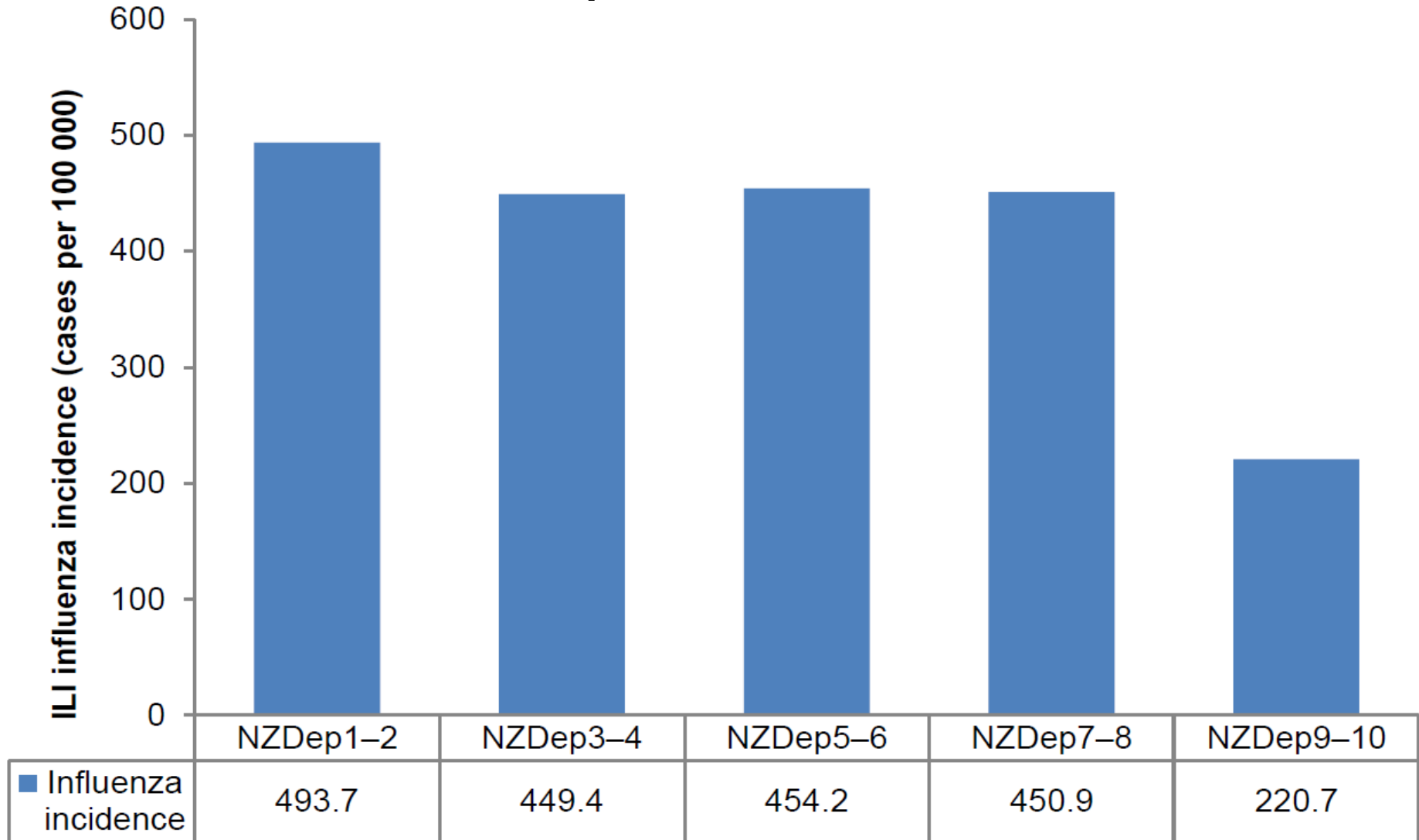


[ESR, 2014]

Influenza

ILI associated influenza incidence by socioeconomic status

29 Apr to 3 Nov 2013

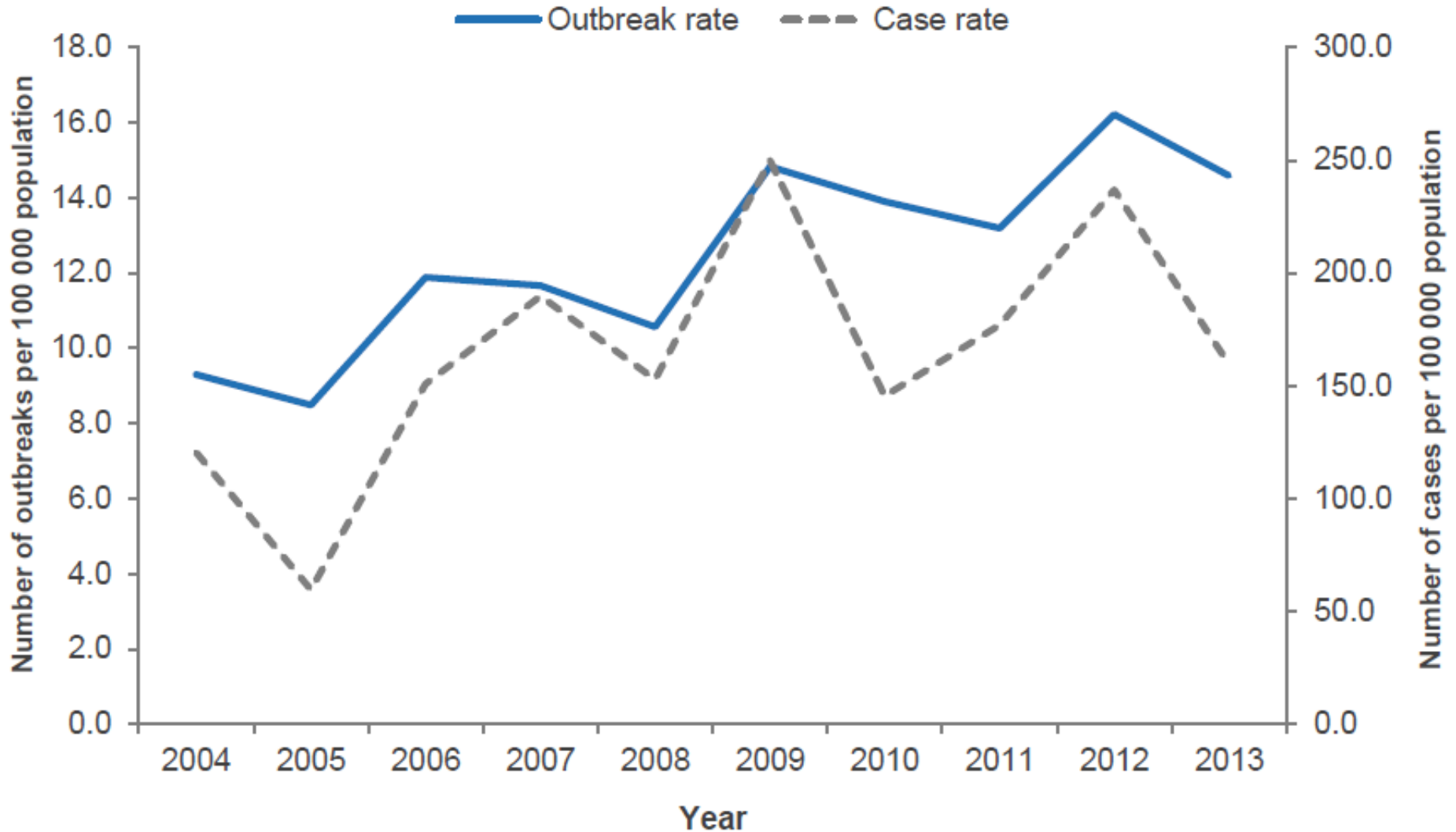


Threats to NZ health

'Unusual' outbreaks

- Overview of outbreaks
- 'Unusual' outbreaks

Outbreak rates and associated cases by year, 2004–2013

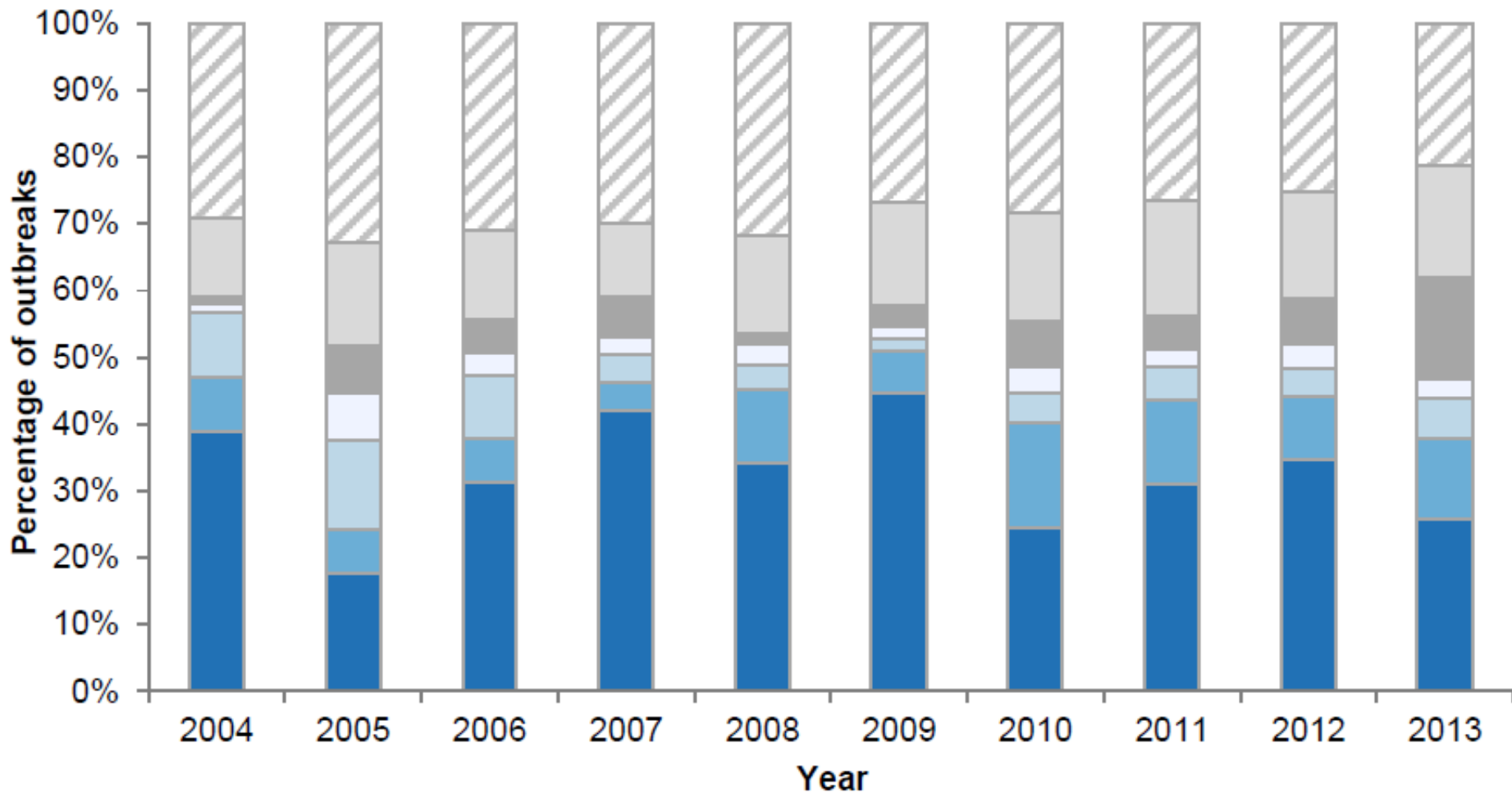
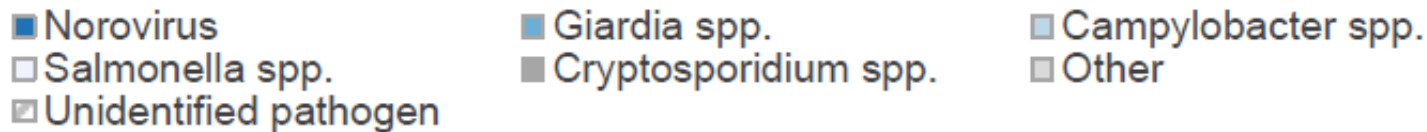


Outbreaks - Trends

Since 2001

- About 90-95% enteric
- Causal agent identified about 70% (66.3–78.7%)

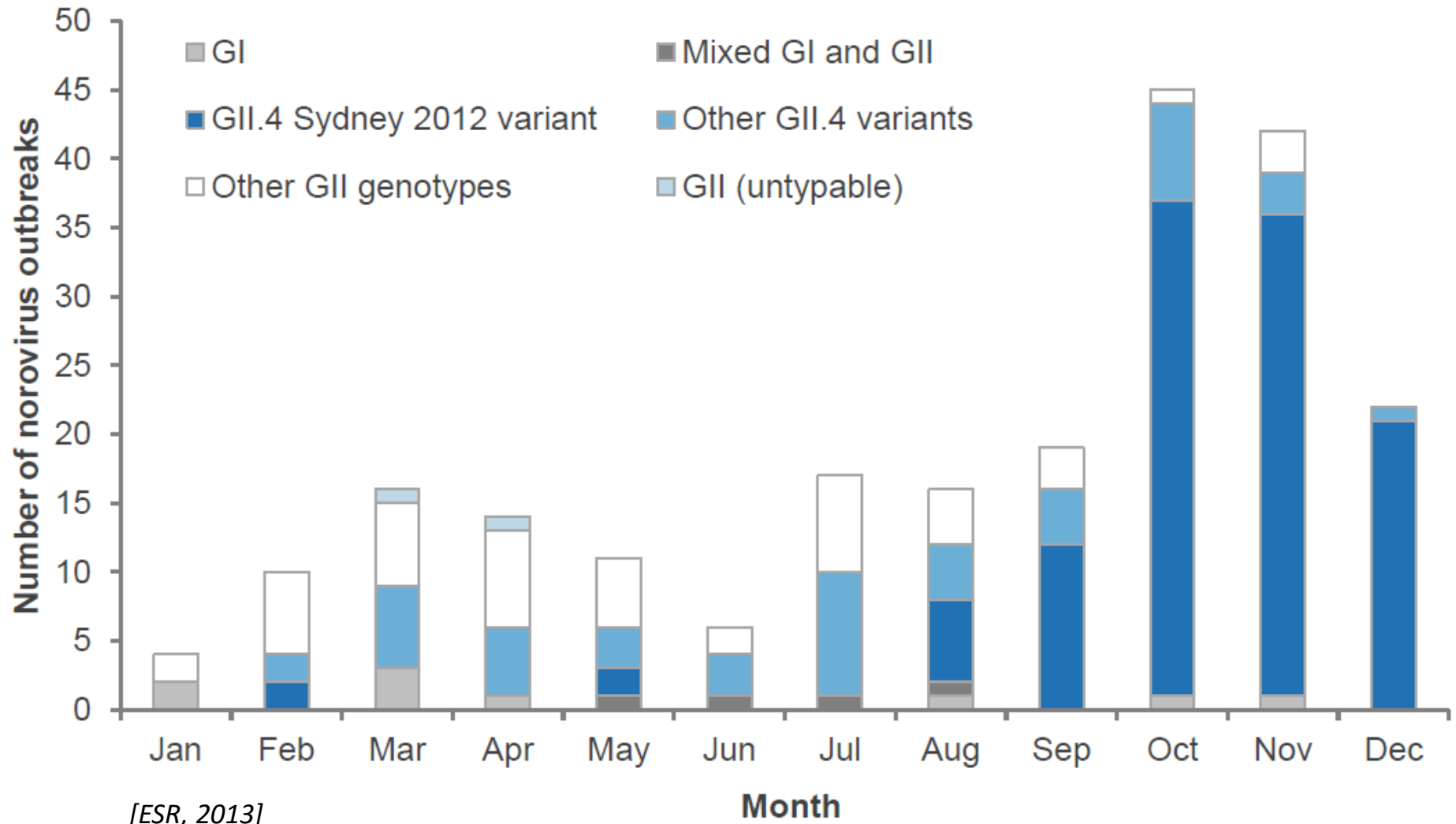
Percentage of outbreaks by pathogen or condition and year, 2004–2013



'Unusual' outbreaks

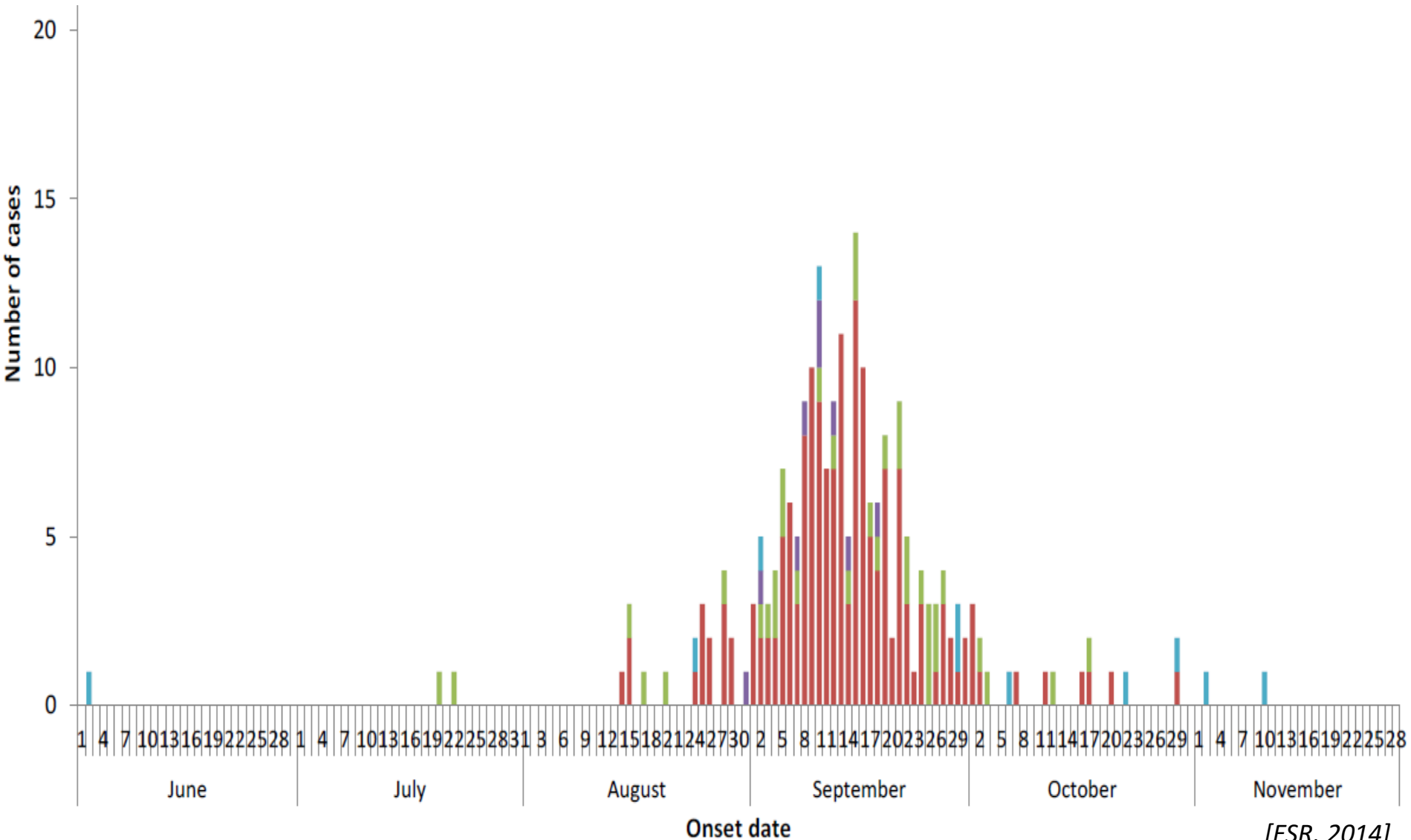
- **Norovirus**—new strains e.g. GII.4 Sydney
- *Clostridium difficile*
- **Meningococcal disease B & C**
- **Yersiniosis**
- **Salmonellosis**
e.g. Mbandaka, Typhimurium (DT160, 135),
Brandenburg....
- **Children: enteroviruses (HFEM)**

Norovirus Reference Laboratory-confirmed norovirus outbreak typing by month, 2012



Yersinia pseudotuberculosis outbreak

Number of *Yersinia pseudotuberculosis* and unknown *Yersinia* species notifications reported to EpiSurv since 01 September 2014, by status and onset date (as of 1145 hours 26 November 2014, n=221)



[ESR, 2014]

NOTE: Excludes 38 cases with no onset date recorded [YPTB ERL (10), YPTB probable (15), YPTB presumptive (1), Unknown (11)] and 1 case with unknown species with an onset date recorded as 15 Oct 2013

Yersinia pseudotuberculosis outbreak (ctd)

- 1/3 of cases hospitalised
- Associated with lettuce and carrots, particularly some specific brands, types and sources
- Given the widespread nature of the outbreak, it was assessed that contamination by *Y. pseudotuberculosis* was likely to have occurred at the grower or processor stage rather than the broker or retailer/consumer stage.
- Source was not found

Enteroviruses

- Affect mostly children <5
- HFMD outbreaks – summer-autumn 2013
 - Auckland: coxsackievirus A6 (CVA6)
atypical illness that is more severe, and affects more frequently adults
 - Australia (Sydney): enterovirus 71 (EV71)
30 children with severe neurological disease

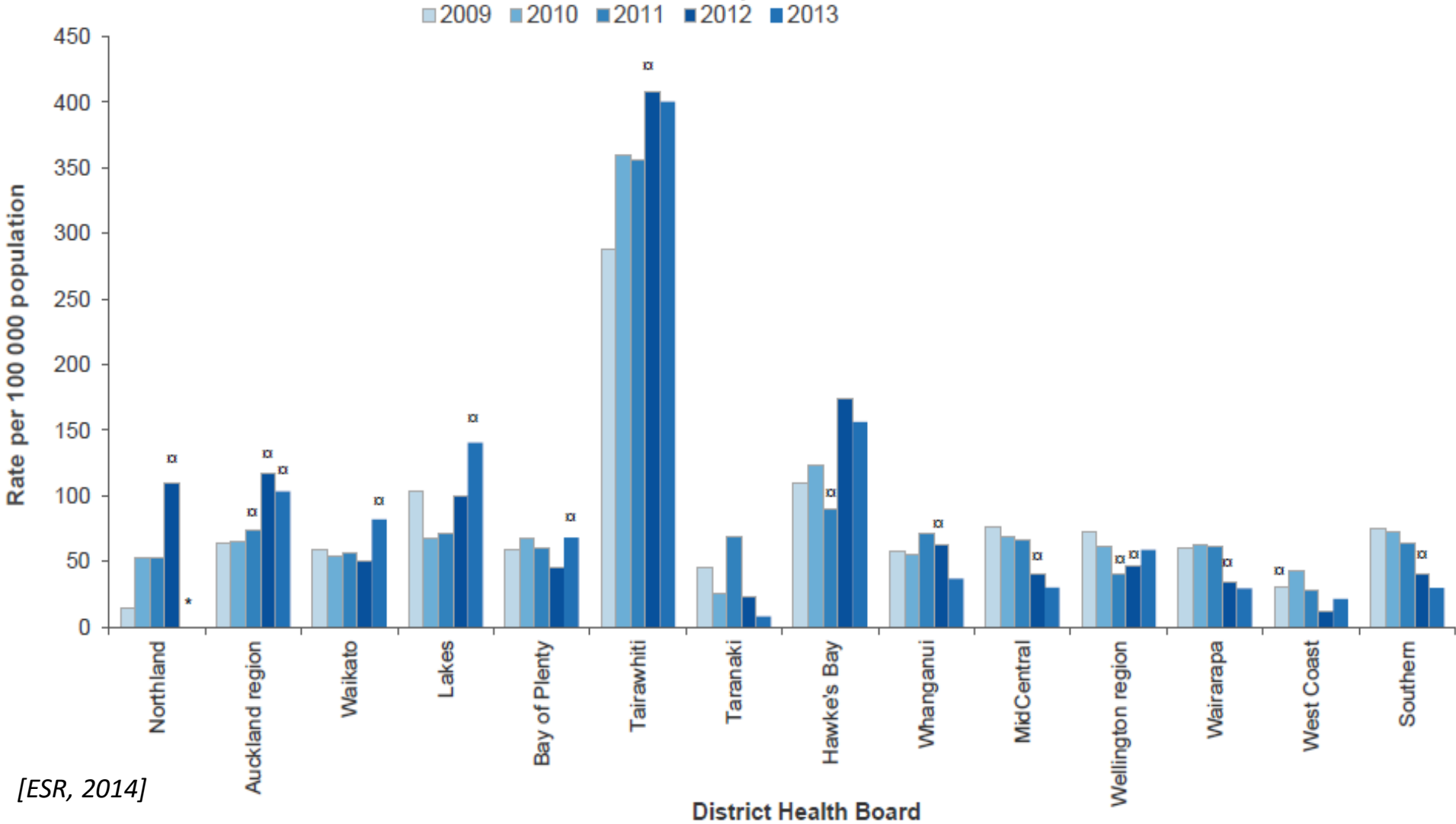
Threats to NZ health

Emerging or re-emerging local trends

- Invasive GAS
- AB resistance
- **STIs**
 - gonorrhoea & chlamydia
 - MSM as a risk factor
- **Legionellosis**
- Foodborne
 - **Campylobacteriosis**
 - Unpasteurised milk
 - TSP
- VPDs
 - Measles
 - Whooping cough
 - IPD
 - New vaccines
 - Immunisation coverage

STIs

Gonorrhoea rates by DHB, 2009–2013



[ESR, 2014]

* Data incomplete.

Notes: Auckland region includes Waitemata, Auckland and Counties Manukau DHBs. Wellington region includes Hutt Valley and Capital & Coast DHBs.

⌘ Introduction of NAAT testing

STIs (ctd)

Confirmed cases by ethnicity and clinic setting, 2013

Chlamydia

Gonorrhoea

Ethnicity	Clinic type		Ethnicity	Clinic type	
	SHC	FPC		SHC	FPC
European	2193	1277	European	278	64
Māori	1838	974	Māori	357	129
Pacific Peoples	502	270	Pacific Peoples	90	34
Other	393	113	Other	77	7
Unknown	61	111	Unknown	18	13
Total	4987	2745	Total	820	247

STIs – At risk behaviour: MSM

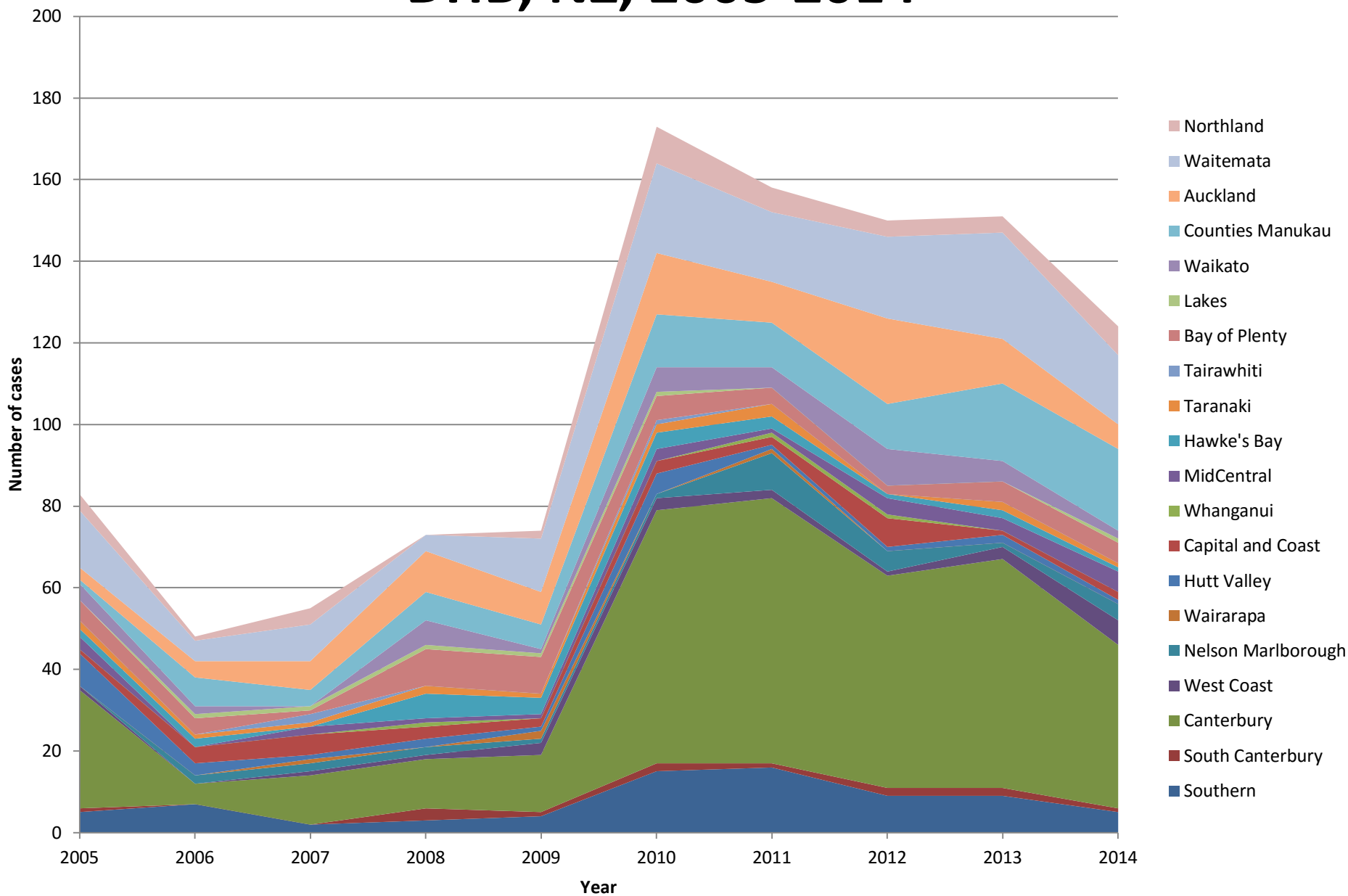
- Internationally, examples of increase STIs transmission among MSM due to unprotected sex
- NZ GAPSS & GOSS surveys [AEG, Nov 2012]

Overall, attitudes towards condoms were highly favourable

However

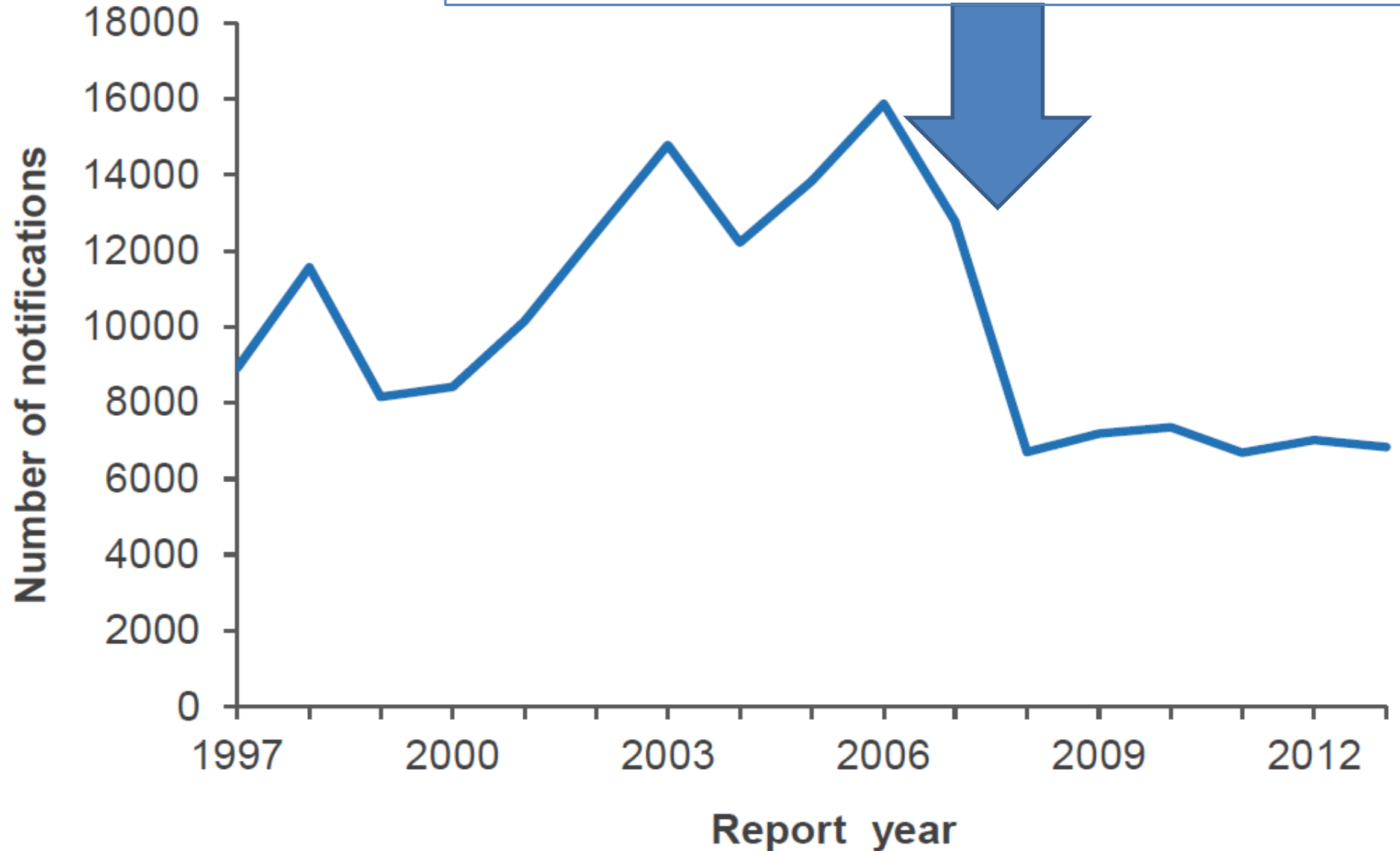
- Close to half agreed they don't like wearing condoms as they reduce sensitivity, and a third agreed that they sometimes feel pressure not to use condoms
- Minority of MSM do not perceive HIV to be an immediate personal threat and this minority is growing
- Having tested positive for HIV was independently associated with holding a number of unfavourable attitudes towards condoms and safe sex

Legionellosis cases (confirmed and probable) by DHB, NZ, 2005-2014



Campylobacteriosis notifications by year, 1997–2013

Monitoring of contamination levels on fresh chicken (Apr 2007)
& regulatory limit set (Apr 2008)



Threats to NZ Health

Diseases specifically linked to importations

Vector-borne diseases

- Mosquitoes

- Ticks

Brown dog tick (*Rhipicephalus sanguineus*) detected in NZ (Christchurch)

The risk to human health is very low.

Overseas, *R. sanguineus* has been shown to transmit two of the spotted fever group rickettsial infections.

MPI – incident response

Outbreak-prone (H-H)

- Measles
- Typhoid
- Hep A
- **TB**

Tuberculosis notifications (new cases) by region of birth, 2013

Region of birth	Cases	Rate ^a
Born in New Zealand	54	1.8
Born outside New Zealand	210	23.9
Australia	2	-
Pacific Islands	33	24.3
North Africa and the Middle East	2	-
Sub-Saharan Africa	16	27.1
North-East Asia	17	12.6
South-East Asia	34	58.4
Southern and Central Asia	97	168.1
Europe	2	-
Southern and Central America	1	-
Unknown	6	-
Total	264	-

^a Rate per 100 000 population. Population data used for the denominator was derived from the 2006 census usually resident population count by birthplace, published by Statistics New Zealand.

Main agencies involved in the prevention and control policies of IDs, by ID category

ID category	Agencies
VPDs	MoH, PHARMAC
CCID	MoH, MSD, HNZCo
HAI	MoH, HQSC (IPC), WorkSafe, DHBs
Bloodborne	MoH, HFNZ, NZBS, WorkSafe
AMR	MoH, PHARMAC, MPI, HQSC
Zoonosis, foodborne	MoH, MPI, WorkSafe, DHBs
Environmental	MoH & MfE (water), MoH & MPI (vectors)
STIs	MoH, DHBs, WorkSafe
Pandemic preparedness	MoH, Whole-of-Government

Conclusion

- Population groups more vulnerable to IDs
 - Pacific and Māori
 - Deprived
 - Very young and old
- IDs with specific vulnerability profiles
 - Meningococcal disease, TB, measles
- Prevention & control measures necessary to avoid or minimise local transmission
 - Multi-agency collaboration
- Are we able to change some of the trends?
 - Positive experiences
 - VPDs, meningococcal disease B, TB, campylobacteriosis, HIV...
 - addressing some of the vulnerability factors
 - RFPP: housing-related CCIDs