‘Excess’ mortality in Scotland: towards an understanding?

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Topics

• What do we mean by ‘excess’ mortality?
• Quantifying the excess:
  – results of new national analyses
• Understanding the excess:
  – synthesising the evidence
• Why this matters
• (As always, a lot of graphs...)
Scottish ‘excess’ mortality

- Higher mortality observed in Scotland (compared to elsewhere in the UK) *over and above* that explained by differences in socio-economic deprivation
- NB Poverty and deprivation (and underlying/related factors e.g. deindustrialisation) main drivers of poor health in any society
- But higher mortality still observed in Scotland after taking deprivation & poverty into account
- (Excess also referred to as the ‘Scottish Effect’ (but not in this presentation...))
Research examples

- Gray L. Comparisons of health-related behaviours and health measures in Greater Glasgow with other regional areas in Europe. Glasgow Centre for Population Health, 2008
- Popham F., Boyle P.J., Norman P. The Scottish excess in mortality compared to the English and Welsh. Is it a country of residence or country of birth excess? Health & Place (2010); doi:10.1016/j.healthplace.2010.03.007
Research examples

- Scotland compared to England & Wales
- Controlled for differences in area-based deprivation
- Scottish all-cause mortality 8% higher than England & Wales c.2001
- Higher cause-specific ‘excesses’ e.g. cerebrovascular disease: 24%; lung cancer: 25%; suicide: 49%
Research examples

- Scottish Health Surveys & Health Surveys for England (1994-2008)
- Controlled for differences in individual SES...
- ... and behavioural risk factors (e.g. smoking, alcohol consumption, diet, physical activity)...
- ... and biological risk factors (e.g. BMI, blood pressure, lung function)
- 29% higher mortality in Scottish sample
Research examples

- Glasgow compared to Liverpool & Manchester (2003-07)
- Controlled for differences in area deprivation
- Very similar deprivation profiles in 3 cities...
- ...and similar everything else
- Premature mortality 30% higher in Glasgow
- (Deaths at all ages almost 15% higher)
Common themes of research into Scottish ‘excess’ mortality

- Excess increasing over time
- Excess shown irrespective of measures of poverty/SES used
- Seen for many different causes of death
- Persists after controlling for individual health behaviours (smoking etc)
- Ubiquitous in Scotland, but greatest in and around West Central Scotland conurbation (esp. Glasgow)
- Affects all social classes, but highest among comparisons of poorest
Premature mortality by social class

Age-standardised all-cause mortality rates by Social Class, England and Scotland, males aged 20-64, 1991-93

(Source: Scottish Executive, 1993 (from data originally presented by Uren et al, 2001))
Age/sex standardised mortality ratios (all-cause deaths 2003-07),
Glasgow relative to Liverpool & Manchester, by 3-city deprivation decile

Source: GCPH, 2010

50% of excess deaths attributable to alcohol & drugs
New national analyses

- Undertaken by Lauren Schofield, ISD Scotland
- Comparative analyses of deprivation and mortality in Scotland compared to England & Wales
- Updating previous analyses for period 1981-2011
- Uses original methodology (e.g. use of Carstairs deprivation index)…
- …but expands on it - lots of new methodological ‘challenges’:
  - Comparing effect of different measures of deprivation
  - Different (smaller) geographical spatial units

Why is mortality higher in Scotland than in England and Wales? Decreasing influence of socioeconomic deprivation between 1981 and 2001 supports the existence of a “Scottish Effect”

P. Hanlon, R.S. Lawder, D. Buchanan, A. Redpath, D. Walsh, R. Wood, M. Bain, B.H. Brewster and J. Chalmers

Introduction

The stimulus for this study was the observation that, unlike England and Wales, relative mortality rates for Scotland were 30-40% higher than for England and Wales between 1981 and 2001. The more recent trend of decreasing mortality rates in Scotland relative to England and Wales had been noted since the mid 1990s and that the rate was particularly large for middle-aged men. Since life expectancy was improving in both populations, this relative gap represented a relative rather than absolute decline in the Scottish population but its size and speed of change suggested the need for further investigation. Ecologically, Scottish poorer health has been attributed to higher levels of deprivation, but recent research appeared to show that, by the early 1990s, deprivation was accounting for less of Scotland’s excess mortality, a phenomenon that was called the “Scottish Effect.” The purpose of this study is therefore, to determine the degree to which changing patterns of deprivation in Scotland and the rest of Great Britain between 1981 and 2001 explain Scotland’s higher mortality rates over this period.

Objectives

To determine the degree to which changing patterns of deprivation in Scotland and the rest of Great Britain between 1981 and 2001 explain Scotland’s higher mortality rates over that period.

Design


Setting

Great Britain (GB).

Participants


Main outcome measure

Change in deprivation scores across census years (Scotland) and postcode sectors (Scotland). Mortality rates adjusted for age, sex and deprivation deciles.

Results

Between 1981 and 2001 Scotland became less deprived compared to the rest of Great Britain. Age- and sex-standardised all-cause mortality rates decreased by approximately 20% across Great Britain, while mortality rates in Scotland increased by approximately 20% while lower social deprivation increased by approximately 20%. Mortality rates in Scotland were significantly higher in 2001. While over 60% of the increase in mortality in Scotland between 1981 and 2001 could be explained in terms of deprivation gradients, less than half the increase could be explained in 1981 and 2001. When adjusting for age, sex and deprivation, excess mortality in Scotland was 8% in 1981, 10% in 1991, and 12% in 2001. This 20% increase is in line with other studies.

Conclusions

Scotland’s relative mortality disadvantage compared to the rest of Great Britain, which increased over the period 1981-2001, appears to be more strongly related to mortality in the most deprived areas of Scotland and the unexplained excess has persisted during this time. More research is needed to understand what is causing this “Scottish effect.”

Keywords: deprivation, inequalities in health, mortality
‘Excess’ mortality by year

Excess mortality (%), Scotland relative to England & Wales, 1981-2011: mortality rates directly standardised by age, sex and Carstairs deprivation decile
By age and year - males

Scottish excess mortality by age group, 1981-2011, MALES
By age and year - females

Scottish excess mortality by age group, 1981-2011, FEMALES
By deprivation decile

Standardised mortality rates by Carstairs deprivation decile, 2011

- Scotland
- England and Wales

Carstairs deprivation decile: 1 (LEAST DEPRIVED) to 10 (MOST DEPRIVED)
Anorak alert!

- Use of better (smaller), more spatially sensitive geographical units (ave. pop size 1,500 in Scotland and England)
- Use of ‘better’ measures of deprivation (e.g. ‘employment deprivation’ from SIMD – applied to both Scottish and English geographical units)
Excess in 2001 (NB not 2011)

Scottish excess mortality (%), 2001

<table>
<thead>
<tr>
<th>Carstairs Index (Scottish postcode sectors, English wards)</th>
<th>Employment deprivation (Scottish merged datazones, English LSOAs)</th>
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What explains the excess?
Synthesising the evidence
Theories, theories, theories...

- Artefact
- Migration
- Political attack/effects
- Culture
- Deindustrialisation
- Income inequalities
- Social mobility
- Substance misuse cultures
- Alienation/anomie
- Family/parenting/early years

- Social capital
- (Health) services
- Patterning of deprivation
- Sectarianism
- Individual values (e.g. psychological outlook)
- Sense of coherence
- Behaviours
- Genetics
- The weather...
Other proposed theories...

- Rainfall
- Irn Bru
- Broadband
- Water impurities
- A lack of runner beans
- Land contamination
- Abortions
- Submarines on the Clyde
- Low air pressure
- A general “curse”

Stop press – this one just in: Fewer pet dogs per head of population in Scotland?
Other proposed theories...

- Lots of unhelpful theorising
- Lots of unhelpful media coverage...
Other proposed theories...

“It is as if a malign vapour rises from the Clyde at night and settles in the lungs of sleeping Glaswegians”

The Economist. ‘No City for Old Men’. August 2012
Let’s be sensible

• No fewer than 17 (17!) separate hypotheses assessed in 2011/12 report/journal paper
• Categorised as ‘upstream’, ‘midstream’ and ‘downstream’ hypotheses (alongside ‘artefact’ and ‘genetic’)...
• ...(Reflecting public health understanding of the social determinants of health and the importance of structural factors)
• Synthesis of most likely causes/causal pathways attempted
• Hindered by gaps in data/knowledge
Since publication of 2011 report, a large number of research projects have been undertaken…

- Matched only by the number of new theories that have since been suggested…
- New synthesis of all evidence to date underway
- Has necessitated more (short-term) research projects:
  - Vulnerability of populations
  - Scale of urban change in Scottish and English cities
  - Housing quality
  - Nature of employment
  - Diet
  - Systematic review of other hypotheses

And lots more e.g.:
- Impact of local policy/practice (UWS)
- Alcohol harm (Deborah Shipton, GCPH)
- Drugs harm (Liverpool John Moores)
- Qualitative research (Pete Seaman, GCPH)
- Changes in deprivation patterning (Joanna Stewart, GU)
- And others (see GCPH website for more details)
Synthesising the evidence

• Synthesis will be based on:
  – Reviewing/updating hypotheses and associated evidence
  – Creating causal models using the more plausible hypotheses
  – Testing and iterating causal models against ability to explain all observed phenomena
  – Identifying assumptions and remaining research questions

• Joint research: GCPH & NHS Health Scotland
• Timescale: for completion summer 2015 (honest..)
Trying to make sense of Scottish excess mortality

1. It’s horribly complicated...
2. The solution will be equally complex and multifactorial
3. Lots (and lots and lots) of theories have been proposed – lots (and lots and lots) seem very unlikely...
4. We have a sophisticated understanding of the determinants of health. They apply to population health across the globe. The globe includes Scotland and Glasgow.
5. Historical factors likely to play a part
Clues from work undertaken to date

1. Different (combinations of) factors affecting different populations

2. Available measures of poverty don’t capture essence of living in deprived circumstances in Glasgow/Scotland – evidenced by:
   - Proven/profound links between poverty and health
   - Causes of death linked to the excess
   - Hints from other data sets

3. Importance of history
   - E.g. scale of urban change in cities
   - National and local political decisions

4. Likely to be protective factors operating in other cities
Why this matters

• I thought this was obvious but...
• This matters because of scale
  – E.g. 11% higher mortality nationally (Scotland v E&W)
  – 30% higher premature mortality in Glasgow compared to England’s two poorest and sickest cities
  – Equates to many thousands ‘excess’ deaths

• **This matters because of the human cost**
• This matters because of the excess is increasing over time
• This matters because of its relevance to the scale of health inequalities in Scotland
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