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Department of Health, February 2016

Selective migration and changing health / deprivation relationships

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Fran Darlington, Queen Mary University
Dan Exeter, University of Auckland,

Where are we going?

Background:

- Changes in self-reported health
- Who has thought about this before?
- Health-deprivation-migration inter-relationships
 - N.B. Sub-national migration
 - International literature 'Healthy migrant effect'
- Using ONS Longitudinal Study

For the population as a whole:

- How changes affect health levels in deprivation extremes
- Overall health deprivation relationship changes

Some more angles:

- Is this the same for different ethnic groups?
- Is this the same by age?
- Are there similarities for another country, health outcome & ethnic context?

Health inequalities

Limiting long-term illness question in 1991 Census

- Do you have any long term illness, health problem or handicap which limits your daily activities or the work that you can do? Include problems which are due to old age. (Yes/No)

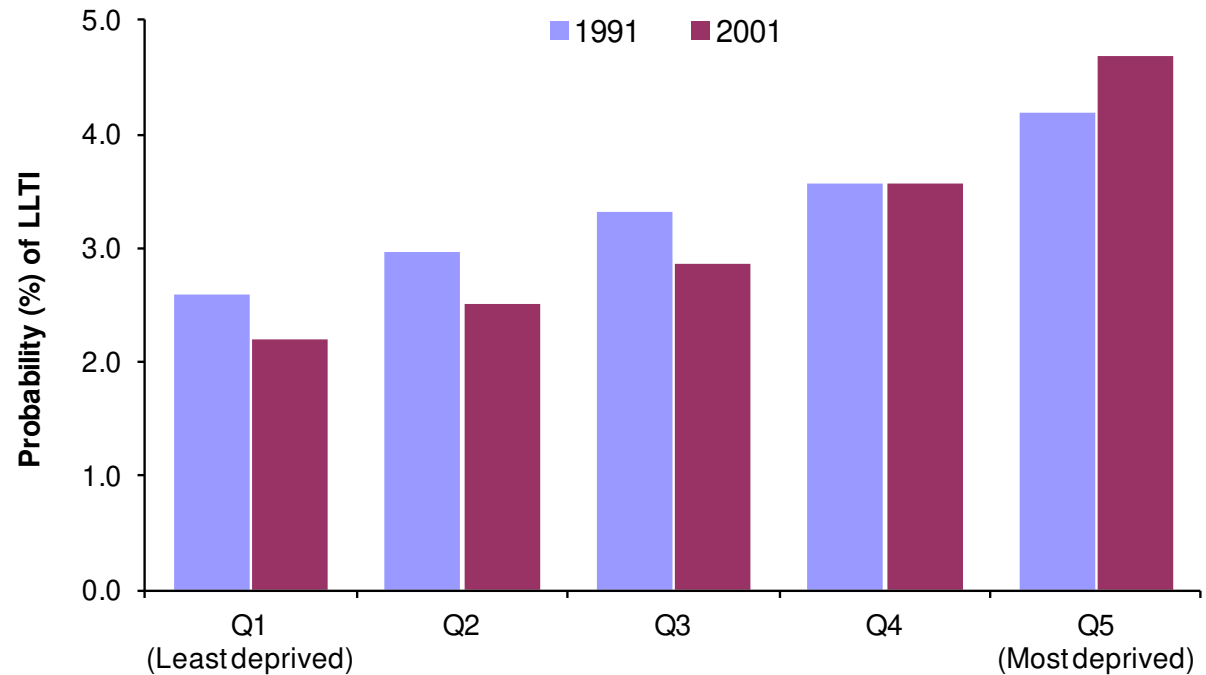
LLTI & Deprivation

(Area data)

Q5 : Q1 ratio

1991 = 1.61

2001 = 2.13

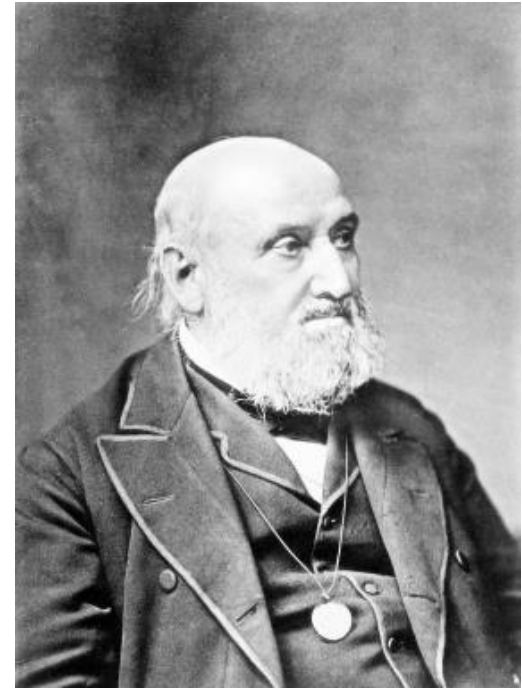


Might the change in gradient be due to migration?

Selective migration affecting local health rates?

Farr (1864) & Welton (1872)

- Age dimensions & life course
- Area types
- Movements affect both origins & destinations



Migration a neglected factor?

- Prothero (1977)
- Learmonth (1988)
- Bentham (1988)
- Gatrell (2002)

Inter-relationships: health, deprivation & migration

Health

- Majority of migrants are young & relatively healthy
- Some people may / may not move because of their health
- A migrant's health may be affected by the process
- Migrants may spread disease

- Gradient of health status along deprivation gradient
- Healthy people live in less deprived locations & *vice versa*

Migration

- More advantaged people tend to migrate to or between less deprived, more attractive locations
- Less advantaged people tend to drift into (or be trapped in) more deprived locations

Deprivation

Calculation & variable issues

- Inputs to calculations may have different 'qualities' of data recording within the same (e.g. Census) and between different sources

Migration & changing health / deprivation relationships?



Area A

Lower social classes
Overcrowding
High unemployment
Poorer health

Area B

- Higher social classes
- More sparsely populated
- Low unemployment
- Better health



Migration & changing health / deprivation relationships?



Area A

Lower social classes
Overcrowding
High unemployment
Poorer health

- Differences in health between migrants and non-migrants?
- Size of the migrant flows?
- Differences in health between the migrant flows?
- Demographic and socioeconomic attributes of migrants and non-migrants?
- Health & other attributes of those 'left behind'?

Area B

- Higher social classes
- More sparsely populated
- Low unemployment
- Better health



ONS Longitudinal Study for England (& Wales)

1971

1981

1991

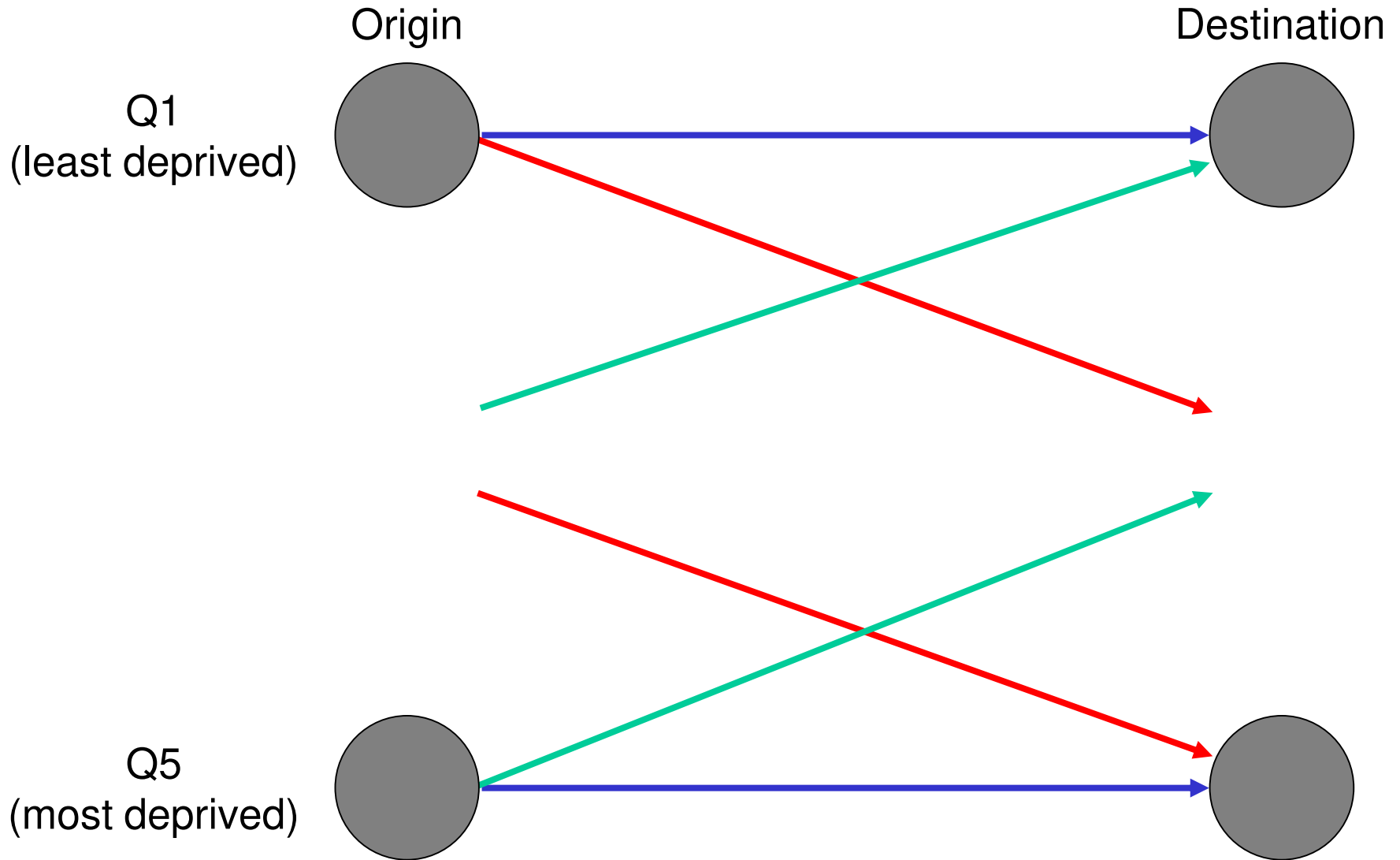
2001

2011

- c. 1% sample, c. 500k at each census & c. 350k across censuses
- Residential sub-sample present in 1991 & 2001 and in 2001 & 2011



Transitions between deprivation quintiles using the LS

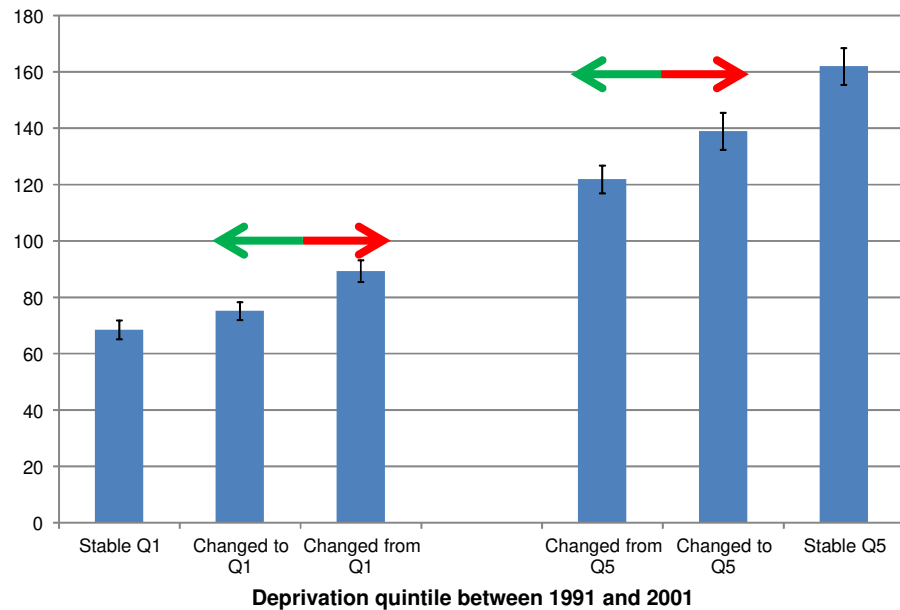


Transitions by both migrants and non-migrants

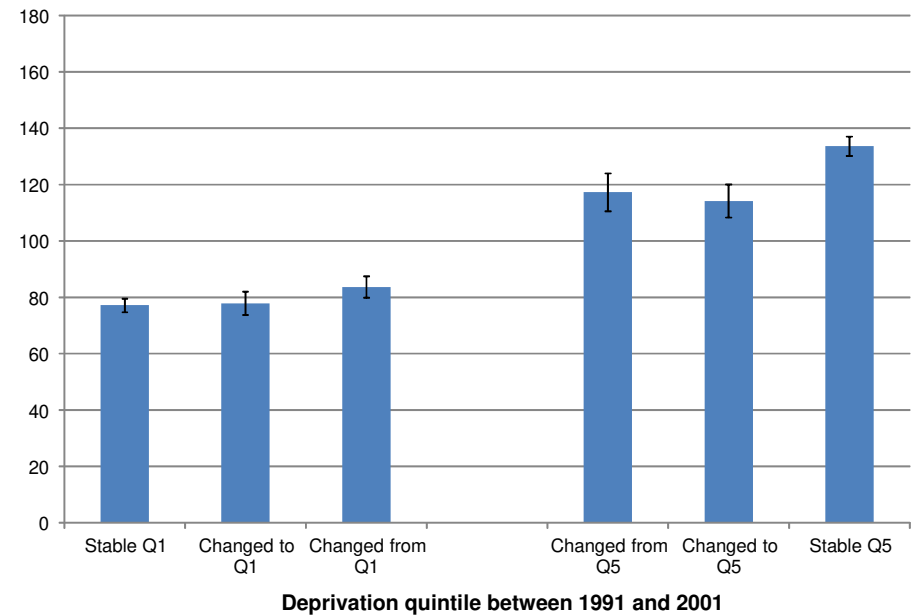
Changes affecting the deprivation extremes

1991 to 2001 SIRs for LLTI

Migrants



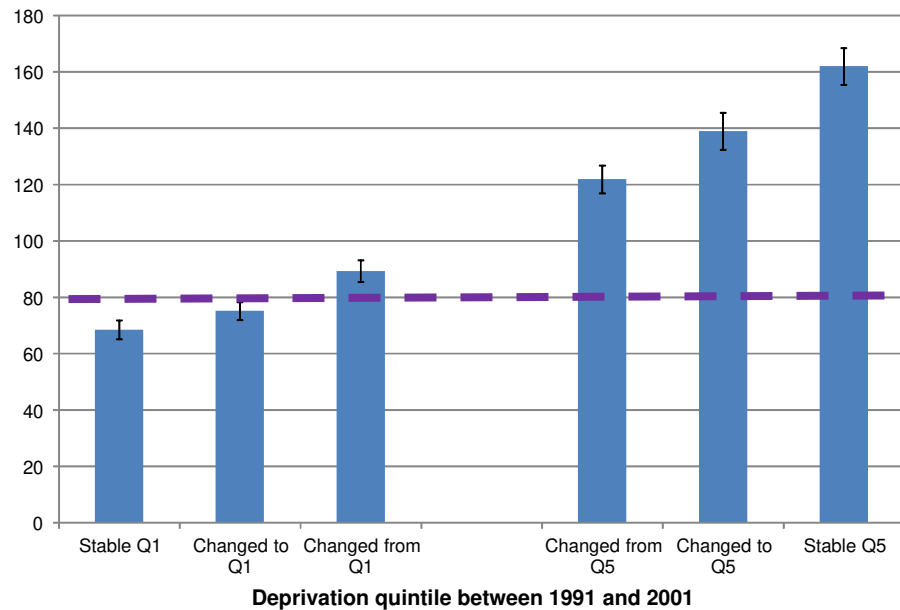
Non-Migrants



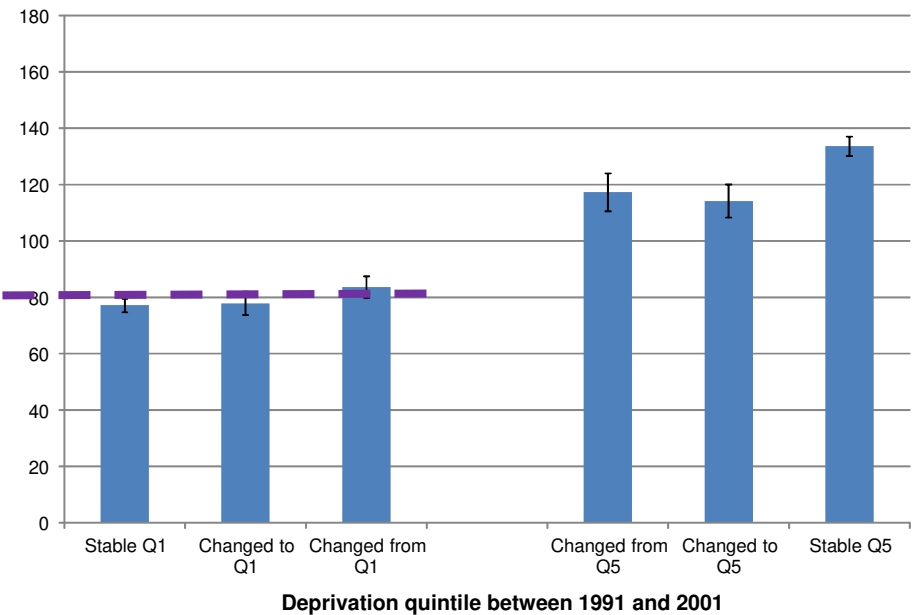
Changes affecting the deprivation extremes

1991 to 2001 SIRs for LLTI

Migrants



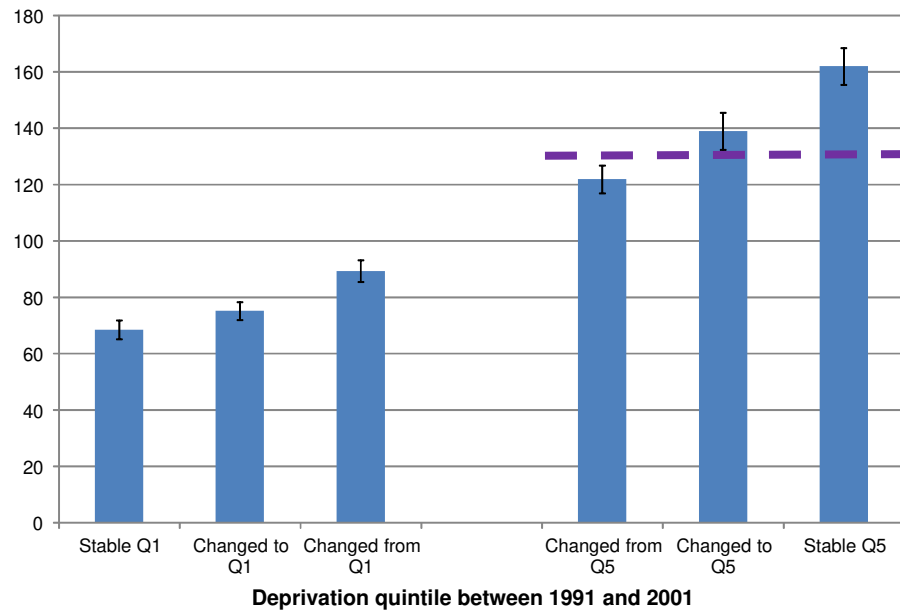
Non-Migrants



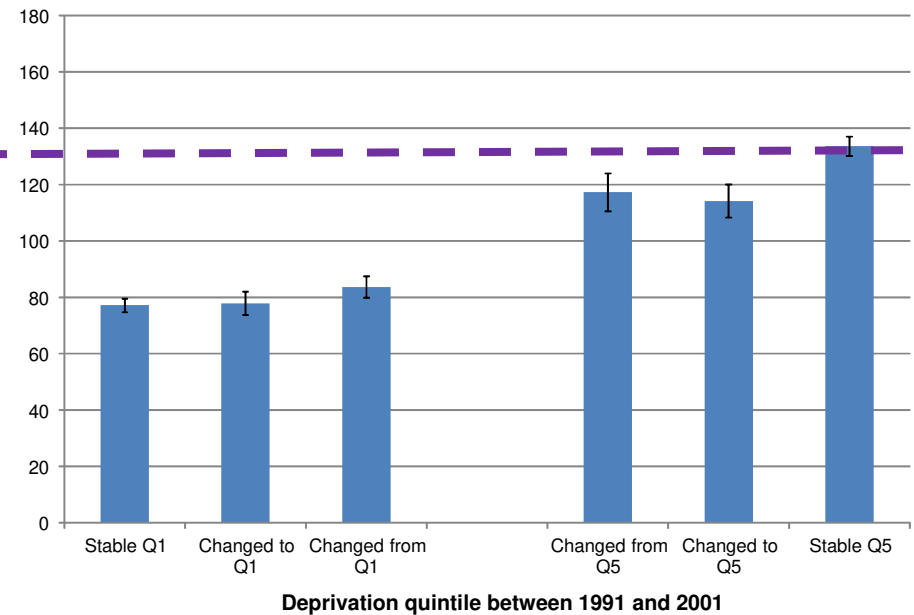
Changes affecting the deprivation extremes

1991 to 2001 SIRs for LLTI

Migrants



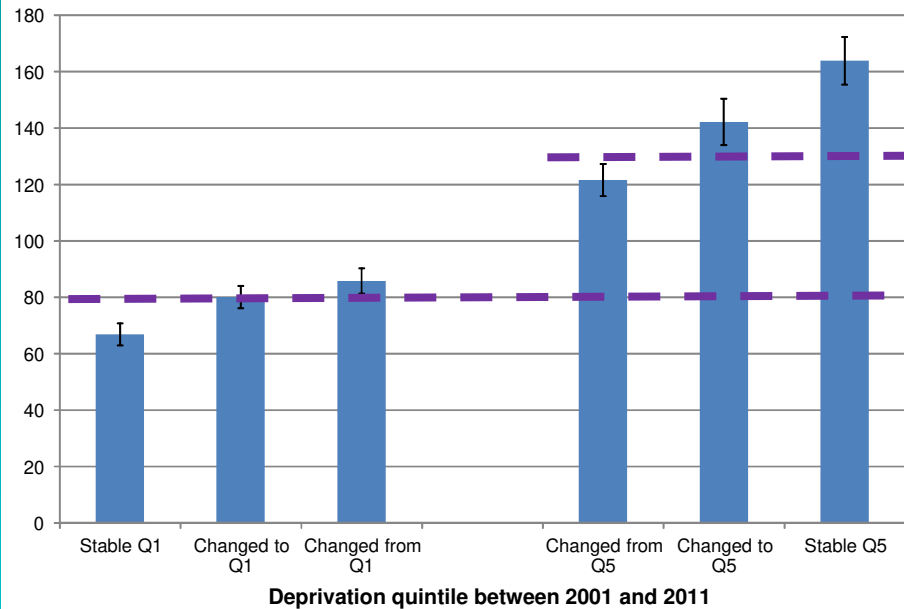
Non-Migrants



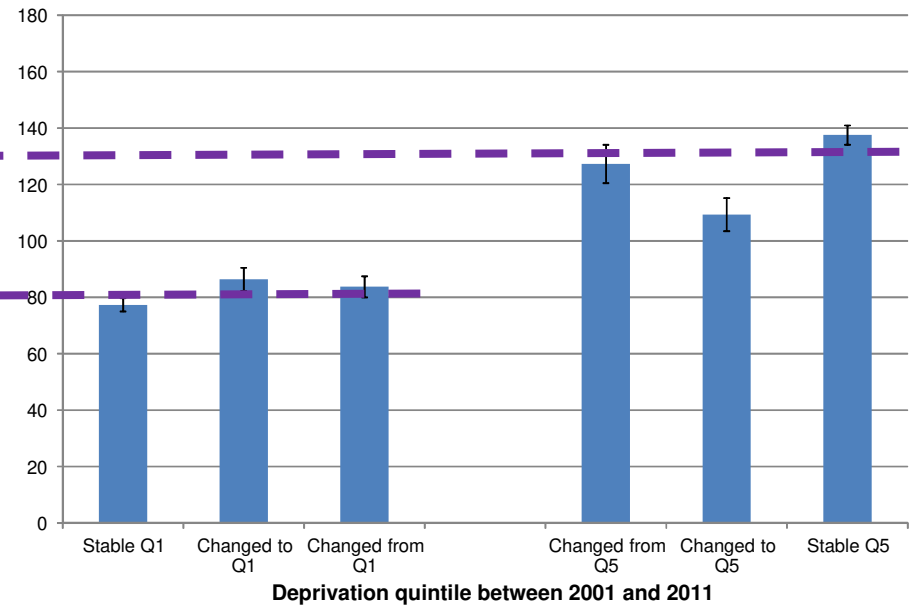
Changes affecting the deprivation extremes

2001 to 2011 SIRs for LLTI

Migrants



Non-Migrants



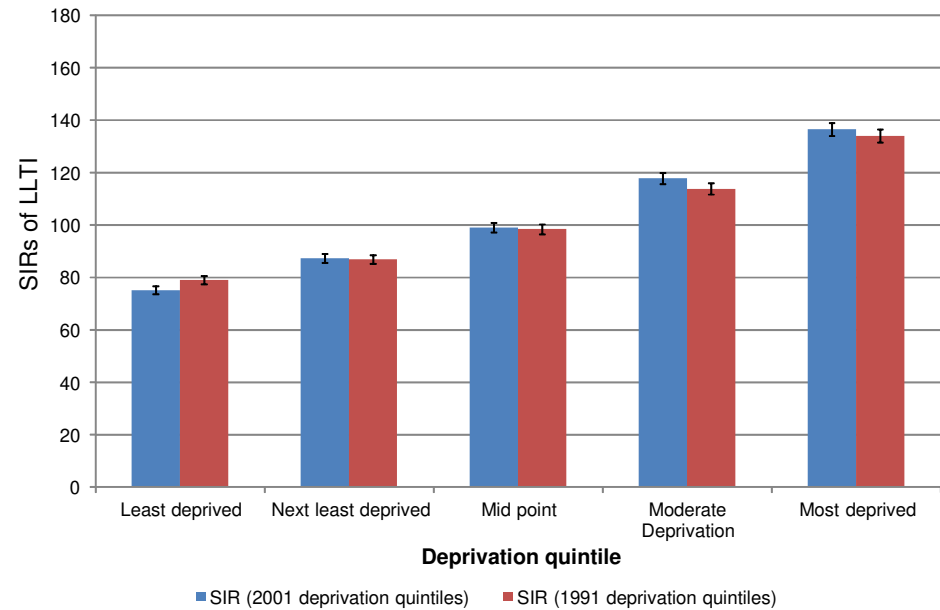
Overall effects on inequality: putting people back

1991-2001

Rate ratio

Movement: 1.82

No movement: 1.67

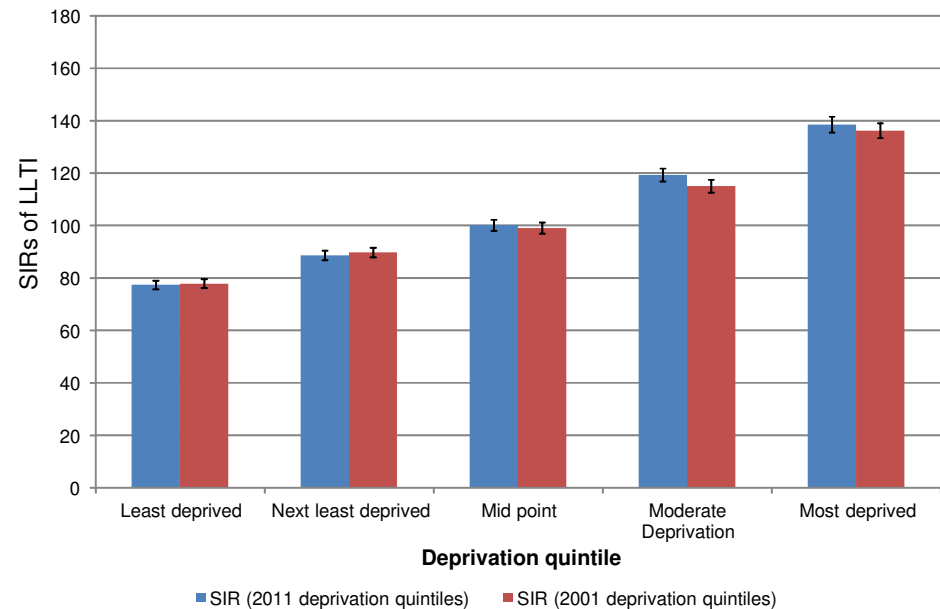


2001-2011

Rate ratio

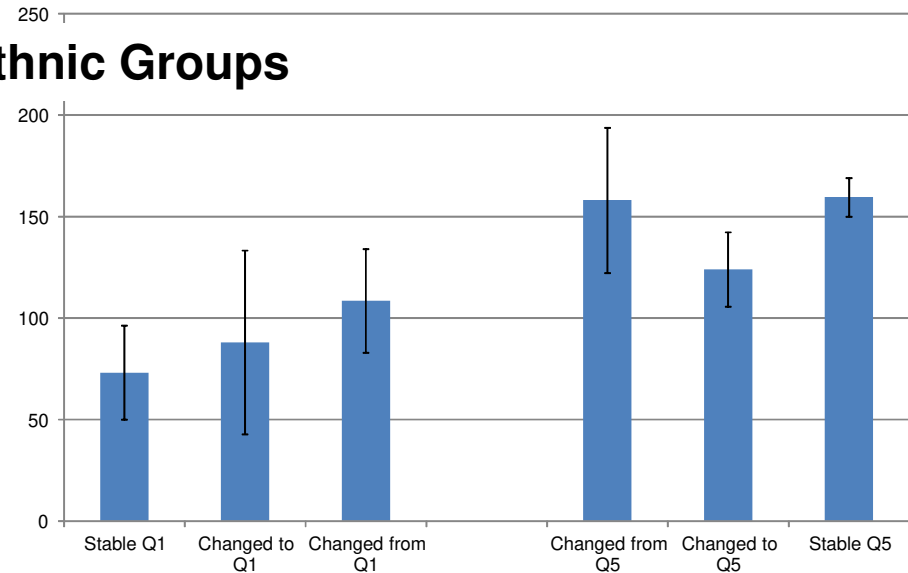
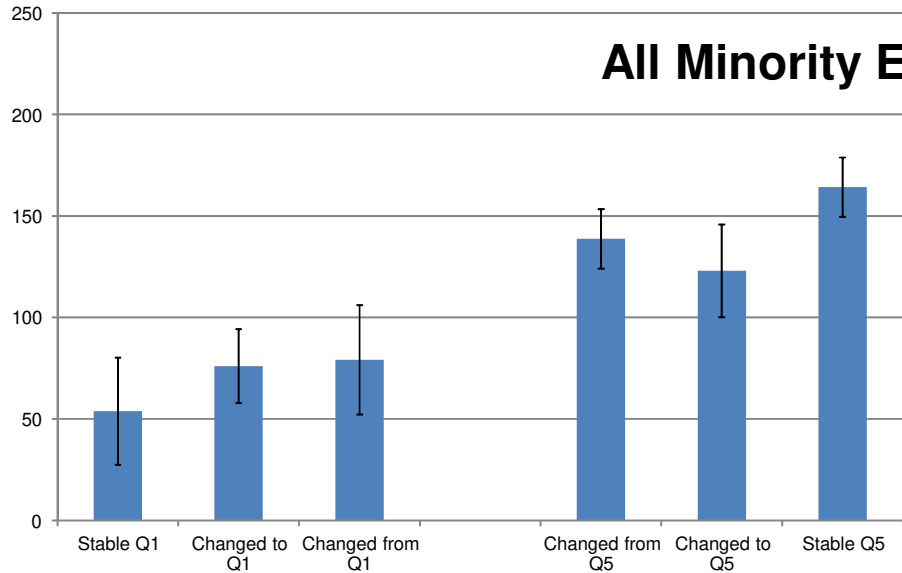
Movement: 1.79

No movement: 1.75

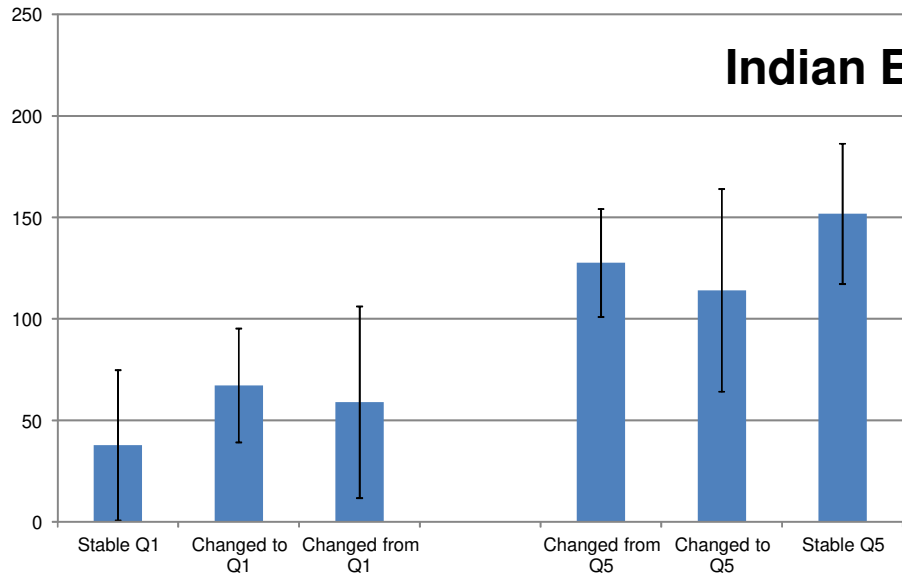


Changes by ethnic group? 2001 to 2011

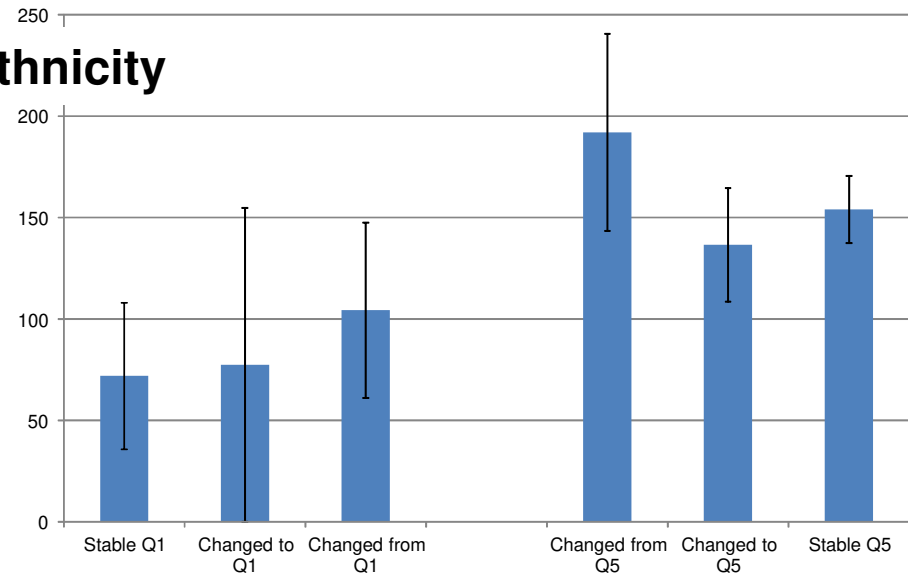
All Minority Ethnic Groups



Migrants



Non-Migrants



Selective migration affecting local health rates?

Health-deprivation relationship

- More exaggerated than if nobody moved & / or if areas didn't change

But ...

- Disaggregating the moves between deprivation categories by age shows some different directions
 - e.g. Unhealthy elderly migrants moving from more to less deprived areas

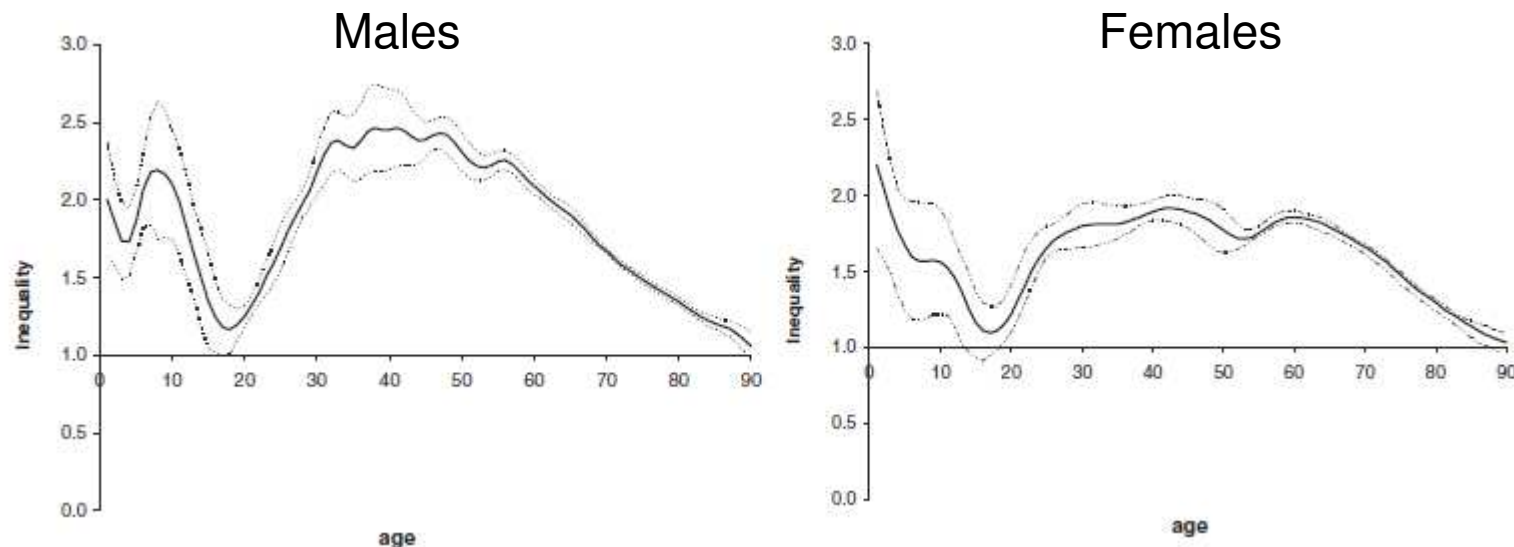
What about different ages?

Are health inequalities evident at all ages?

The notion that mortality inequalities across area deprivation may vary by age is logical

- Not every cause of death increases with age
- Not every cause of death related to the deprivation

Mortality (1997-99) ratio most : least deprived IMD quintile



(Dibben & Popham, 2012 for England)

Variations by age: an alternative / additional 'explanation'

In addition to the interaction between the cause–age & cause–deprivation relationships ...

Population migration may redistribute the population such that the health–deprivation relationship varies by age

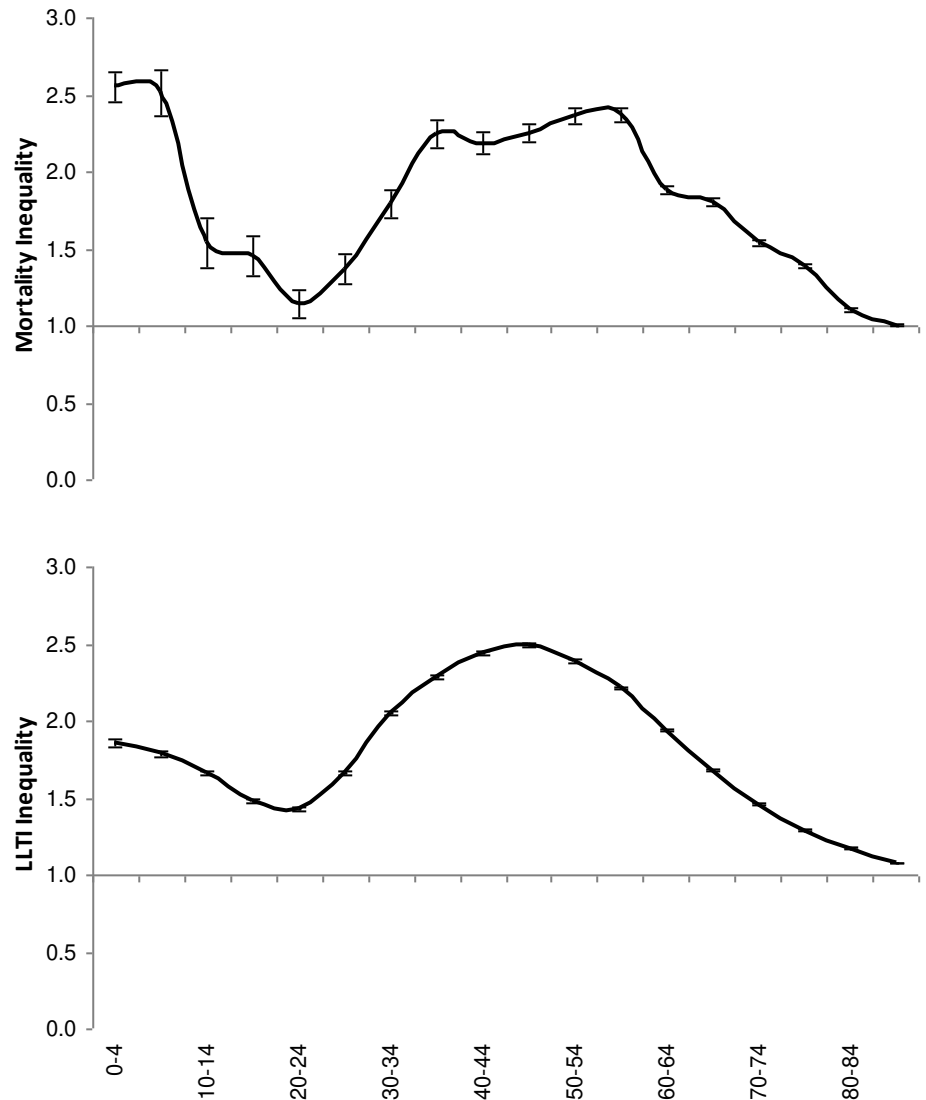
Proposition based on:

- Distinctive age schedule of migration
- Types of areas people typically move from & to at different ages
- Migration process itself is health selective

Cross-sectional inequalities by age

England & Wales
Ratio Most : Least deprived
by Carstairs quintile

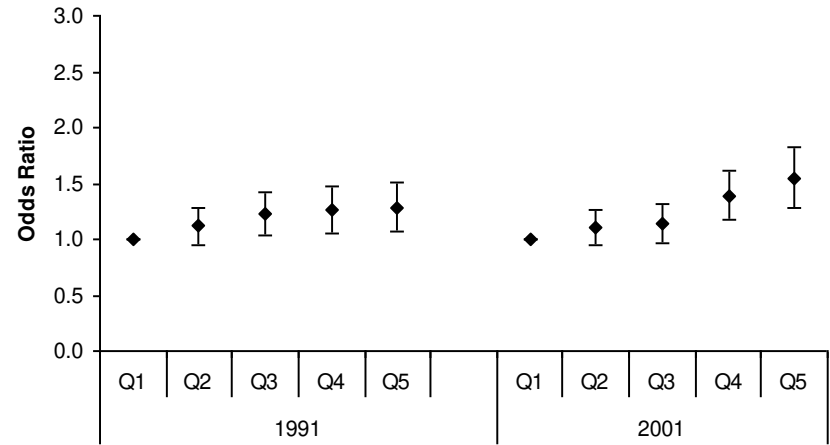
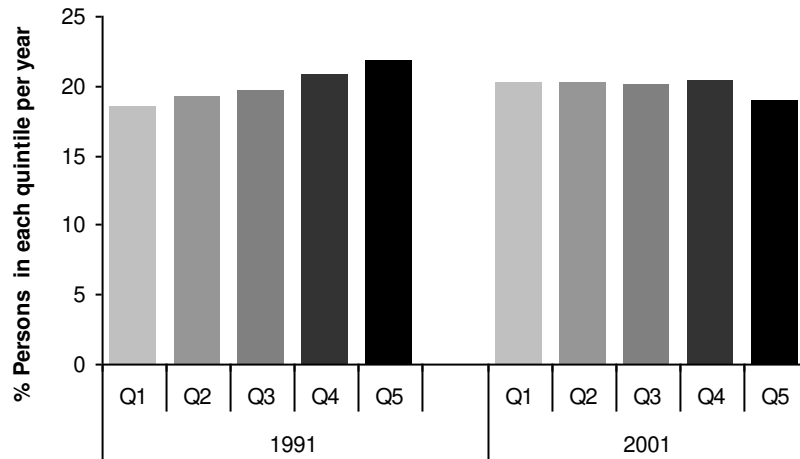
Mortality
(2000-02)



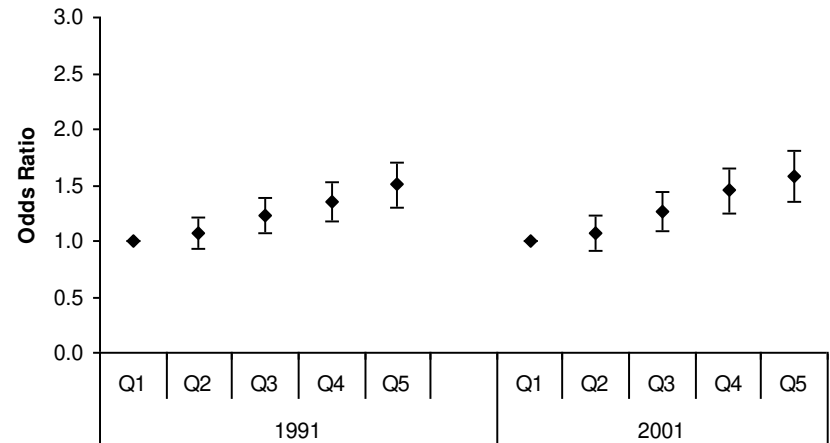
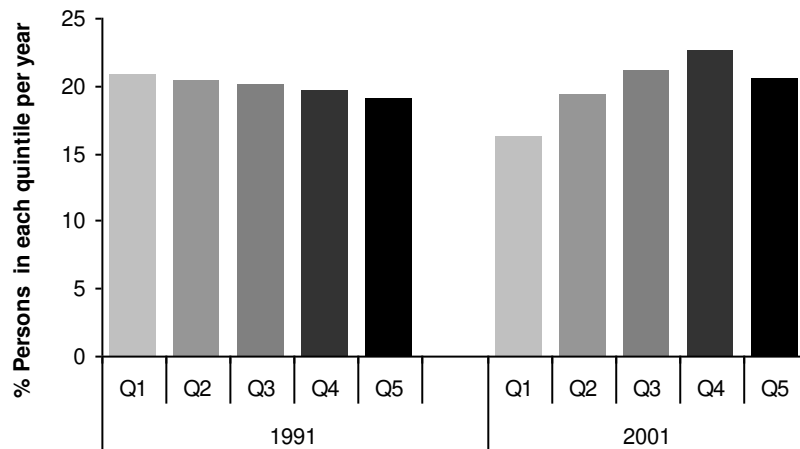
Limiting long-term illness
(2001)

Longitudinal LLTI inequalities by age

Age 0-9 in 1991 & 10-19 in 2001

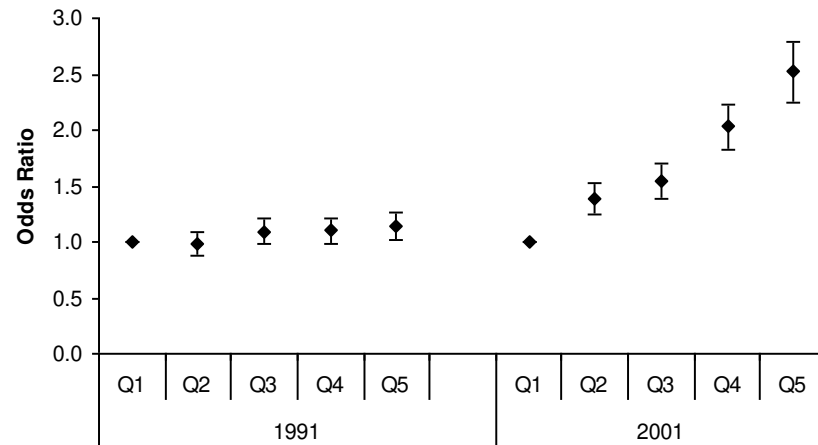
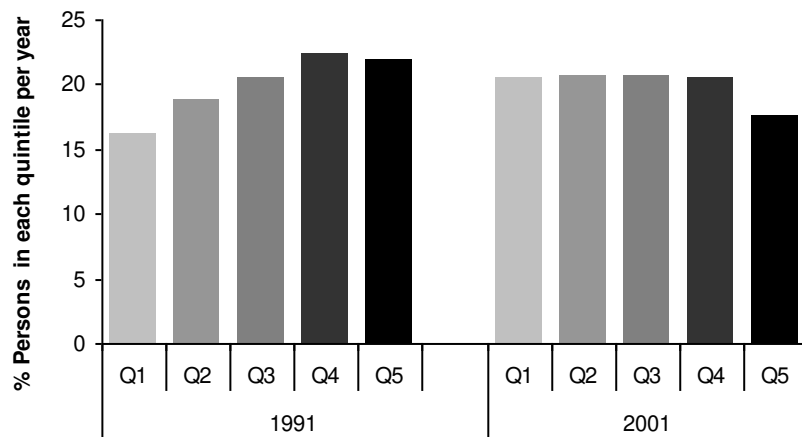


Age 10-19 in 1991 & 20-29 in 2001

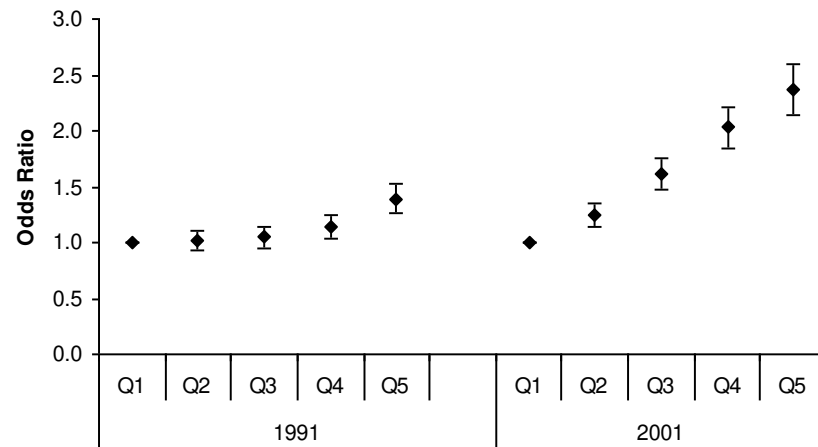
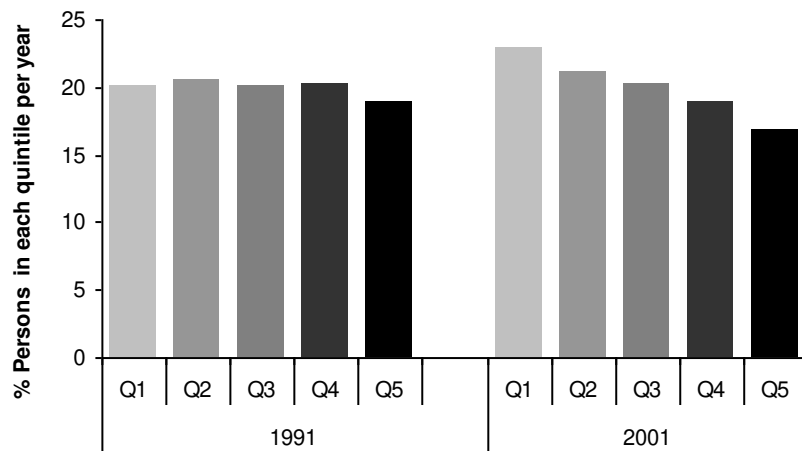


Longitudinal LLTI inequalities by age

Age 20-29 in 1991 & 30-39 in 2001

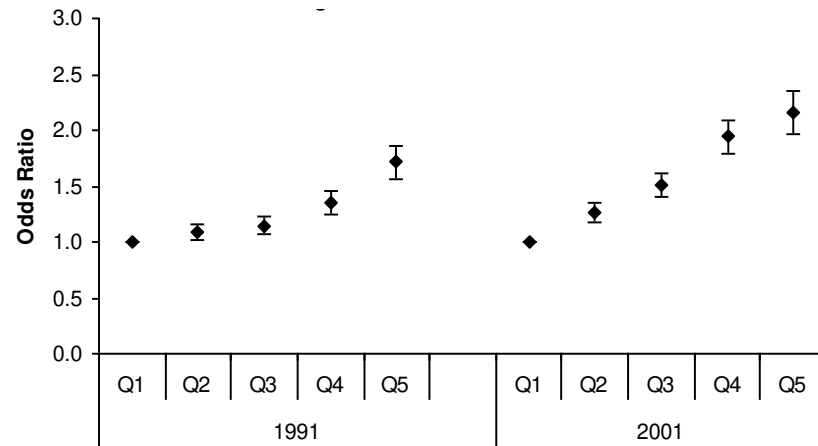
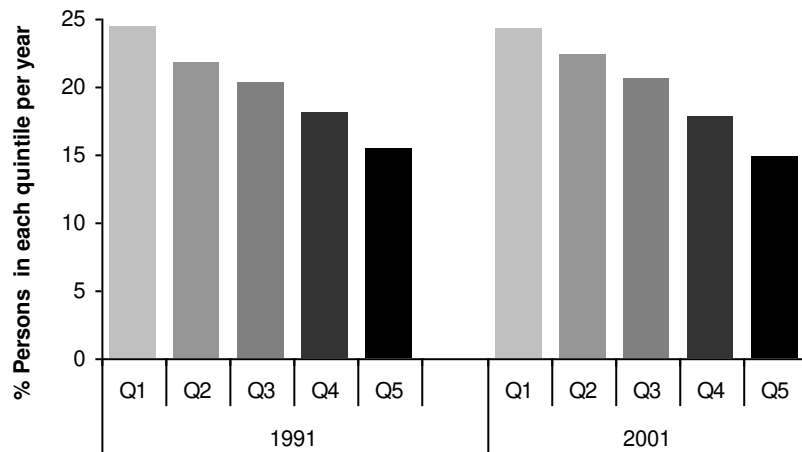


Age 30-39 in 1991 & 40-49 in 2001

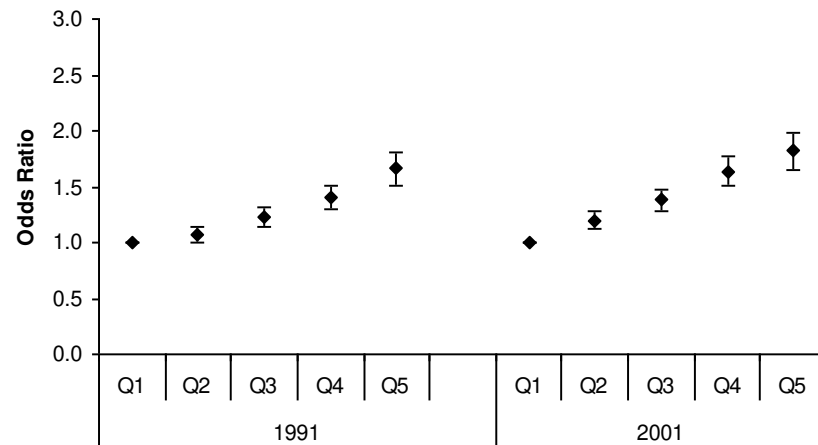
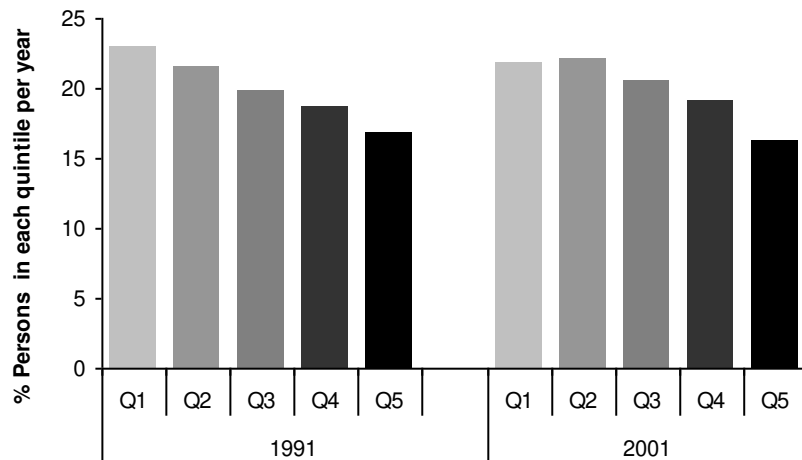


Longitudinal LLTI inequalities by age

Age 40-49 in 1991 & 50-59 in 2001

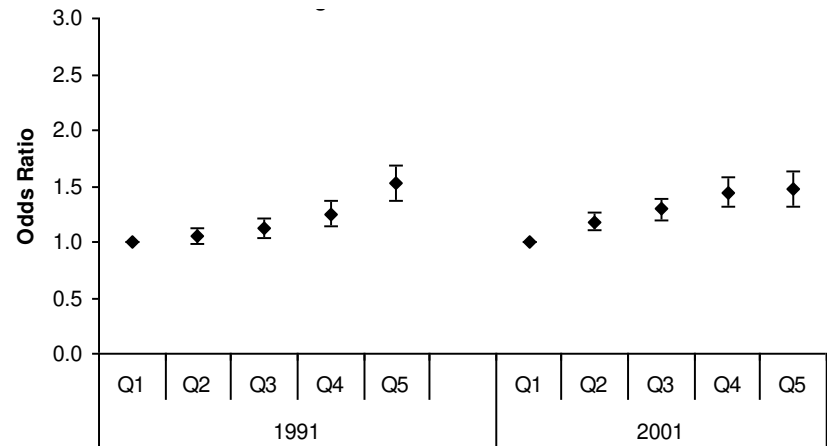
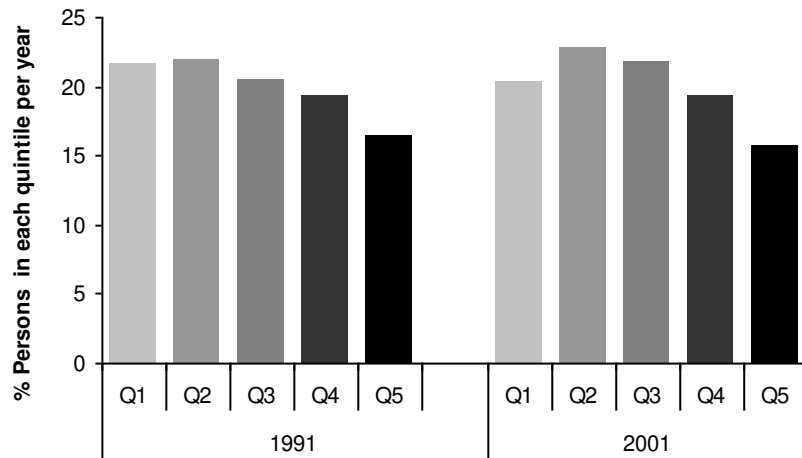


Age 50-59 in 1991 & 60-69 in 2001

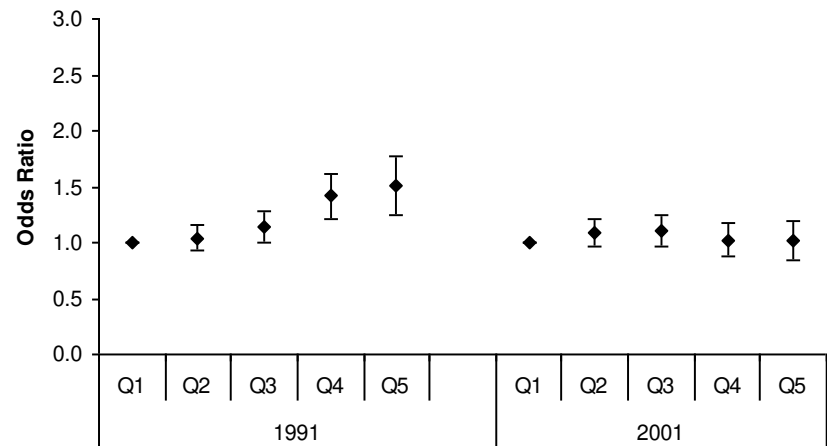
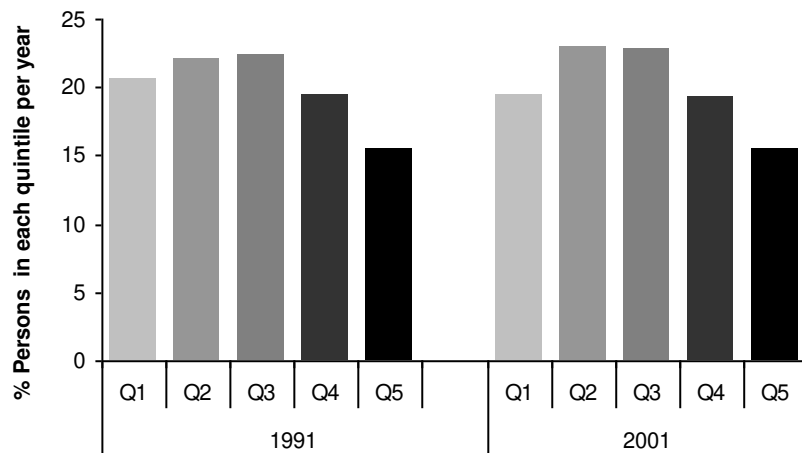


Longitudinal LLTI inequalities by age

Age 60-69 in 1991 & 70-79 in 2001



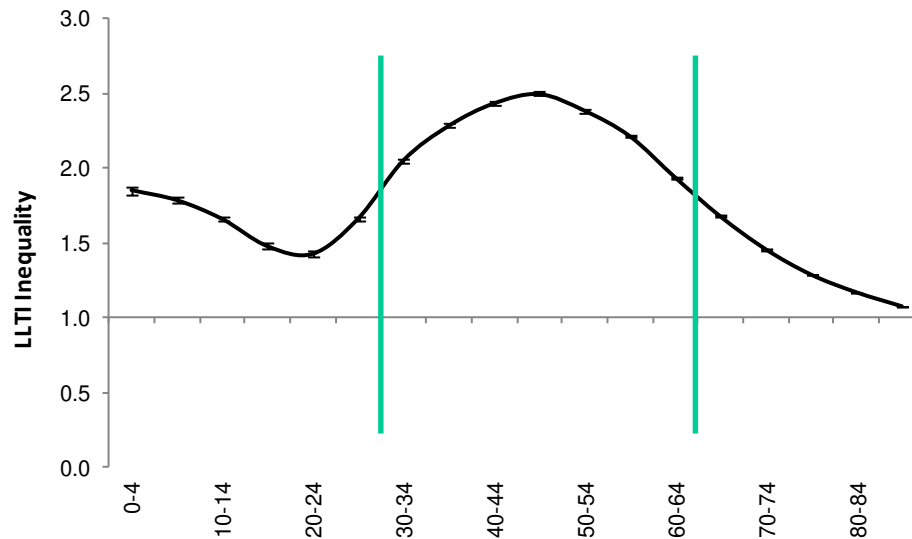
Age 70-79 in 1991 & 80+ in 2001



How might we use this information?

Investigations of health-deprivation relationships

- Direct / Indirect standardisation often all age or 'premature' (excluding elderly)
- What if other age boundaries applied?



Health-deprivation-migration inter-relationships

Are any of the above applicable:

- In another country?
- For a different health outcome?
- Where ethnicity is also relevant?

The role of deprivation transitions in explaining health inequalities in New Zealand

- Cardiovascular disease (CVD) one of the leading causes of death globally, with marked variations between ethnic groups
- In Auckland, residential mobility found to be an important determinant of CVD (Exeter et al., 2015)
- Propensity to migrate varies by ethnic group, as does risk of CVD
- Exploring relationship between CVD, residential mobility and ethnicity may be revealing as to ethnic health inequalities in CVD

Explore how residential mobility and the nature of a move interacts with risk of CVD for different ethnic groups in New Zealand:

- Do movers in New Zealand have higher risk of CVD?
- Is risk of CVD for movers attenuated by baseline deprivation?
- Do patterns observed for movers and stayers in NZ vary for specific ethnic groups?
- How does risk of CVD vary by ethnic group for stayers?

Illustrate some of the 'selection effects' behind migration events which may influence ethnic health gradients

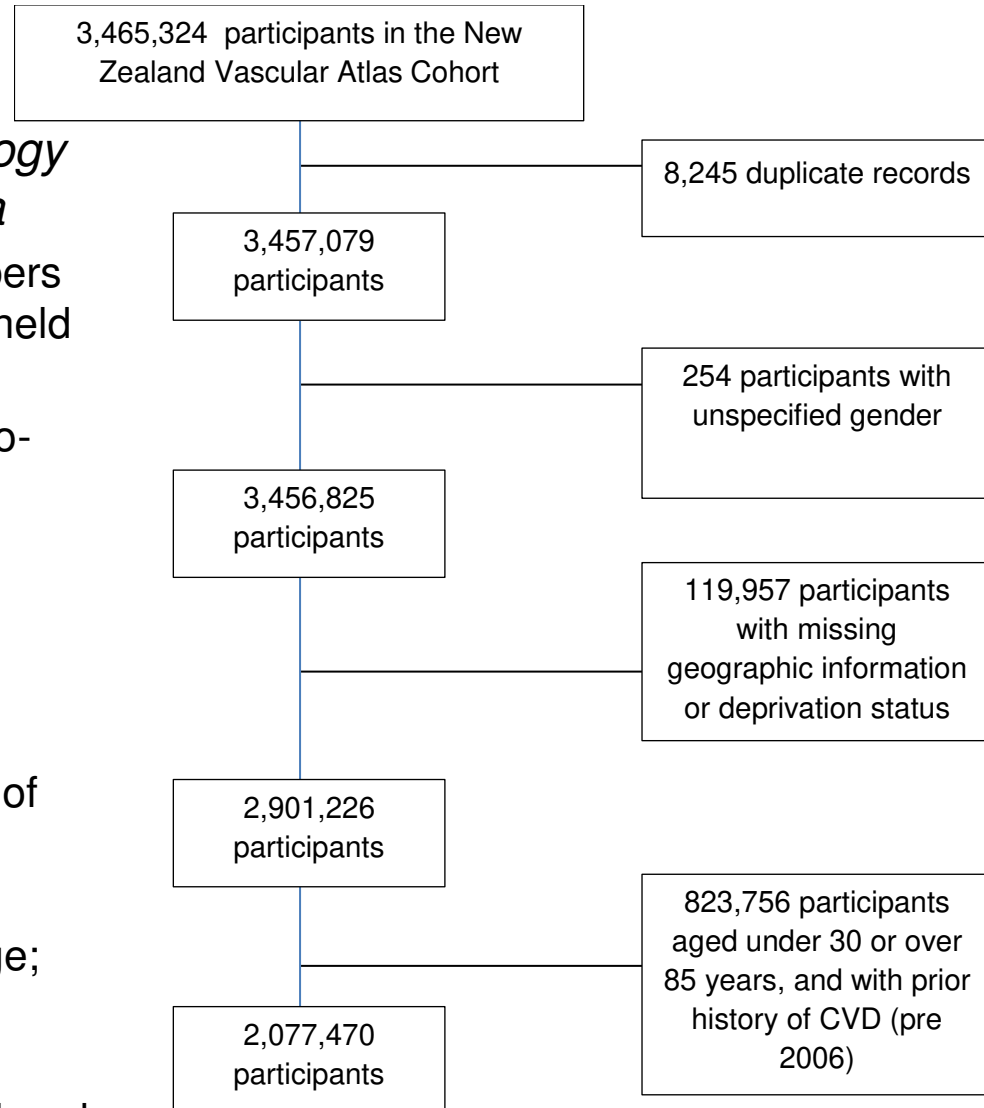
Data & Methods

Vascular Informatics using Epidemiology and the Web (VIEW) longitudinal data

- Encrypted National Health Index numbers used to anonymously link 4 nationally held datasets
- Eligibility based on age, complete socio-demographic information and no prior history of CVD
- Study period 01/01/06 – 30/06/14

Methods

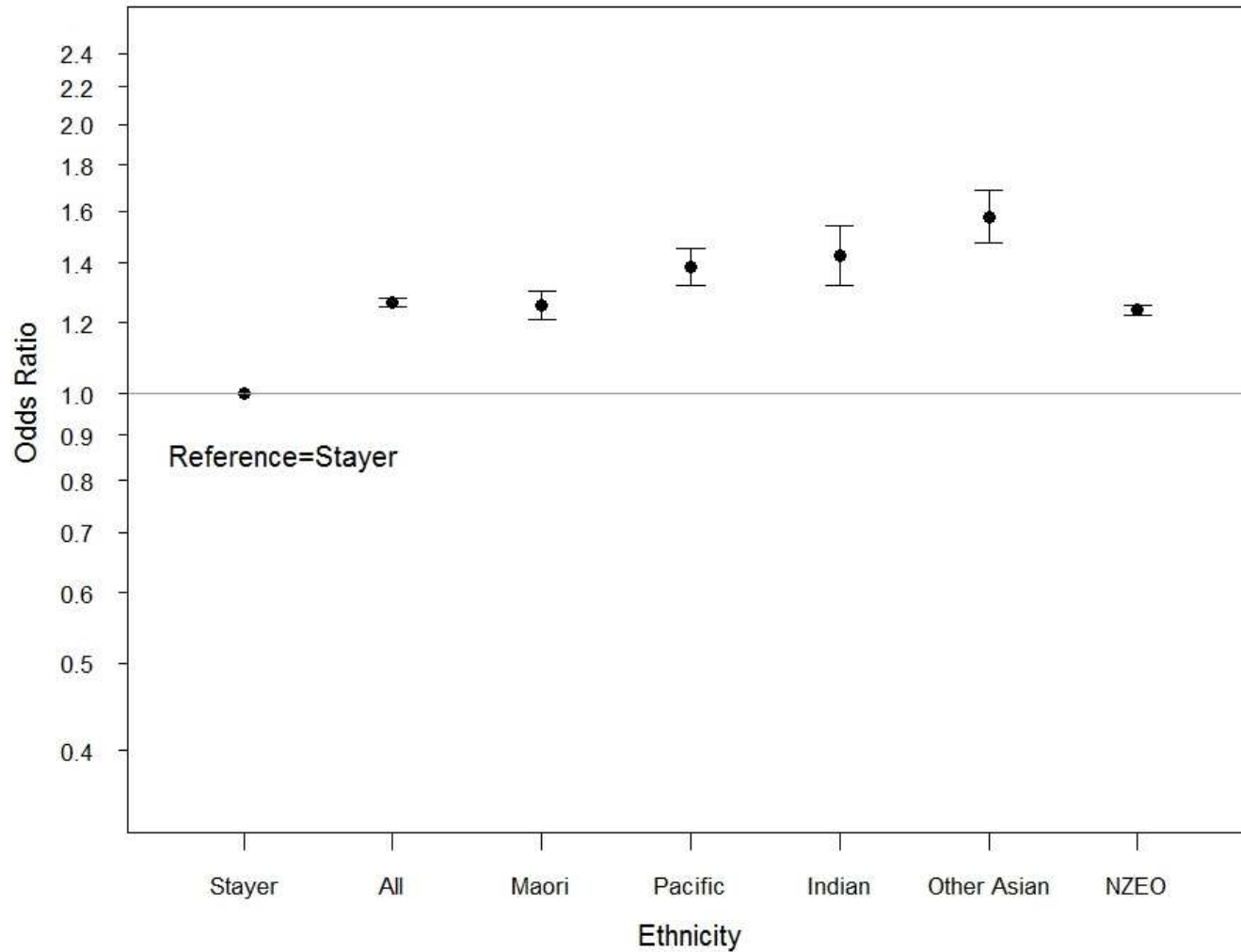
- Binary logistic regression: model odds of CVD adjusting for:
 - (1) mover status;
 - (2) mover status and baseline deprivation;
 - (3) deprivation change;
 - (4) deprivation transitions;
 - (5) stable deprivation for stayers
- Interaction effects by ethnic group explored via ethnic-specific models



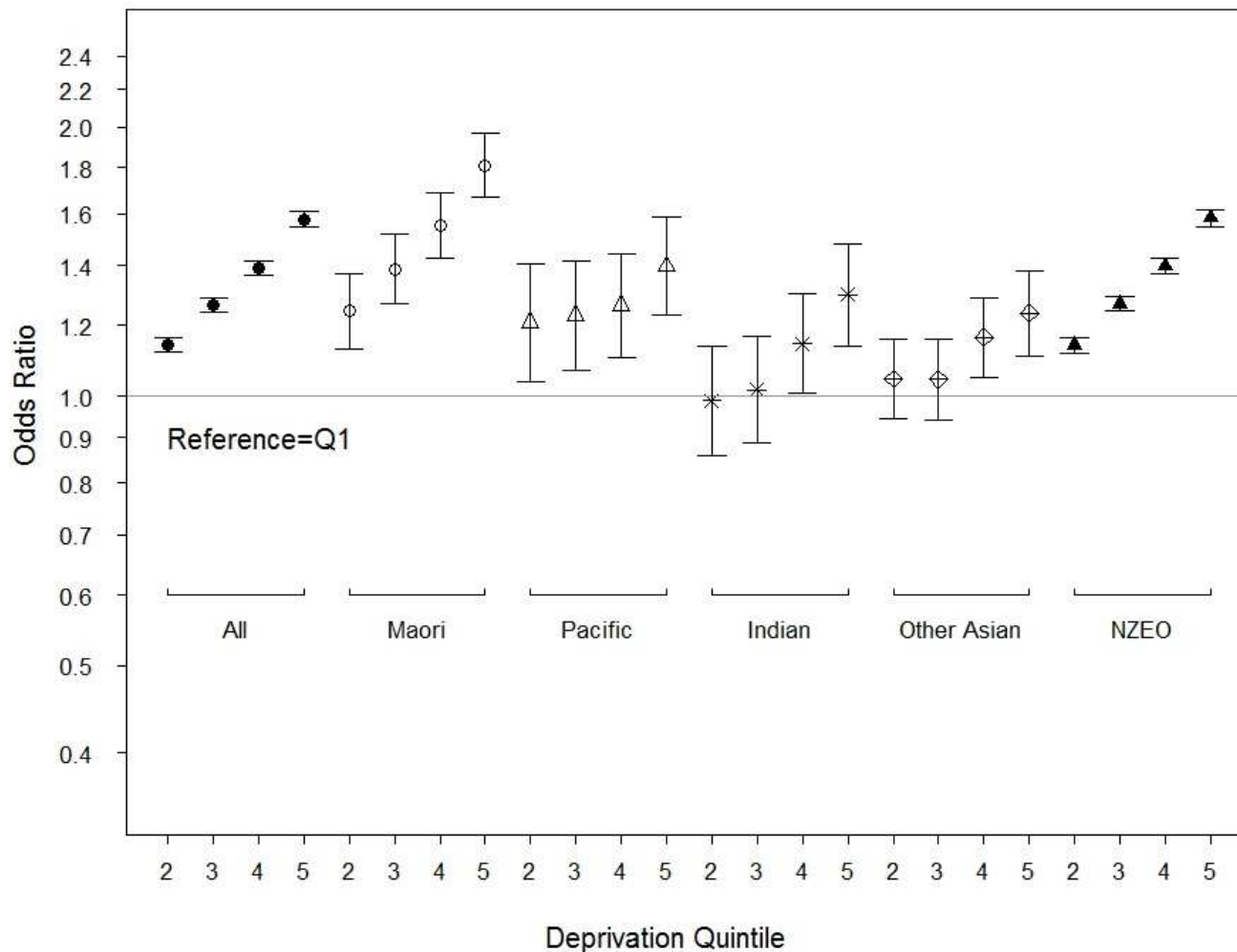
Variables

Variable	Category
Sex	Female; Male
Age	30-44; 45-54; 55-64; 65-74; 75-85
Ethnicity (prioritised)	Maori; Pacific; Indian; Other Asian; New Zealand European & Other (NZEO)
CVD hospitalisations (events)	CVD; No CVD
Deprivation (NZDep2006)	Q1- least deprived; Q2; Q3; Q4; Q5 – most deprived
Deprivation change (for movers)	Stayers; Less deprived; churn; More deprived
Deprivation transitions (for movers)	Stayers; Across Q1; Into Q1 (Q2-Q4); Out of Q1 (Q2-Q4); Across Q2, Q3, Q4; Out of Q5 (Q1-Q4); Into Q5 (Q1-Q5)
Stable deprivation (for stayers)	Movers; Stable Q1; Stable Q2; Stable Q3; Stable Q4; Stable Q5

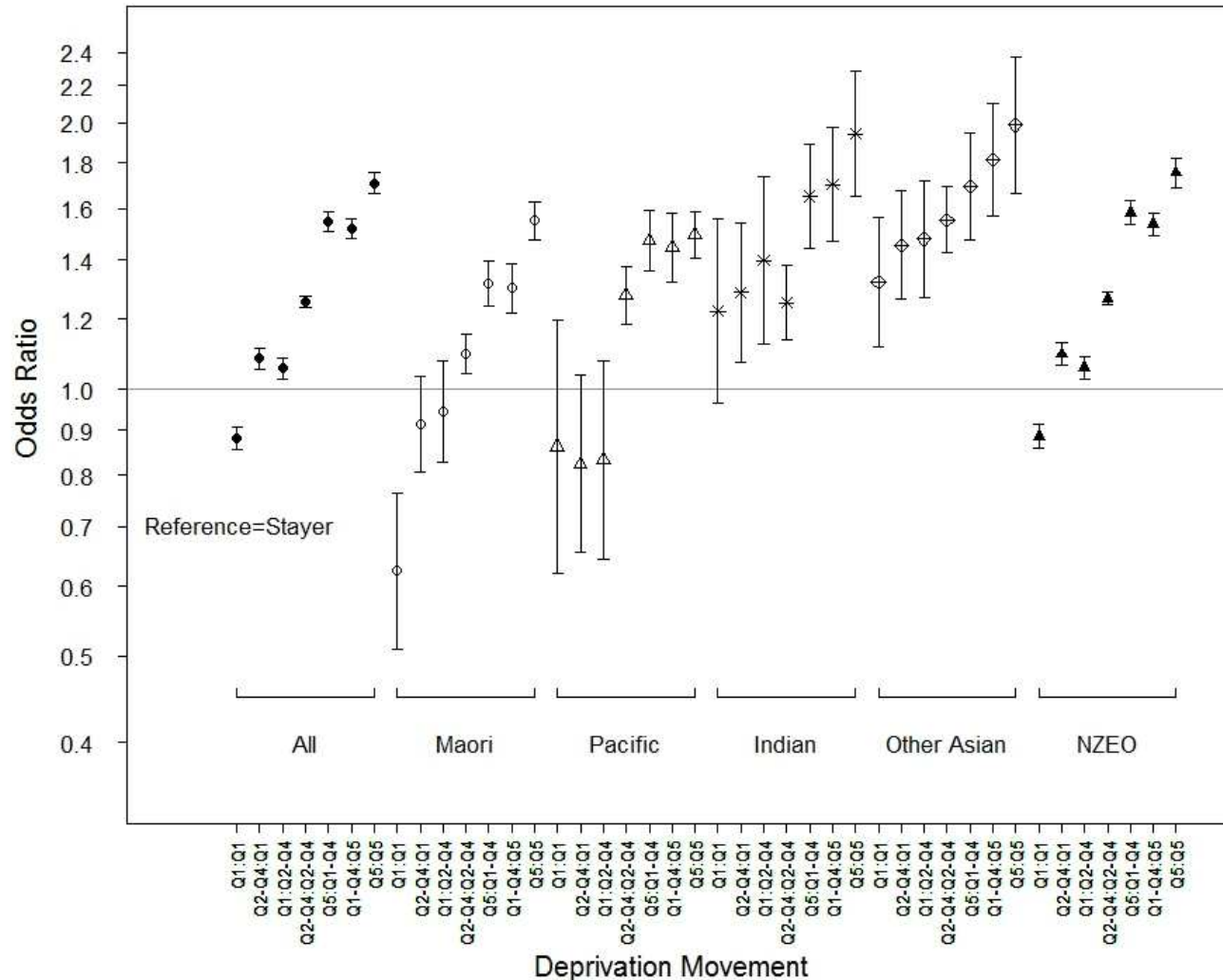
Model CVD, adjusting for age, sex, [ethnicity], mover status (stayer = reference)



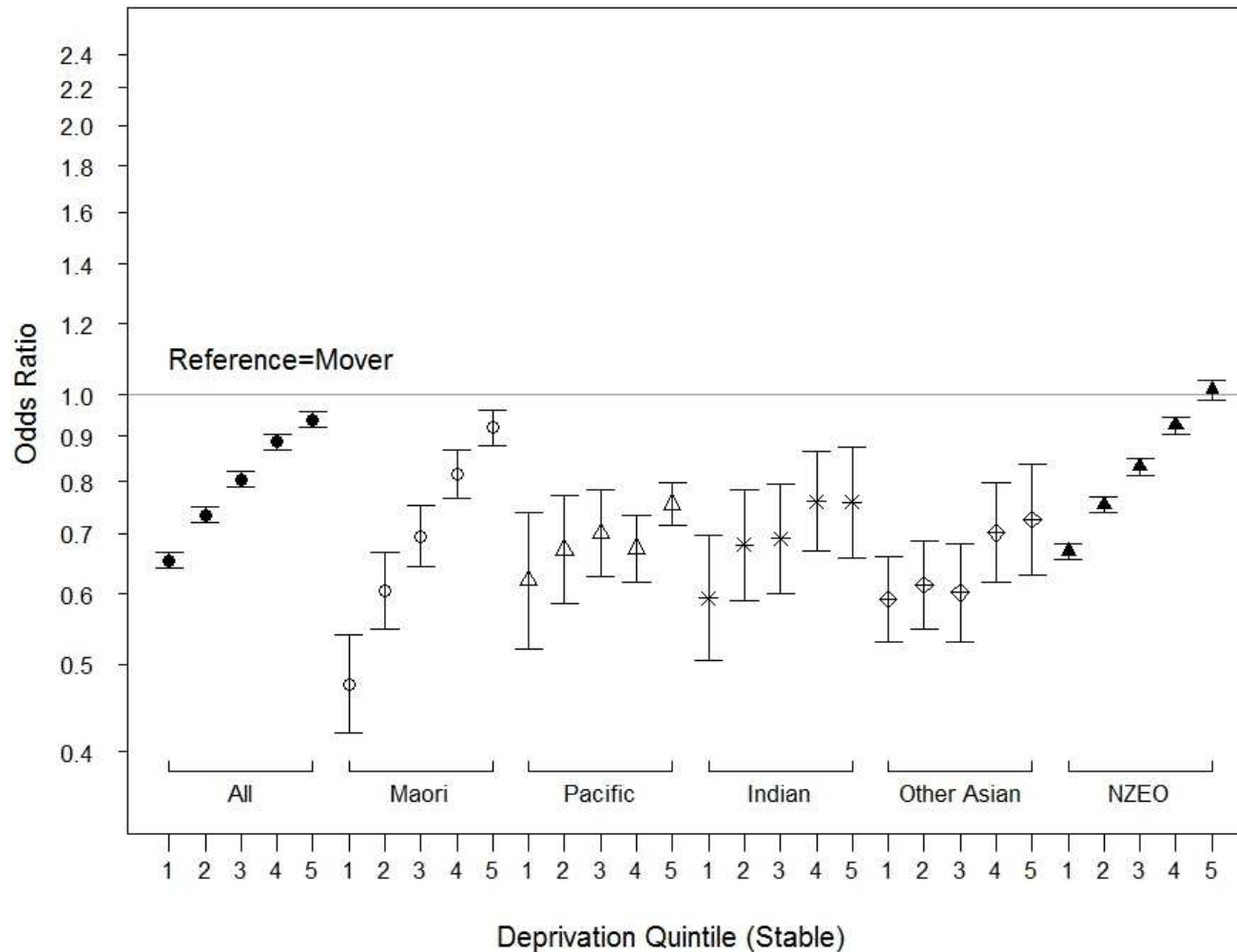
Model CVD, adjusting for age, sex, [ethnicity], mover status and baseline deprivation (Q1 = reference)



Model CVD, adjusting for age, sex, [ethnicity], deprivation transitions (stayers = reference)



Model CVD, adjusting for age, sex, [ethnicity], stable deprivation for stayers (movers = reference)



Postscript

England ONS Longitudinal Study LLTI

- Lowest and highest levels of LLTI for migrants within least and most deprived areas. Similar by ethnic group
- Changes to least & from most deprived areas and opposite direction mainly associated with concomitant levels of self-reported health
- Systematic movements between differently deprived areas at different ages leads to age-specific inequalities; greatest in mid-life

New Zealand VIEW CVD

- Residential mobility important determinant of CVD in NZ apparent through relationship with deprivation mobility
- Movers have higher risk of CVD than stayers
 - More work on timing of events & survival forthcoming
- Similarities in distribution of risk of CVD for:
 - (1) NZEO and Maori (2) Pacific, Indian and Other Asian
- Migration at least maintains overall area inequalities
- Overall health (dis)advantage consistent with deprivation change
- For CVD, movers may have greater health risk

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Data suppliers / funders

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VIEW data provided by Analytical Services at the New Zealand Ministry of Health, Encryption of unique identifiers by www.enigma.co.nz

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