Epidemiology of Intussusception in New Zealand Pre Rotavirus Vaccination

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Introduction - Intussusception

- Invagination of intestine into adjacent distal segment.
- Often initiated by infection and gut adenopathy.
- Disrupts vascular supply → perforation and death.
- World-wide incidence 74 /100,000 in children < 1 year.

Introduction - Rotavirus

- Worldwide:
  - Deaths - 200,000 - 450,000 per year
  - Hospitalisations - 2.4 million per year

- New Zealand pre rotavirus vaccination
  - 1 in 43 children hospitalised by age of five.

Introduction – Vaccination

- Rotashield (1999)
  - Increased intussusception risk (1:5000 – 1:10,000)
- RotaTeq and Rotarix (2006 – 2008)
  - Pre-licensure studies, no increased risk.
  - Post licensure studies, small increase (5.6:100,000)
  - Increase particularly associated with first dose.
- NZ - RotaTeq at 6 weeks, 3 and 5 months from July 2014.

Aim

- Describe epidemiology of intussusception:
  - New Zealand children (0 – 36 months)
  - Before routine rotavirus vaccination

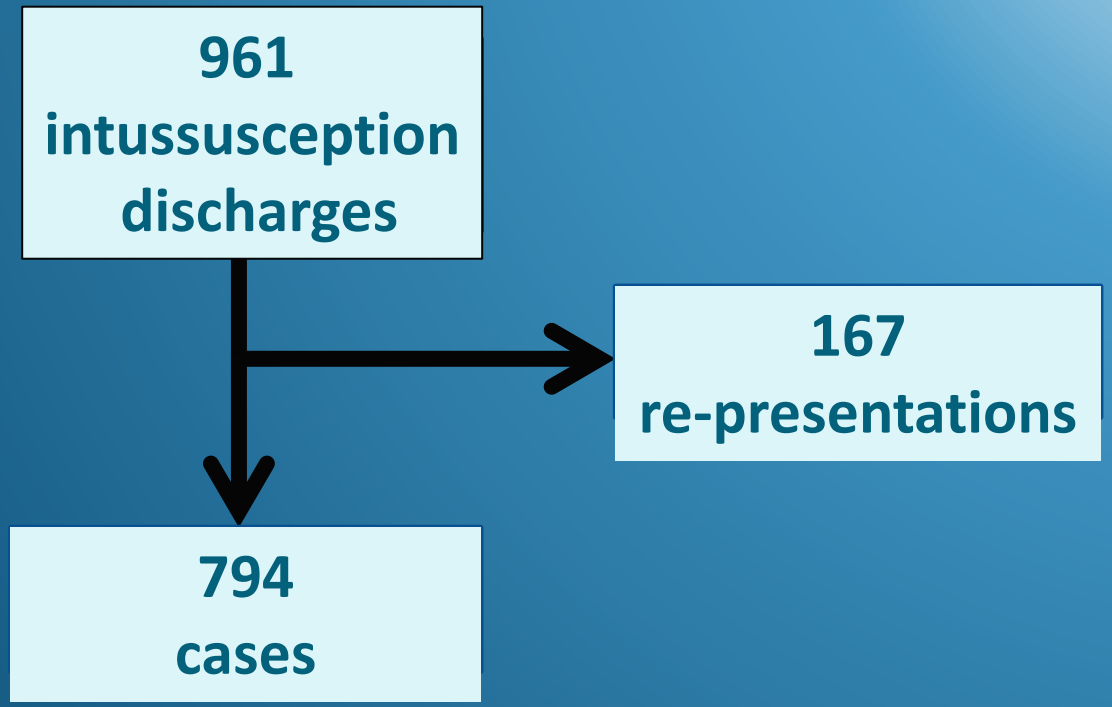
Method

- ICD-10 data from January 1994 to December 2013.
- NZ census birth data

- Population incidence rates by:
  - age
  - sex
  - ethnicity
  - season

- Poisson distribution and non-parametric statistics
- Compared rates to international norms

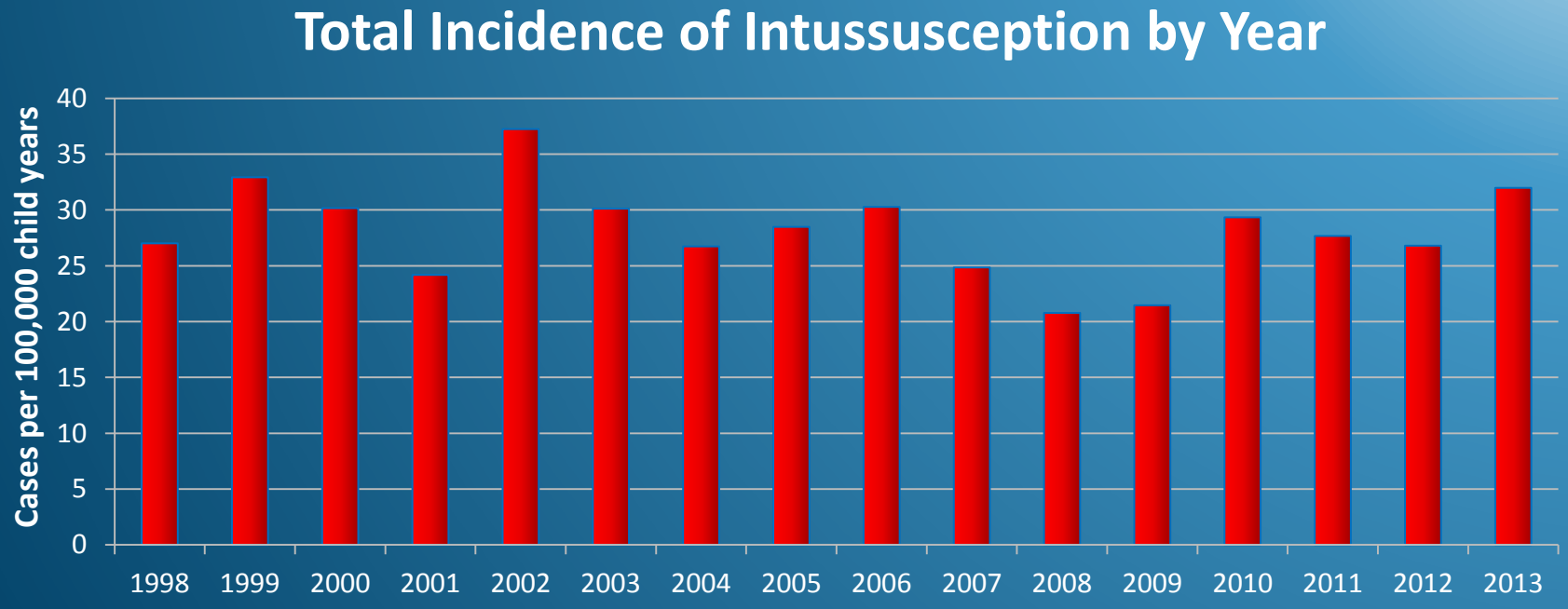
Data


961
intussusception
discharges
167
re-presentations
794
cases

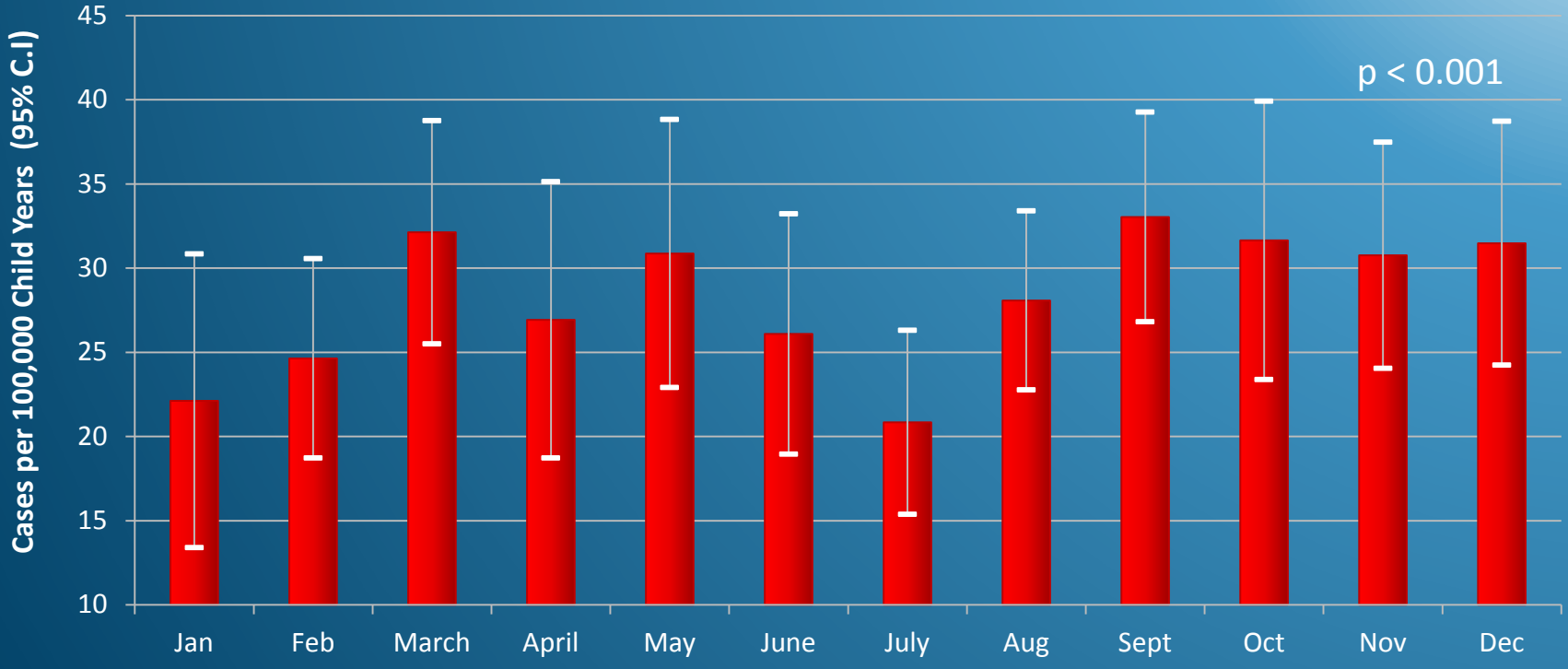
Incidence

Age	Cases	Population	Incidence	95% C.I.
< 1 year	531	946614	56.1	41.7-71.2
1-2 years	176	959666	18.6	9.4–25.9
2-3 years	87	915909	9.2	3.3–15.2
Total	794	2822189	28.0	17.5–38.2

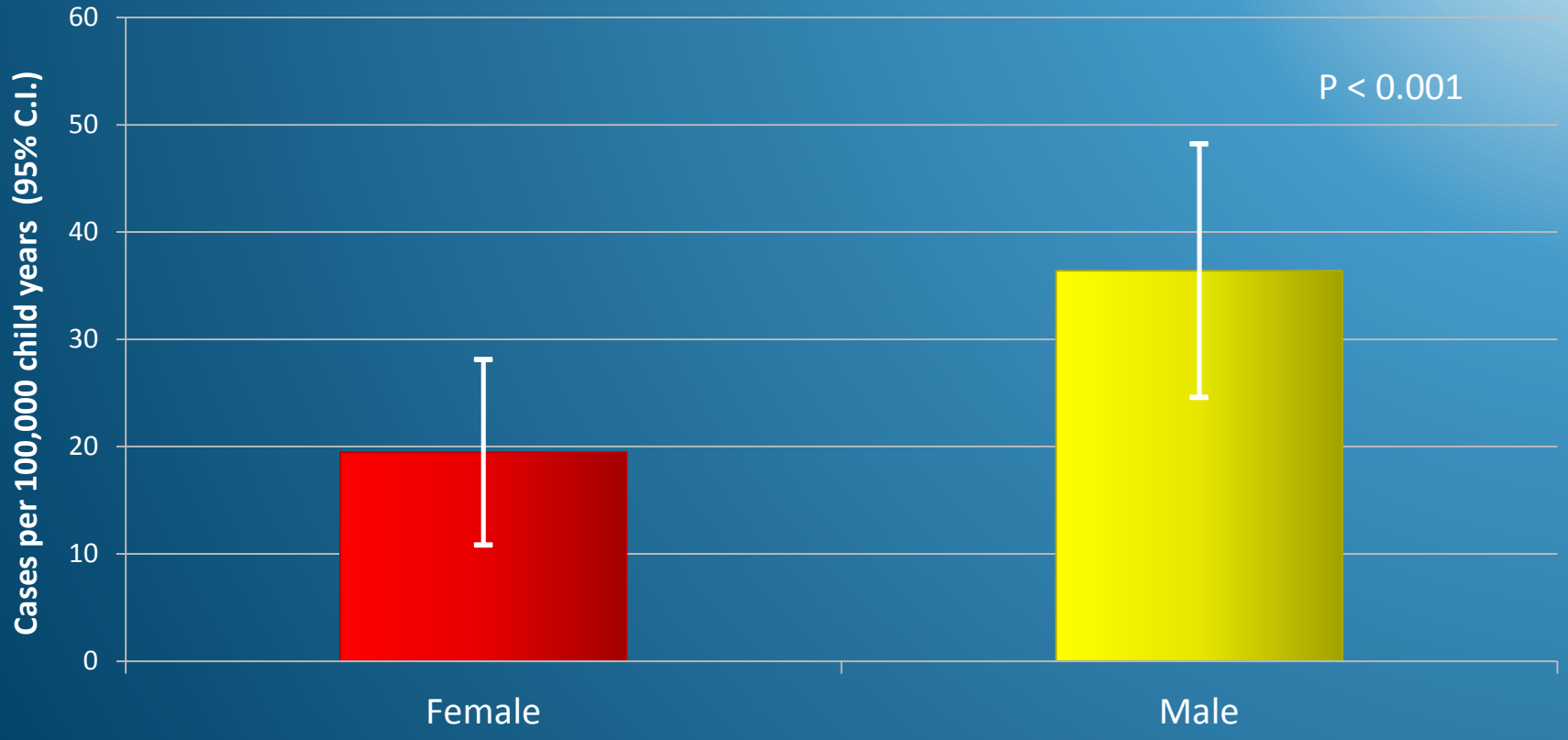
Trend over Time



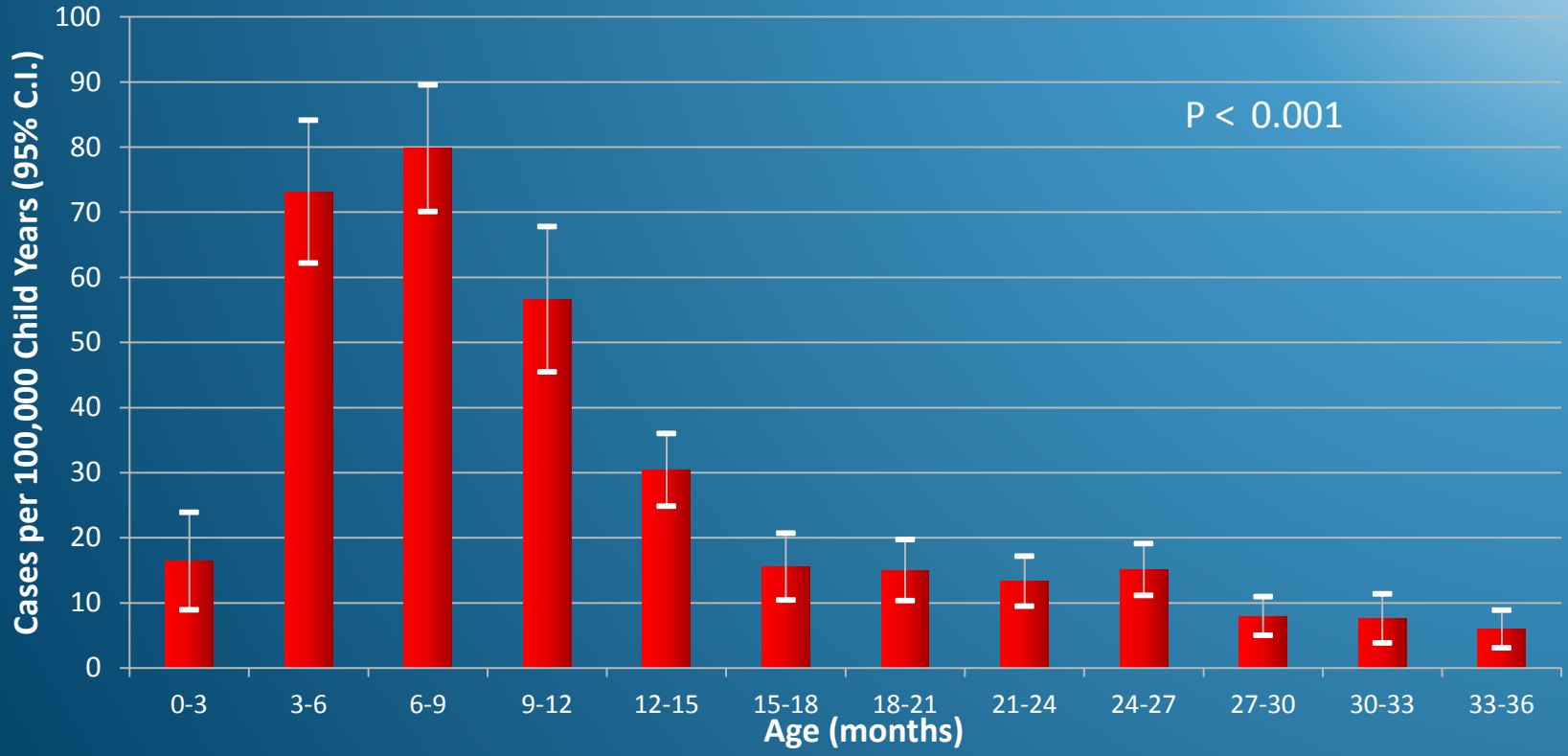
Season


Cases per 100,000 Child Years (95% C.I)
45
40
35
30
25
20
15
10
p < 0.001
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec

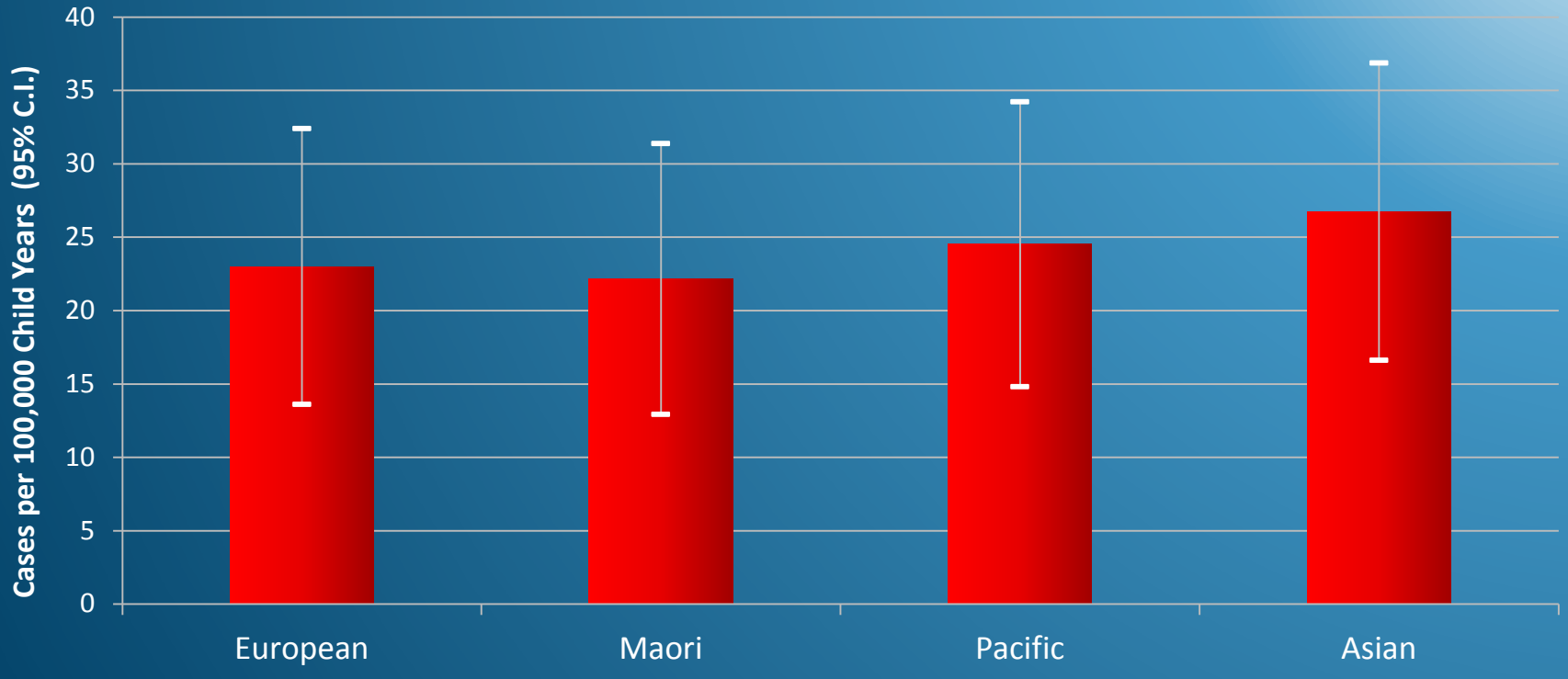
Sex


Cases per 100,000 child years (95% C.I.)
60
50
40
30
20
10
0
P < 0.001
Female
Male

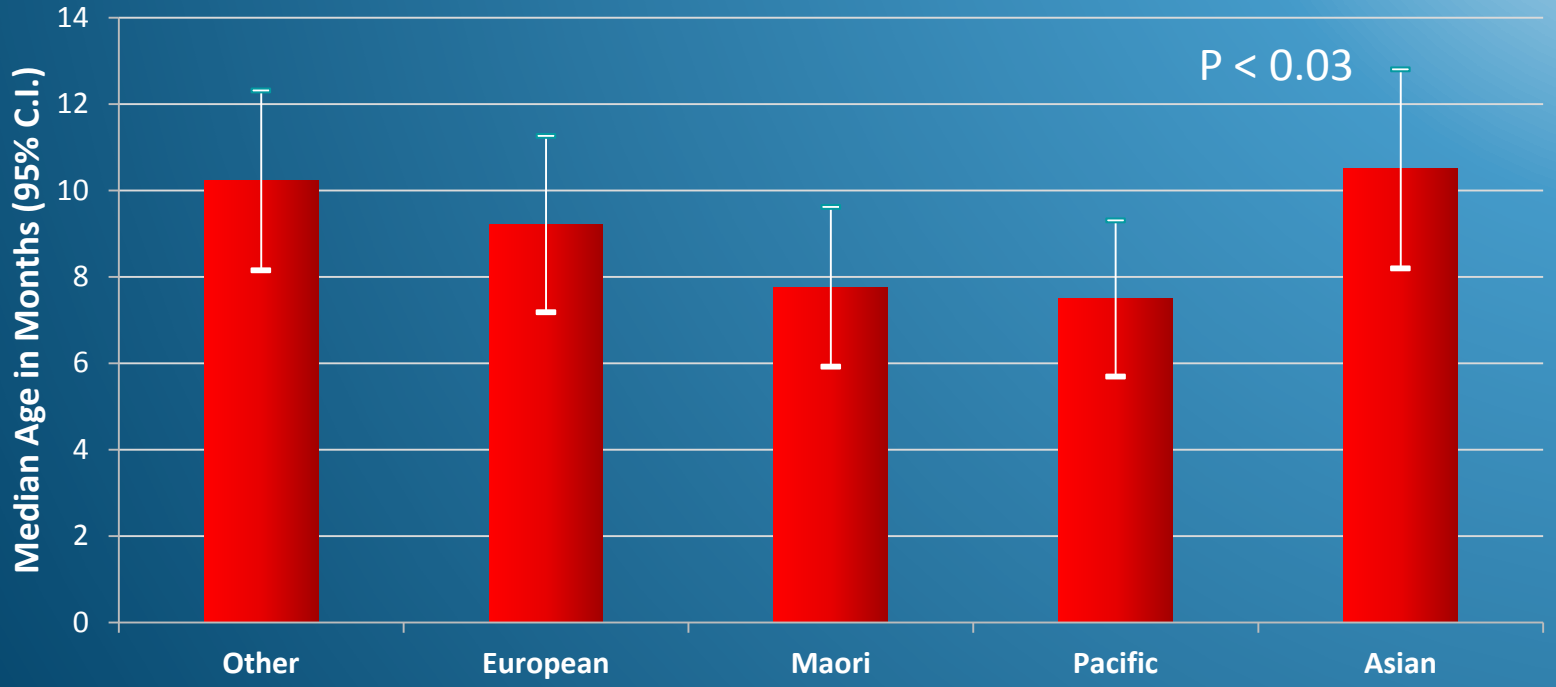
Age


Cases per 100,000 Child Years (95% C.I.)
100
90
80
70
60
50
40
30
20
10
0
P < 0.001
0-3
3-6
6-9
9-12
12-15
15-18
18-21
21-24
24-27
27-30
30-33
33-36
Age (months)

Ethnicity


Cases per 100,000 Child Years (95% C.I.)
40
35
30
25
20
15
10
5
0
European
Maori
Pacific
Asian

Ethnicity and Age



Discussion

- World-wide intussusception rates vary enormously.
- Emphasizes need for local data.
- Our study:
  - NZ comparable to other developed countries
  - Incidence constant over 16 years.

Discussion

- Previous studies:
  - No definitive link with wild-type rotavirus infection
  - No clear seasonal pattern

- Our study
  - Weak seasonal pattern
  - Peaks in spring and autumn
  - Association with wild-type rotavirus infection unknown

Discussion

- Uncertainty whether rotavirus vaccination -
  - increases intussusception incidence
    OR
  - causes earlier age of onset

- Preliminary evidence supports early vaccination strategy.
- Our study:
  - Median age at intussusception 8.9 months.
  - Older than recommended age for vaccination completion.

Discussion

- Earlier intussusception in Maori and Pacific infants.
- Possible causes:
  - Increased infectious disease burden?
  - Heavier?
- Implications for intussusception risk uncertain

Discussion

- Findings emphasize importance of vaccine timeliness
- NZ vaccine timeliness problematic, particularly for Maori
- Impact of vaccine delay on intussusception risk unknown

Limitations

- Anonymous retrospective coding data
- Coding data usually under-estimates incidence rate
- Comparing our data with prospective data may:
  - under-estimate vaccine risk
  - over-estimate vaccine risk
  - be insufficiently sensitive

Conclusions:

- Establishes contemporary intussusception data for NZ
  - NZ incidence similar to other developed countries
  - Peaks in Spring and Autumn
  - Peak incidence later than vaccine completion
  - Earlier intussusception in Maori and Pacific infants
- Emphasizes need for ongoing monitoring

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Conflicts of Interest

- None