



# Enhancing Hospital Outcomes

**HRC-FUNDED PROJECT**

**BARRY MILNE**

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# Outline



- Background to EHO
- 3 themes
- Analysis of equity
  1. Is ethnicity/deprivation associated with hospital outcomes
  2. Is there an inequality gradient across NZ hospitals?
  3. Summary
- Analysis of patient safety
- Analysis of inputs, outputs and productivity

# Background



- Worldwide, investment in health increasing at a rate which outstrips GDP; much of this absorbed in the hospital sector.
- Have we got value for money, as judged by output, efficiency, effectiveness, quality and equity of care?
- Analyse hospital performance 2001-2009
  - From NMDS, with linked mortality data 2001-2007

# Theme 1



1. Assess between-hospital variation in the quality and safety of hospital services.
- People: Phil Hider, Patrick Graham
  - Department of Public Health & General Practice  
University of Otago, Christchurch



# Theme 2



2. Assess the productivity and efficiency of hospital-related services.

- People:

Jackie Cumming, Jaikishan Desai, Nick Bowden  
Health Services Research Centre (HSRC)  
Victoria University



# Theme 3



3. Assess equitable distribution of hospital care (quality, safety, effectiveness).
  4. Assess the effectiveness of primary health care services using preventive health (ambulatory sensitive) indicators.
- People: Peter Davis, Barry Milne, Roy Lay-Yee, Karl Parker, Martin von Randow, Jessica Thomas  
COMPASS Research Centre, Univ of Auckland

# Quality Dimensions



## Quality Dimensions - NZ Health Strategy

<i>Indicator group</i>	<i>Effectiveness</i>	<i>Efficiency</i>	<i>Safety</i>	<i>Equity</i>
Throughput		√		√
Readmission	√	√	√	√
Mortality	√		√	√
Length of stay	√	√		√
Patient Safety	√		√	√
Other	√	√	√	√

# 1. Ethnicity/deprivation & hospital outcomes



- Do ethnic/deprivation groups differ in the hospital treatments/outcomes they experience?
- Assessed by mixed models with random intercepts for hospital, and controls for demographic factors, primary diagnosis and comorbidities
- N=35 hospitals (provision for acute admissions, <500 admissions/yr)



# Equity of care



- Equal care for equal need
- Inequity suggested if, after controlling for need, certain groups receive better/worse care
- Defining need is problematic and is constrained by available data.
- We use patients' clinical characteristics as a proxy for need
- So, assess whether equal care is obtained for groups of patients, after controlling for group differences in clinical characteristics

# Equity of care



## CONTROLS

- Clinical characteristics:
  - Main reason for hospital admission
  - Clinical comorbidities (Elixhauser)
- Other characteristics:
  - Age, Sex
  - Deprivation/Ethnicity
  - Rurality
  - Hospital of admission

# Ambulatory Sensitive Hospitalisations (ASH)



<b>Rates - per 100</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Any Acute ASH</b>	4.07	4.28	4.20	4.20	4.09	4.18	4.26	4.45	4.51
<b>Any Chronic ASH</b>	10.30	11.14	11.18	11.18	11.19	11.33	11.33	11.16	11.52

## **Acute**

- Dehydration and gastroenteritis
- Convulsions and epilepsy
- Ear, nose & throat infection
- Dental conditions
- Perforated/bleeding ulcer
- Ruptured appendix
- Pyelonephritis
- Pelvic inflammatory disease
- Cellulitis
- Gangrene

## **Chronic**

- Diabetes complications
- Nutritional deficiency
- Iron deficiency anaemia
- Hypertension
- Congestive heart disease
- Angina
- Chronic obstructive pulmonary disease
- Asthma

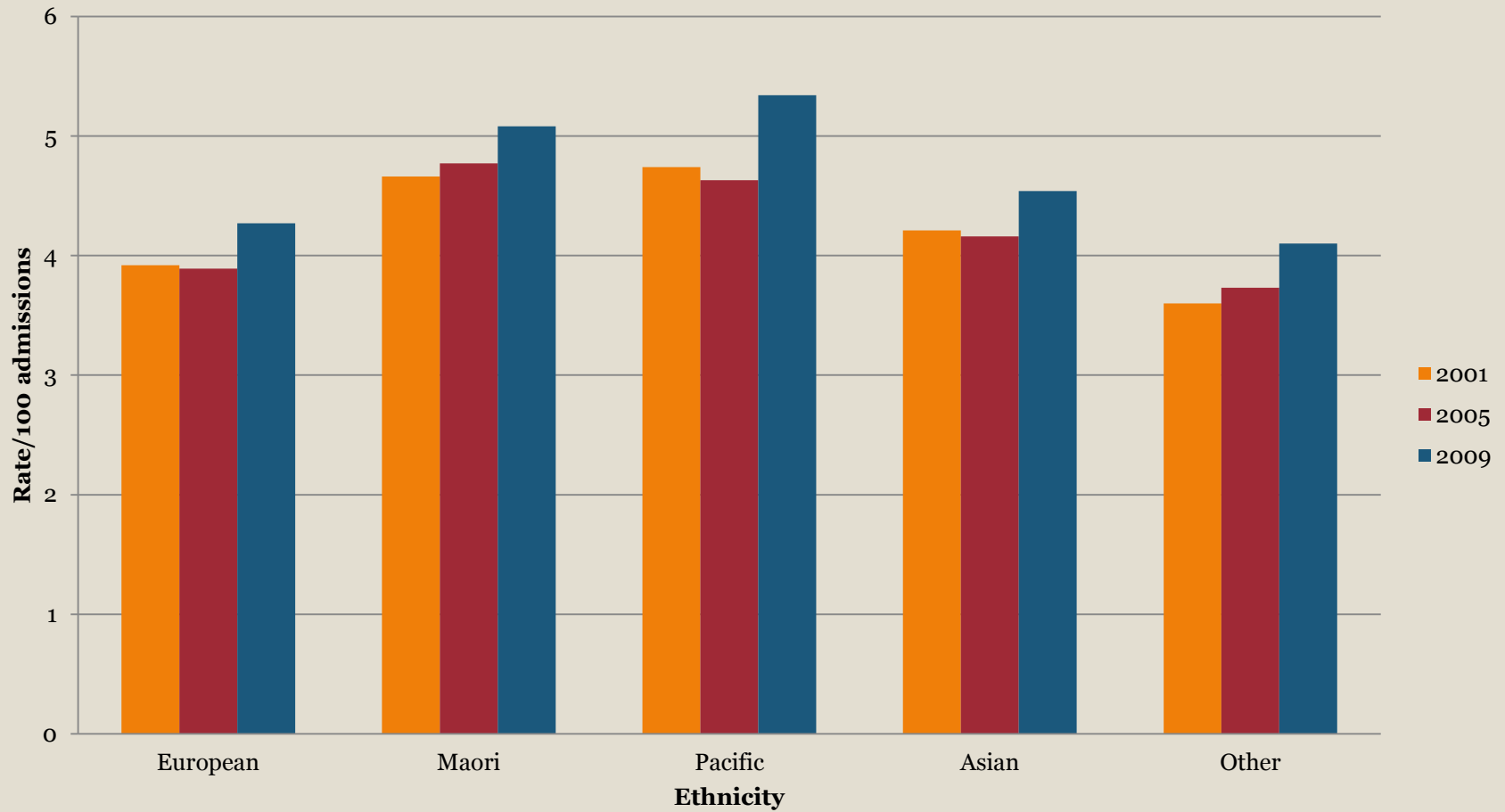
# Readmissions, Mortality, Length of Stay



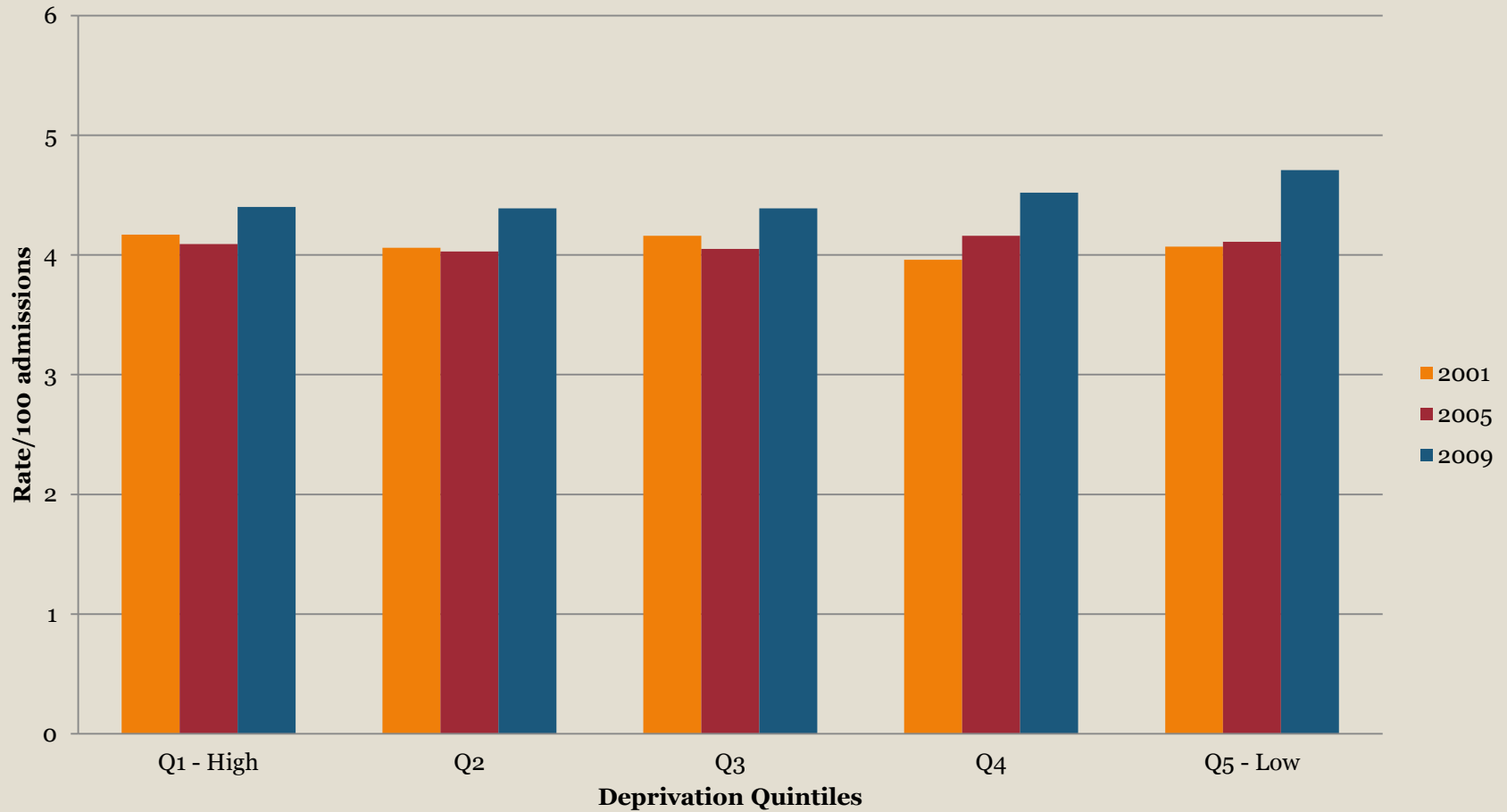
	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
<b>Readmissions</b>	10.87	11.86	12.05	11.90	11.96	12.21	12.27	12.43	12.55
<b>30d mortality</b>	3.13	3.16	3.09	3.07	2.90	3.02	2.80	-	-
<b>Length of stay</b>	3.05	2.98	2.96	2.95	2.94	2.88	2.90	2.89	2.82

- Unplanned readmission within 30 days of discharge – may indicate lack of effective or safe care (and inefficient)
- Mortality within 30 days of hospital discharge – once clinical characteristics are controlled may indicate lack of effective or safe care
- Total length of stay (incl daystay = 0) – indicates efficiency with which hospitals are treating patients.

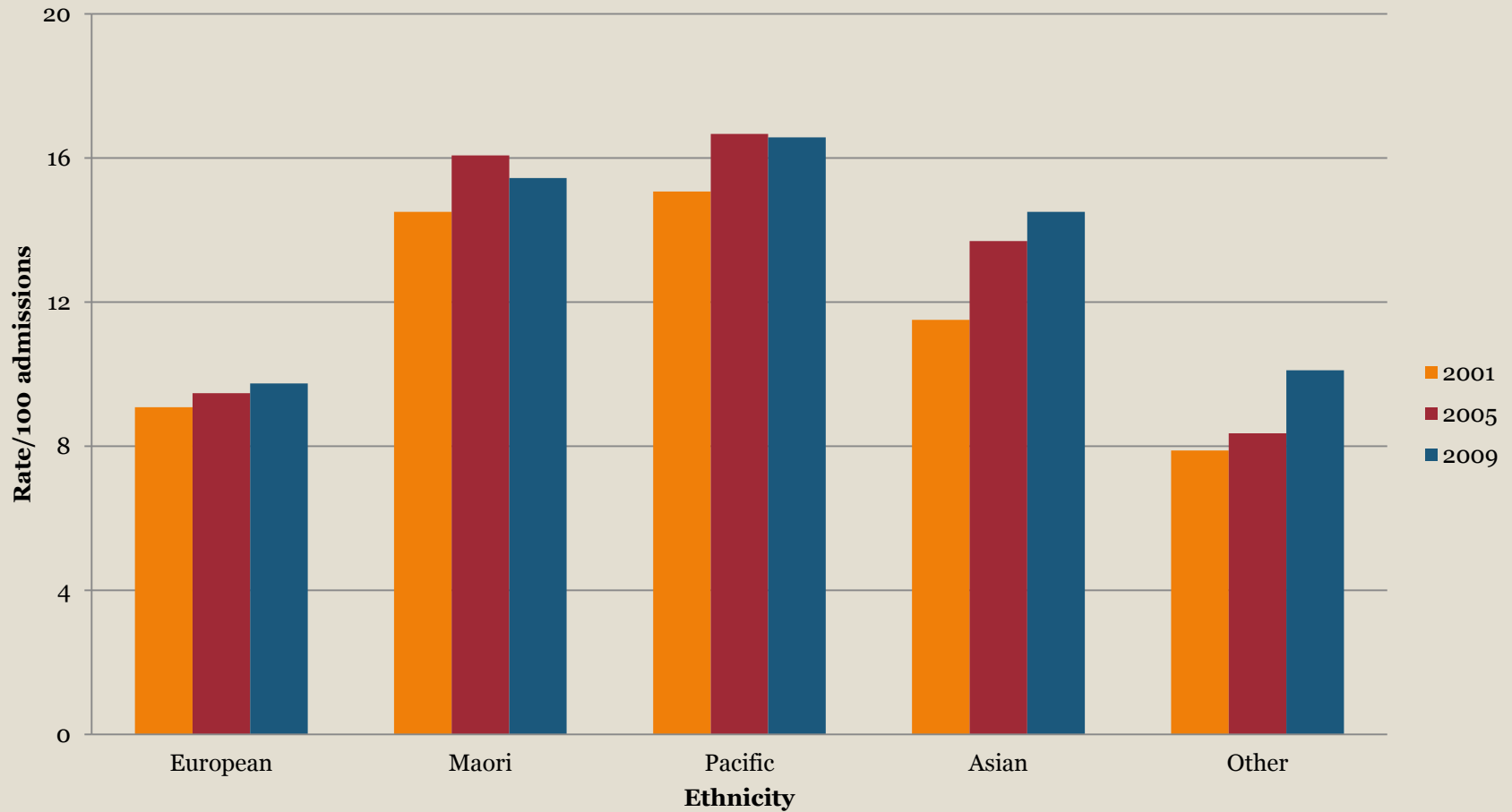
# Acute ASH - Ethnicity



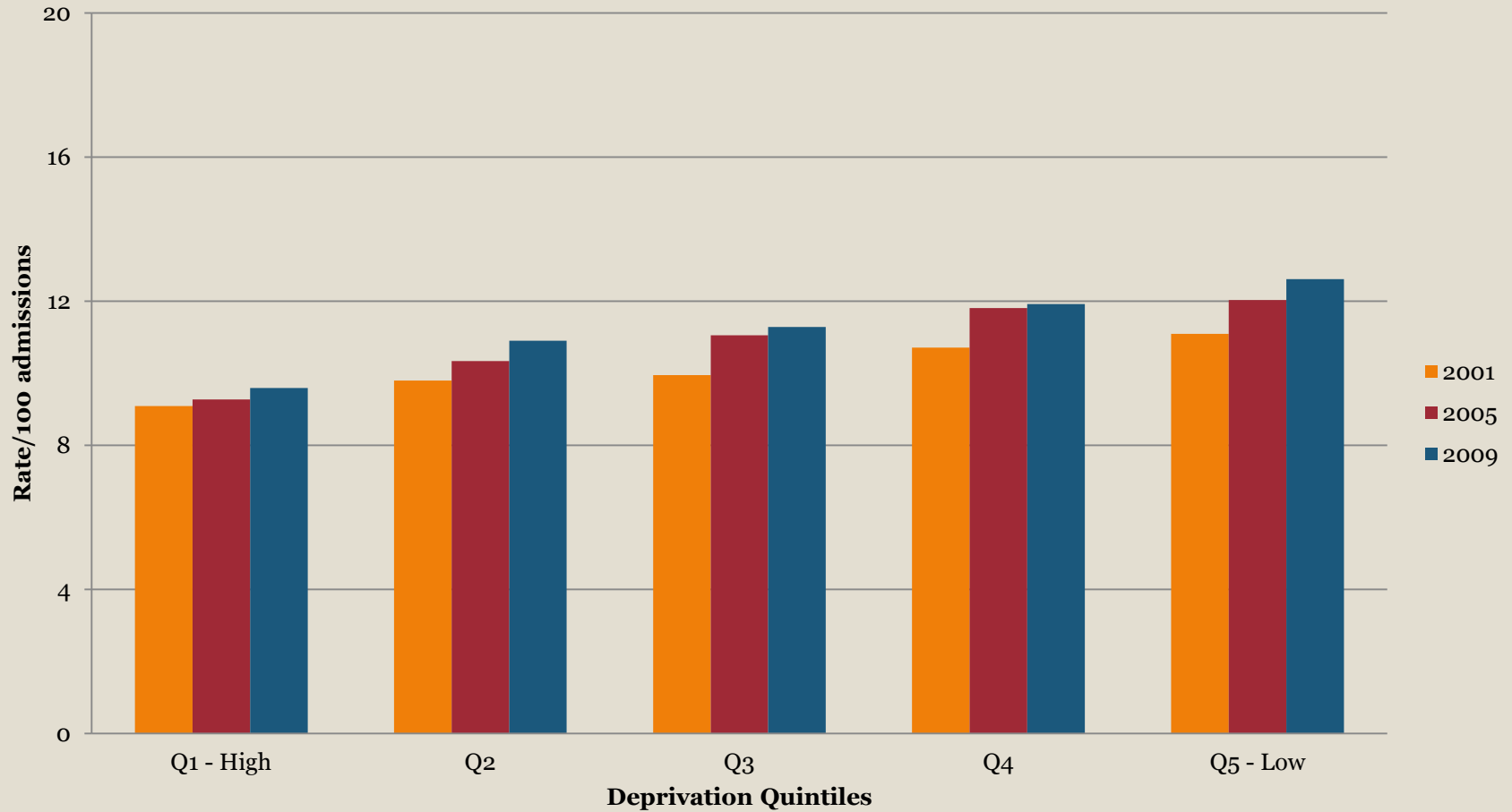
# Acute ASH - Deprivation



# Chronic ASH - Ethnicity

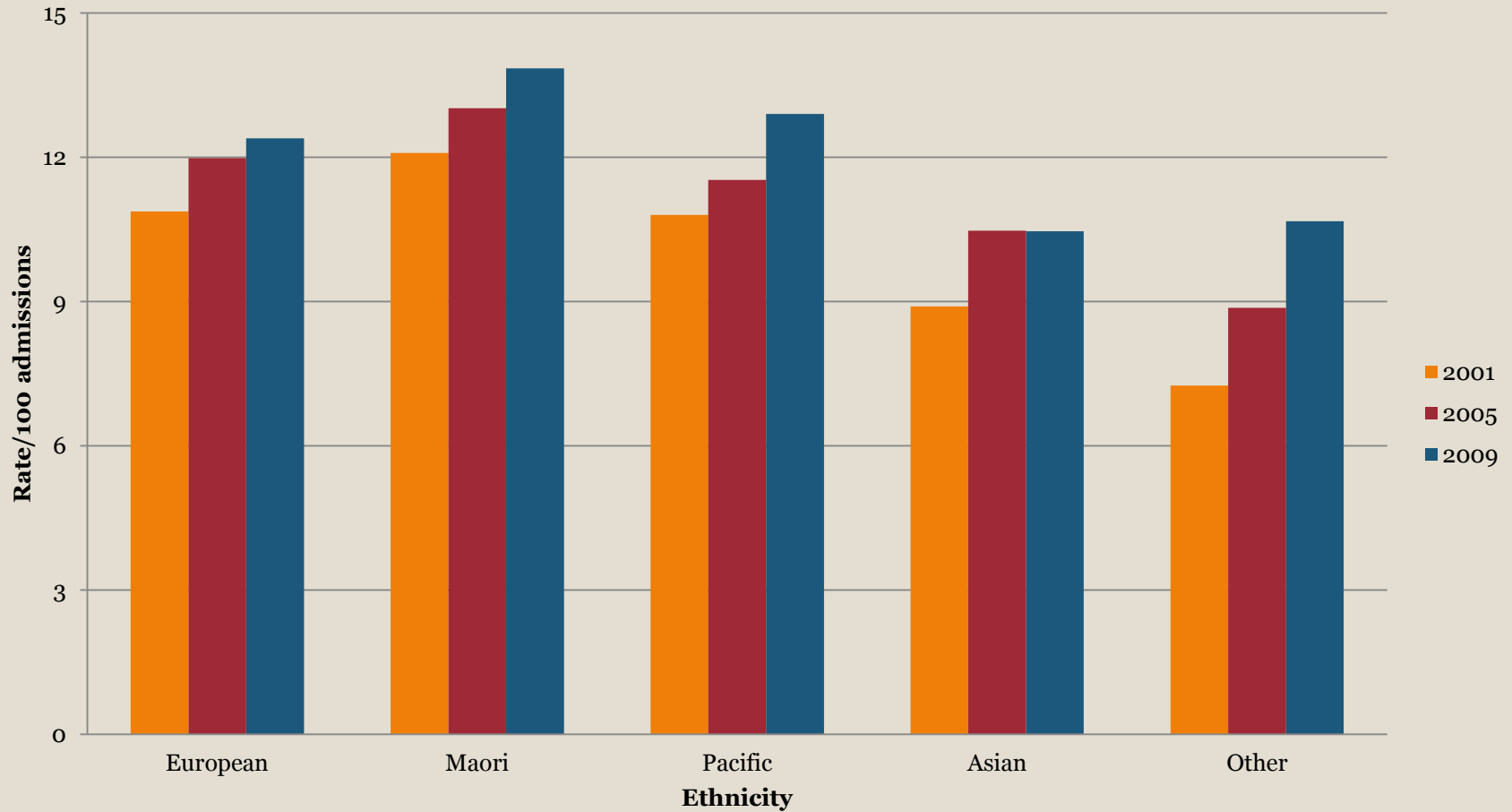


# Chronic ASH - Deprivation

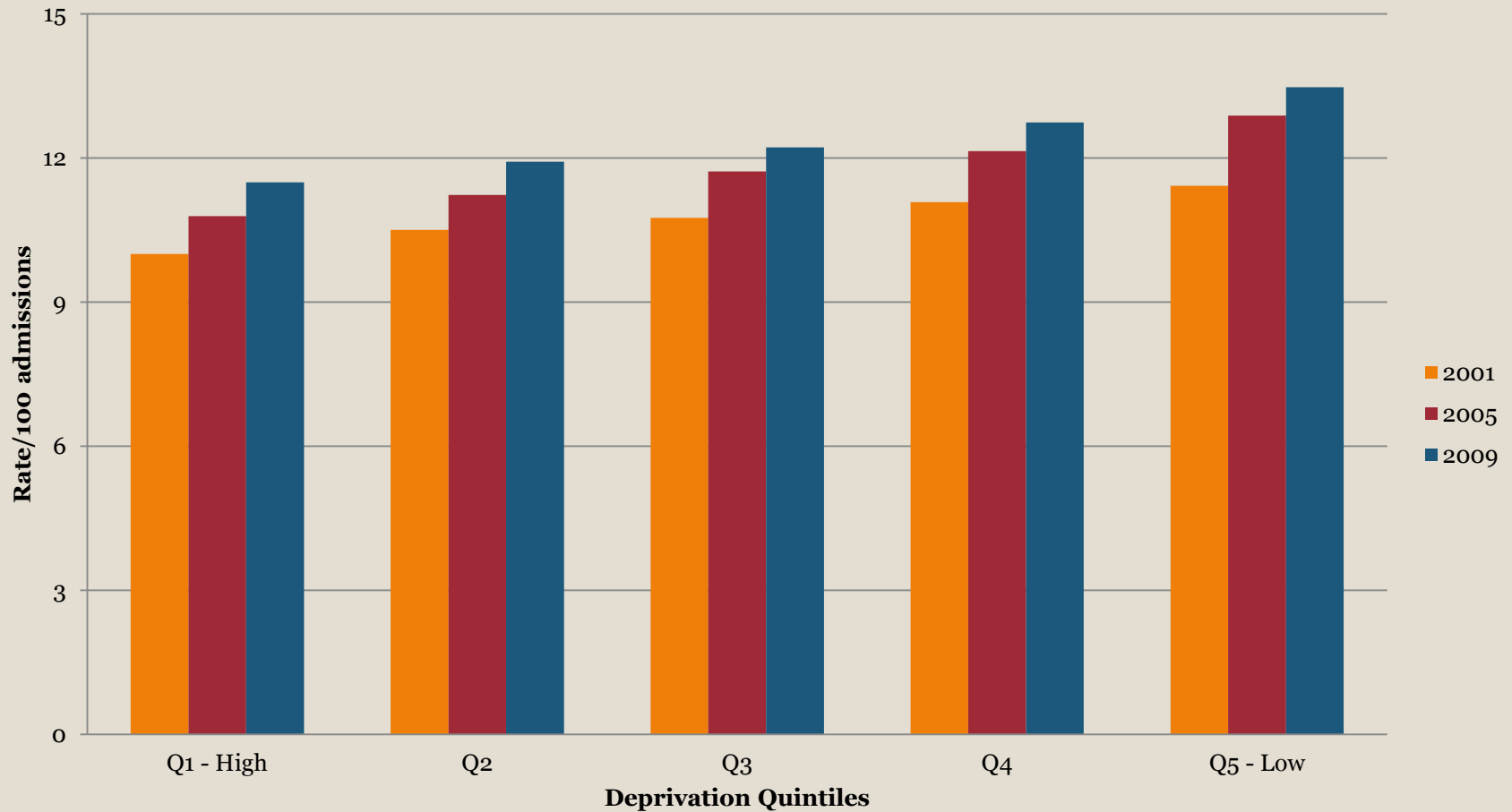




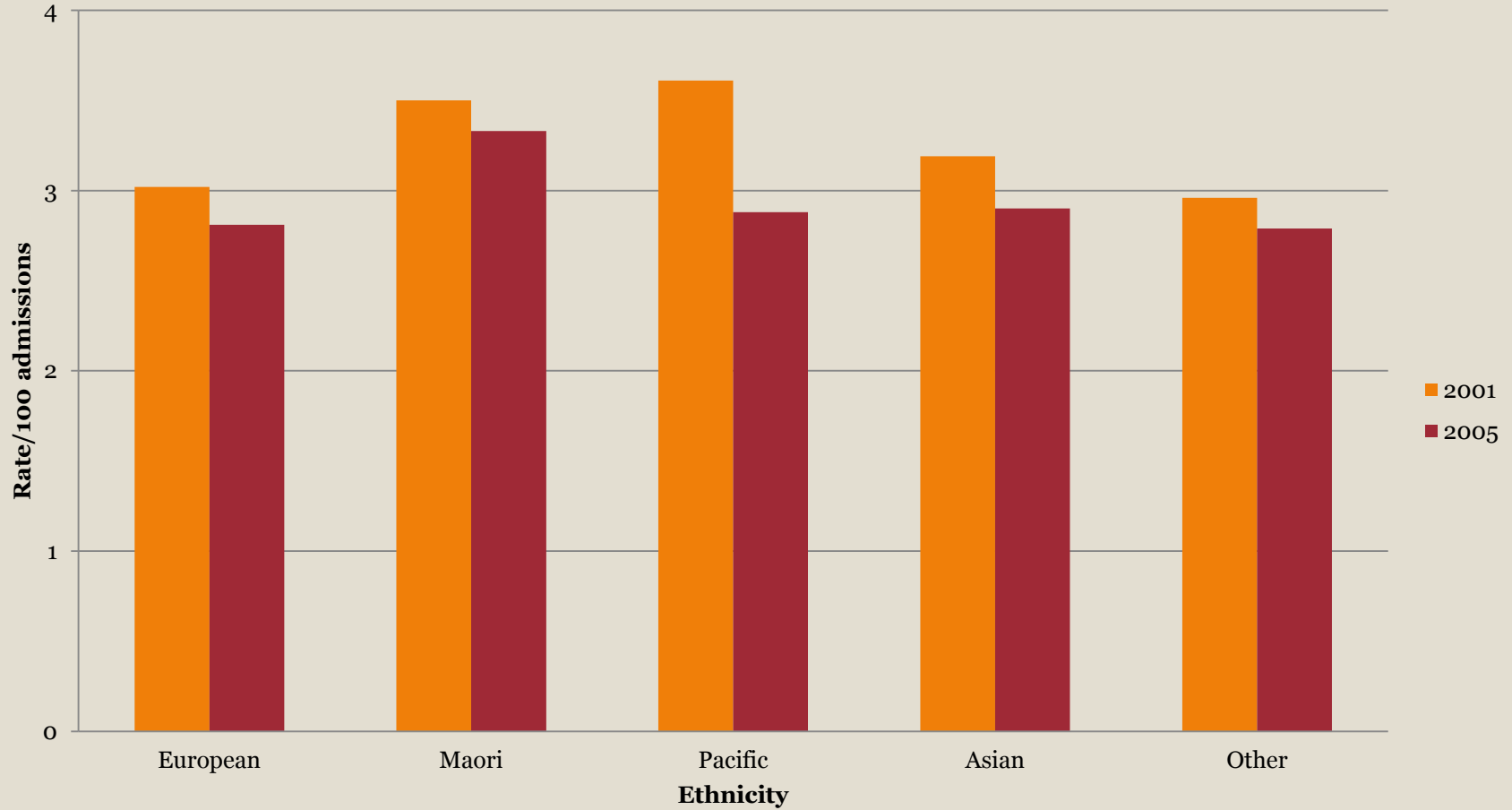
# Unplanned Readmissions - Ethnicity



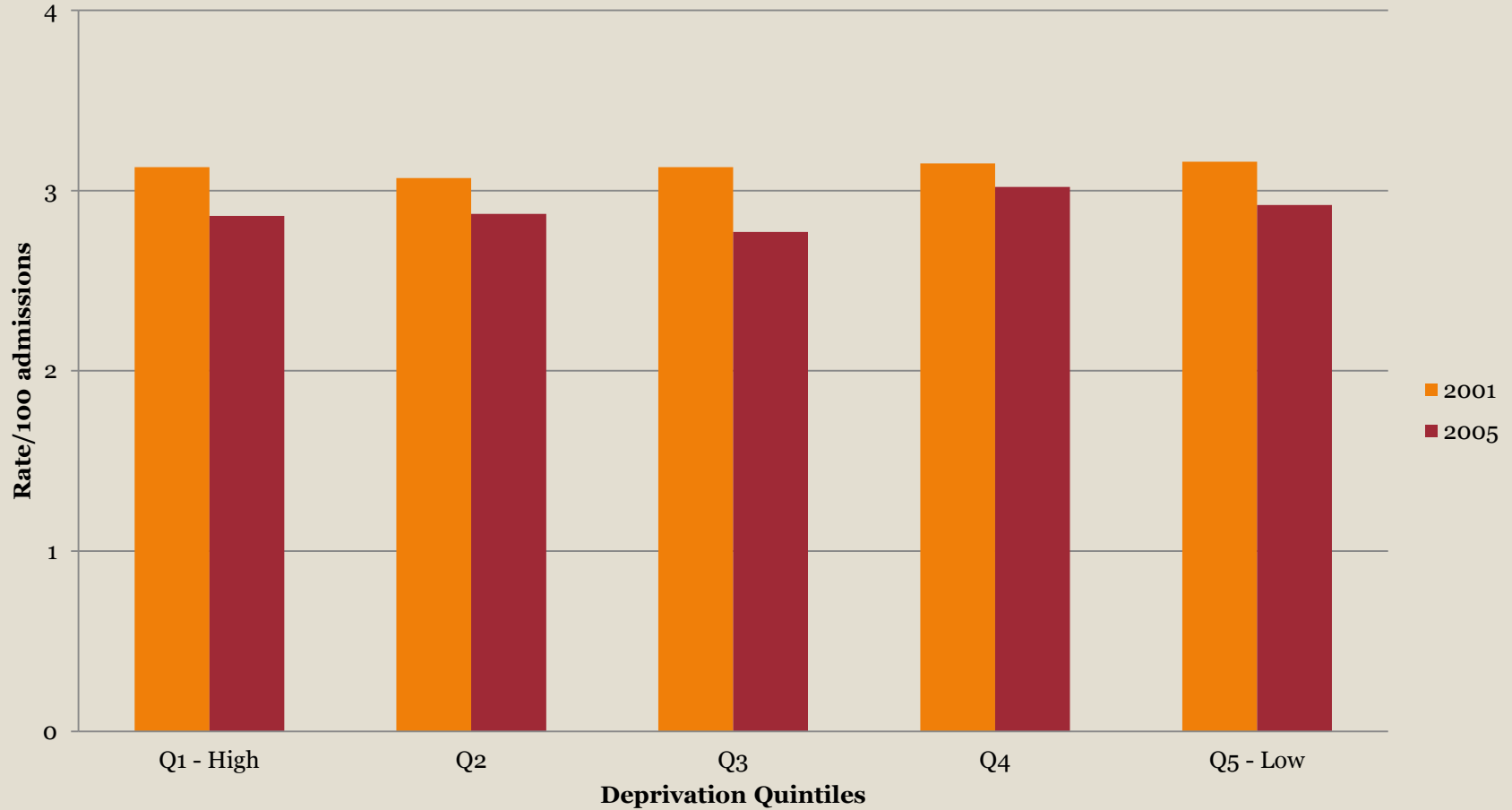
# Unplanned readmissions - Deprivation



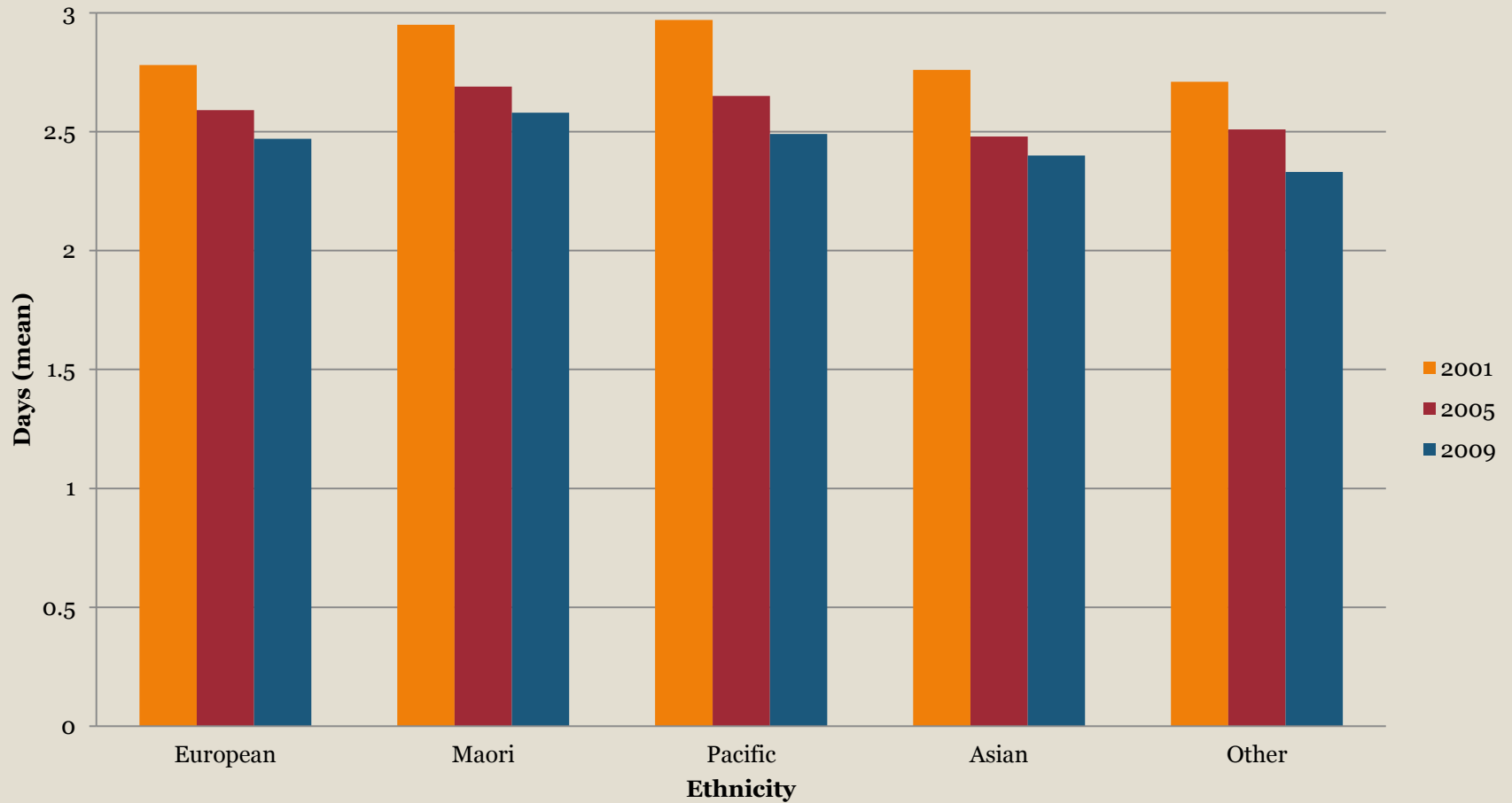
# 30d mortality - Ethnicity



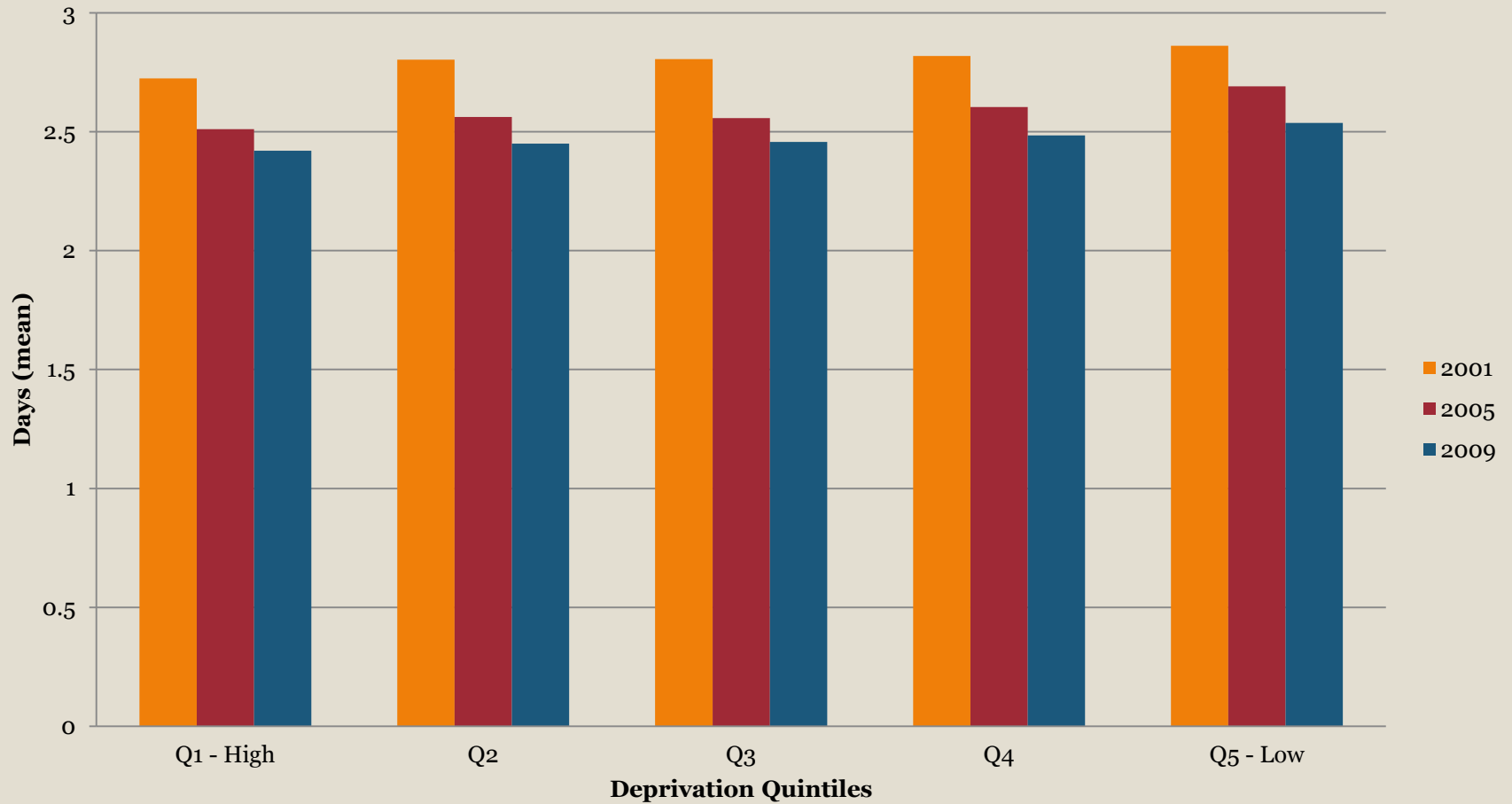
# 30d mortality - Deprivation



# Length of Stay - Ethnicity



# Length of Stay - Deprivation



# Are there inequalities between hospital?



- ‘Slope index of inequity’ (SII) allows assessment of unequal outcomes by {deprivation, ethnicity, ... } across ‘units’

## 2. Inequality gradients across hospitals



- ‘Slope index of inequity’ (SII) allows assessment of unequal outcomes by {deprivation, ethnicity, ... } across ‘units’

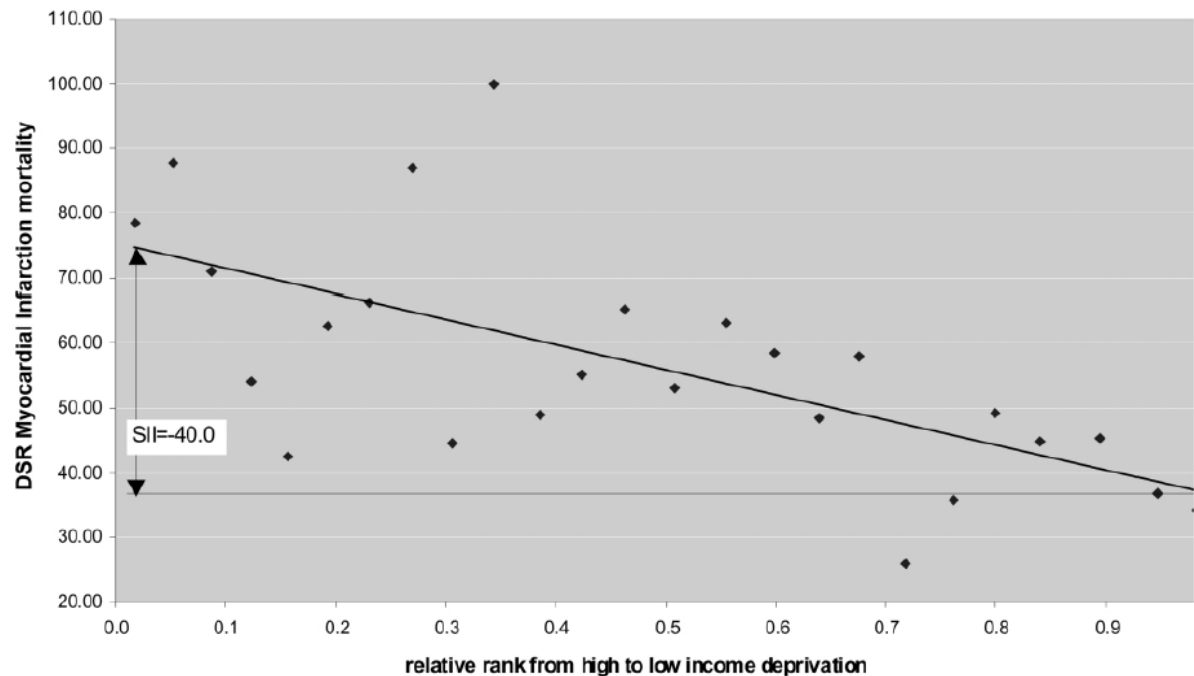


Figure 1 The absolute health gap in mortality from Myocardial Infarction (1998-2000) associated with income deprivation across wards in Sunderland

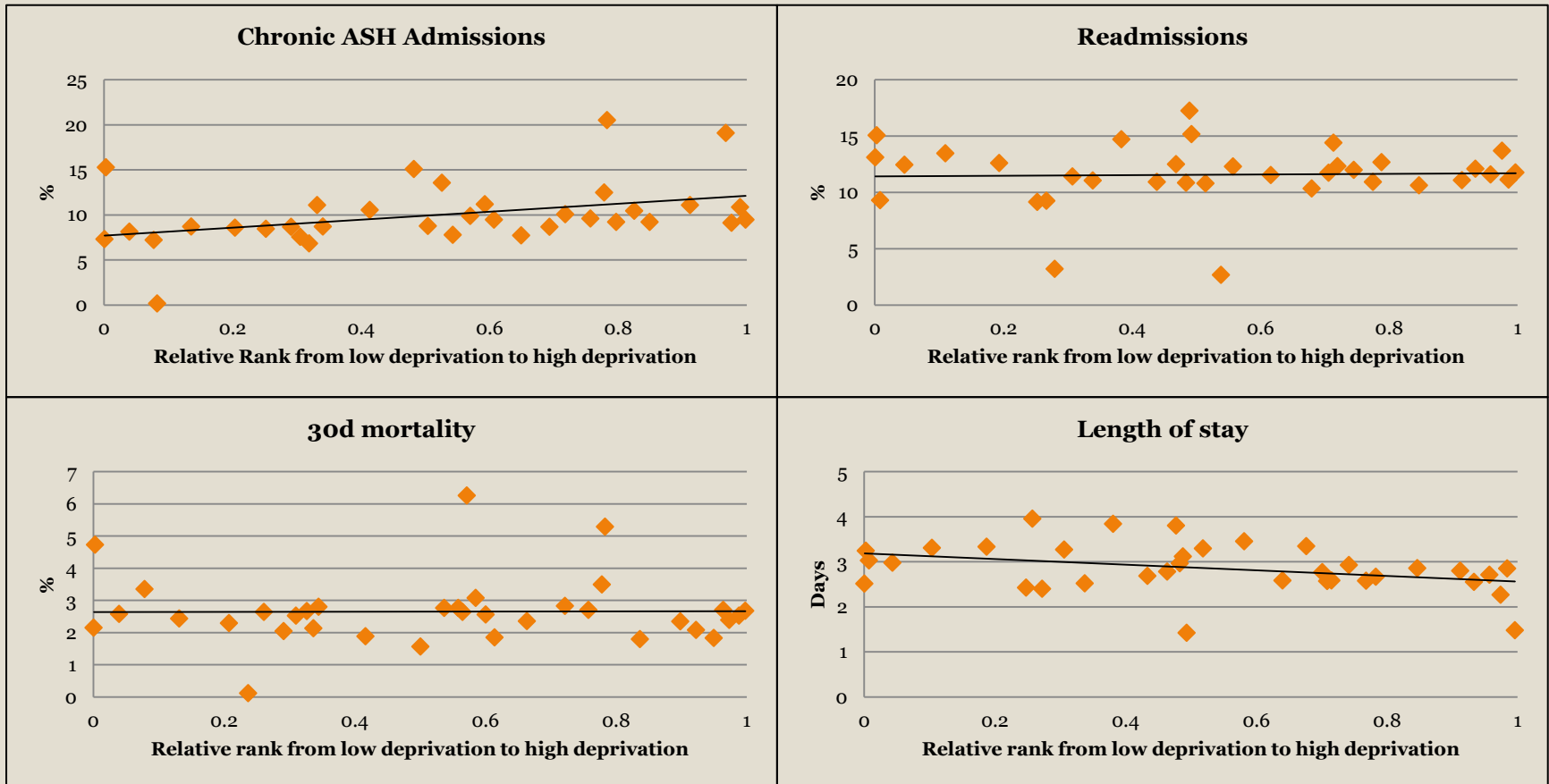
Low & Lowe, 2004, J Pub Health, 26, 388-95



# Inequality gradients across hospitals



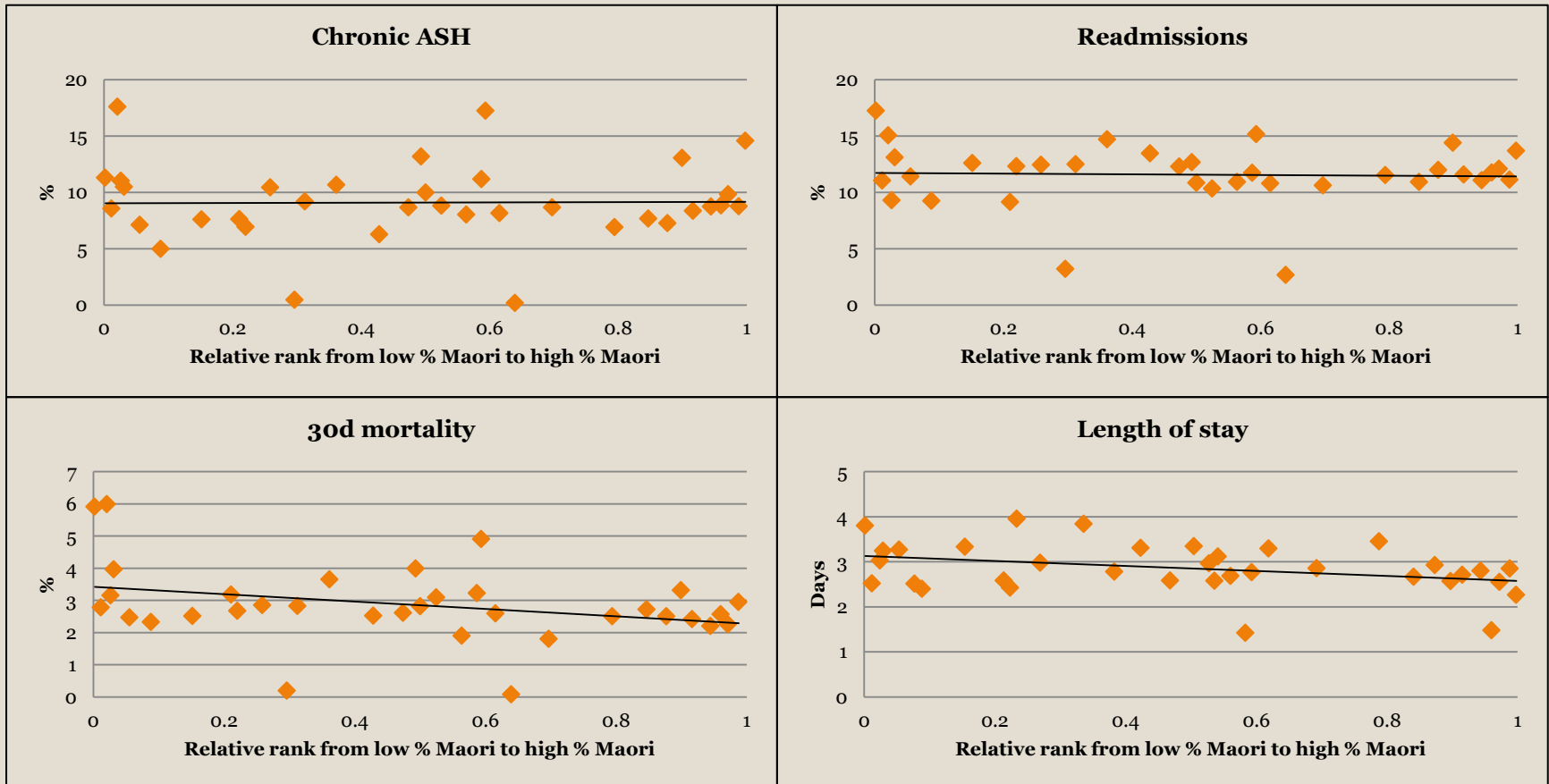
- What about across NZ hospitals?? - Deprivation



# Inequality gradients across hospitals



- What about across NZ hospitals?? – Māori ethnicity



## 3. Summary



- Large differences between ethnic groups on chronic ASH; smaller differences for other outcomes
- Small deprivation gradients across chronic ASH, readmissions and length of stay
- ASH and readmissions have increased since 2001; Length of Stay and 30d mortality have decreased
- Little evidence of an ethnic/deprivation inequality gradient across hospitals

# Questions



**QUESTIONS?**