‘Excess’ mortality in Scotland and Glasgow: context & evidence

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Topics

• Part one (context):
  – What’s the focus: Scotland or Glasgow?
  – Scotland’s/Glasgow’s health – a (very) quick overview
  – Determinants of health and health inequalities
  – A socio-economic history of Glasgow over 300 years

• Part two (evidence):
  – ‘Excess’ mortality in Scotland and Glasgow
  – Suggested explanations

• Why I hate the term ‘Glasgow Effect’

• An unfeasibly large number of graphs
What’s the focus: Scotland or Glasgow?

• Both...
• Scotland has a very small, and geographically concentrated, population
• What happens in and around Glasgow impacts on national figures
• Shown in analyses at different geographical levels...
What's the focus: Scotland or Glasgow?

Glasgow – 11% of pop
Greater Glasgow – 17% of pop
& Clyde – 23% of pop
West Central Scotland – 41% of pop
Strathclyde – 42% of pop

This work is based on data provided through EDINA UKBORDERS with the support of the ESRC and JISC and uses boundary material which is copyright of the Crown and the Post Office.
What’s the focus: Scotland or Glasgow?

• In health terms same issues apply, but in different concentrations

• True of:
  – Overall health status relative to other populations
  – Change over time
  – ‘Excess’ mortality
Scotland’s & Glasgow’s health

Scotland: still the sick man of Europe
Why is Glasgow the UK’s sickest city?

By Lucy Ash

Babies born in Glasgow are expected to live the shortest lives of any in Britain. One in four Glaswegian men won't reach their 65th birthday. What is behind the "Glasgow Effect" and can it be prevented?
Scotland’s & Glasgow’s health

The Guardian

In Iraq, life expectancy is 67. Minutes from Glasgow city centre, it's 54

In deprived inner-city area of Calton, the chance of surviving to old age is lowest in UK.

Audrey Gillan
The Guardian, Saturday 21 January 2008 06.05 GMT

There are ghosts sitting in the Cottage bar in Glasgow’s Calton area. The locals call them the missing generation, the men who died before their time. Sometimes the drinkers dip their heads or lift their pints to them. They may not see them but all the drinkers know they are there: Jimmy, Swiftie, Davy and many more.

For here in this multi-deprived inner city area, the average life expectancy of a male is just 63.9 years. In Iraq, after 10 years of sanctions, a war and a continuing conflict, suicide bombs and insurgency, the average man has a good chance of making it into his 60s, the life expectancy of a male there is 67.49. In Iran it is 69.96, in North Korea, 71.37 and in the Gaza Strip it is 70.8.

Statistics recently revealed that the Calton ward has not just the lowest life expectancy in the United Kingdom and Europe but of many areas of the world. A child born in the Calton—locals always prefix a “the” to Calton—arrives into an environment saturated by drink, drugs, smoking.
Male life expectancy at birth, c. 2009

FEMALE life expectancy at birth, c. 2009

Male life expectancy: Scotland & other W. European Countries, 1851-2005

Male life expectancy: Scotland vs. England & Wales, 1850-2006

Male life expectancy at birth by Scottish local authority area, 2007-09

Male Life Expectancy at Birth across selected UK Cities, 1991-93 to 2007-09

Male life expectancy at birth, selected post-industrial European cities: mid-2000s

Sources: NISRA; GRO(S); S.O. Free State of Saxony; CORPH-SPMA; INSEE & CepiDc; NRW-LIGA; ONS; Landesamt für Verbraucherschutz Sachsen-Anhalt; CSO; GUS; CBS Netherlands
Health inequalities in Scotland and Glasgow
Health (mortality) inequalities in Scotland

Male life expectancy at birth by SIMD deprivation decile, Scotland 2008-2010
Source: National Records of Scotland

<table>
<thead>
<tr>
<th>AREA DEPRIVATION DECILE</th>
<th>Male Life Expectancy at Birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (most deprived)</td>
<td>68.2</td>
</tr>
<tr>
<td>2</td>
<td></td>
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<tr>
<td>3</td>
<td></td>
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<tr>
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<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10 (least deprived)</td>
<td>81.4</td>
</tr>
</tbody>
</table>

(Least deprived)
Health inequalities in a European context
Education based Relative Index of Inequality (RII) for all-cause mortality, females 30-74 years, early to mid 2000s

Education based Relative Index of Inequality (RII) for all-cause mortality, males 30-74 years, early to mid 2000s

Male life expectancy by area deprivation quintile (Greater Glasgow)

least and most deprived Carstairs quintiles in Greater Glasgow* compared to Scotland

Source: Hanlon, Walsh, Whyte 2006

* areas fixed to their deprivation quintile in 1981
### Male life expectancy, between- and within-country inequities, selected countries

<table>
<thead>
<tr>
<th>Place</th>
<th>Life expectancy at birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom, Scotland, Glasgow (Calton)(^a)</td>
<td>82</td>
</tr>
<tr>
<td>India(^b)</td>
<td>62</td>
</tr>
<tr>
<td>United States, Washington DC (black)(^c)</td>
<td>63</td>
</tr>
<tr>
<td>Philippines(^a)</td>
<td>64</td>
</tr>
<tr>
<td>Lithuania(^a)</td>
<td>65</td>
</tr>
<tr>
<td>Poland(^a)</td>
<td>71</td>
</tr>
<tr>
<td>Mexico(^a)</td>
<td>72</td>
</tr>
<tr>
<td>United States(^a)</td>
<td>75</td>
</tr>
<tr>
<td>Cuba(^a)</td>
<td>75</td>
</tr>
<tr>
<td>United Kingdom(^a)</td>
<td>77</td>
</tr>
<tr>
<td>Japan(^a)</td>
<td>79</td>
</tr>
<tr>
<td>Iceland(^a)</td>
<td>79</td>
</tr>
<tr>
<td>United States, Montgomery County (white)</td>
<td>80</td>
</tr>
</tbody>
</table>

\(^a\) Country data: 2005 data from World Health Statistics (WHO, 2007c).
\(^c\) Pooled data from 1997-2001 (Murray et al., 2006).
World Health Organisation (WHO)

“It does not have to be this way and it is not right that it should be like this... Social injustice is killing people on a grand scale”

WHO’s Commission on Social Determinants of Health, 2008.
Scotland’s & Glasgow’s health

• Improving, but...
• Doing so more slowly than elsewhere
• Very wide health inequalities
• Highest mortality in Western Europe
Understanding reasons for poor health

- Sophisticated understanding of what creates and destroys health in any population
- Developed over many years and in many settings
- Many models of health determinants have been developed
Models of health determinants
What determines health in a population

World Health Organisation (WHO)

“It does not have to be this way and it is not right that it should be like this... Social injustice is killing people on a grand scale”

WHO Commission on Social Determinants of Health, 2008.
“It is not inequalities that kill people, as the report states, it is those who are responsible for these inequalities that kill people”

What determines health in a population

Widening of socio-economic inequalities in the UK

Trends in income inequality (Gini coefficient of equivalised inequality in income after tax and before housing costs), GB/UK* 1961-2010

Source: Institute of Fiscal Studies

*Data are for Great Britain 1961-2001/02, and for United Kingdom thereafter
Income inequalities 2009, selected OECD countries

Income inequality - gini coefficient, selected OECD countries 2009
Source: OECD

Gini coefficient (disposable income)
Income inequalities mid-2000s, Scotland and selected European countries

Income inequality in Scotland and Selected European countries: 2004*

Source: Luxemburg Income Study
* Except France (2005) and Belgium (2000)
Income inequalities and spatial (local authority) mortality inequalities, GB 1921-2007

Widening of socio-economic inequalities in the UK

• Income inequalities as a driver of health inequalities
• UK economic policies since 1979 have driven widening income inequalities...

• ...accompanied by the ‘spatial polarisation’ of UK:
  – Large chunk of prosperous southern England
  – The rest: ‘a series of poorly connected city cluster islands that appear to be slowly sinking demographically, socially and economically’*

• Current unprecedented scale of ‘welfare reform’ (cuts of £28 billion by 2016) likely to widen income inequalities further (and, therefore, health inequalities also)

Where does Glasgow sit in this story?
Socio-economic history of Glasgow

- Population as a proxy for economic ‘health’
- Glasgow at start of 18th Century: 15,000 people...
Socio-economic history of Glasgow: growth
Socio-economic history of Glasgow: decline

Population of Glasgow, 1801-2011

Source: Hanlon, Walsh & Whyte 2006, for the period 1801-2001 (from Reports of the Medical Officer of Health and General Register for Scotland (now National Records of Scotland (NRS)), and NRS for 2011.
Socio-economic history of Glasgow: decline

Industrial employment as percentage of total employment, 1931-2001
Source: University of Portsmouth/Great Britain Historical GIS Project (www.visionofbritain.org.uk)

Manufacturing employment as percentage of total employment, 1971-2001
Source: University of Portsmouth/Great Britain Historical GIS Project (www.visionofbritain.org.uk)
Poverty & deprivation as drivers of poor health
Poverty & deprivation as drivers of poor health

The Main Determinants of Health

- General socio-economic, cultural and environmental conditions
- Social and community networks
- Individual lifestyle factors
- Age, sex & hereditary factors

Income deprivation, 2005: % of population classed as income deprived
Source: 2006 SIMD

Bar chart showing deprivation rates across different regions.
So, what’s the problem?

• Complication: Glasgow’s history of growth, decline, poverty and deprivation is not unique
• But its mortality profile is...
Poverty & deprivation as drivers of poor health
Comparison with other UK post-industrial cities

Income deprivation, 2005: UK cities

% 'breadline poor', 2000

% 'core poor', 2000

% of children living in poverty, 2012, selected British cities
Source: End Child Poverty Campaign, 2013 (from data from HMRC)
Comparison with other UK post-industrial cities

Population of Glasgow, 1801-2001

Population of Liverpool and Manchester, 1801-2001

Total population

- Red: Liverpool
- Yellow: Manchester
Comparison with other UK post-industrial cities

Industrial employment as percentage of total employment, 1931-2001
Source: University of Portsmouth/Great Britain Historical GIS Project (www.visionofbritain.org.uk)

Manufacturing employment as percentage of total employment, 1971-2001
Source: University of Portsmouth/Great Britain Historical GIS Project (www.visionofbritain.org.uk)
Comparison with other UK post-industrial cities

Industrial employment loss:
Loss of industrial employment 1931-2001 as % of employment in 1931
Source: University of Portsmouth/Great Britain Historical GIS Project (www.visionofbritain.org.uk)

<table>
<thead>
<tr>
<th>Region</th>
<th>Loss %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glasgow</td>
<td>83.3</td>
</tr>
<tr>
<td>Liverpool</td>
<td>82.5</td>
</tr>
<tr>
<td>Manchester</td>
<td>85.8</td>
</tr>
<tr>
<td>Scotland</td>
<td>47.1</td>
</tr>
<tr>
<td>England</td>
<td>30.5</td>
</tr>
<tr>
<td>Wales</td>
<td>43.8</td>
</tr>
</tbody>
</table>
Trends in poverty/deprivation

Percentage of households classed as 'core poor', 1970-2000

Percentage of adult males in Social Class 4 & 5, 1951-2001

Male unemployment rates, 1951-2001

Source: University of Portsmouth/Great Britain Historical GIS Project (www.visionofbritain.org.uk)
Income deprivation in Glasgow, Liverpool & Manchester

a) Liverpool: 291 LSOAs

b) Manchester: 259 LSOAs

c) Glasgow: 351 merged datazones
Income deprivation - Glasgow

Glasgow (350 merged datazones)

Total city: 24.8%
Income deprivation - Liverpool

Liverpool (291 LSOAs)

Total city: 24.6%
Income deprivation - Manchester

Manchester (259 LSOAs)

% of total population who are income deprived

Total city: 23.4%
Excess mortality, Glasgow relative to Liverpool & Manchester

Excess mortality in Glasgow, standardised by age, sex and 3-city deprivation decile, 2003-07

- Excess mortality for 0-64 age group: 31%
- Excess mortality for 15-44 age group: 45%
- Excess mortality for 45-64 age group: 30%
- Excess mortality for 65+ age group: 10%
- Excess mortality for all ages: 15%
Very similar levels and patterns of deprivation

But premature deaths 30% higher in Glasgow (15% higher for deaths at all ages)

This ‘excess’ Glasgow mortality seen in most ages, both genders, deprived and non-deprived neighbourhoods

Important distinction between premature and all-age deaths…

Seen for different causes of death (again, a distinction…)

Increasing over time…

Not seemingly explained by historical changes in deprivation

Not explained by differences in population composition of cities

Data show quite remarkable similarities between the cities (especially Glasgow and Liverpool) in all aspects… except mortality

\[\begin{align*}
\text{Age/sex standardised mortality ratios (all-cause deaths 2003-07),} \\
\text{Glasgow relative to Liverpool & Manchester, by 3-city deprivation decile}
\end{align*}\]

\begin{align*}
\text{Deaths < 65 years, males:} \\
\text{European age-standardised mortality rates (EASRs) per 100,000 population, 1921/25 - 2001/05}
\end{align*}

Source: calculated from SASI Research Group Death and Population Data, 1921-2005
Excess mortality research

• So, ‘excess’ defined as higher mortality over and above that explained by socio-economic deprivation

• ‘Three city’ comparisons only one of many examples of research highlighting ‘excess’ mortality in Scottish population...
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
Common themes of research into Scottish ‘excess’ mortality

• Excess increasing over time
• Excess shown irrespective of measures of poverty/SES used
• Seen for all causes of death
• Persists after controlling for individual health behaviours (smoking etc)
• 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))
Context for Glasgow’s excess mortality

**KNOWLEDGE**
- Accumulated knowledge & evidence regarding the key determinants of health in all societies

**EXPOSURES**
- Impact of de-industrialisation and associated poverty & deprivation
- Impact of UK economic policies on socio-economic inequalities (‘spatial polarisation’ of UK)

**OUTCOME 1**
- Glasgow, Liverpool and Manchester have highest mortality of all British cities

**OUTCOME 2**
- Unexplained divergence between Glasgow and Liverpool/Manchester from latter half of 20th Century

*Unknown ‘effect modifiers’*
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”
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
Theories, theories, theories...

- Artefact
- Migration
- Political attack/effects
- Culture
- Deindustrialisation
- Income inequalities
- Social mobility
- Substance misuse cultures
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- Sectarianism
- Individual values (e.g. psychological outlook)
- Sense of coherence
- Behaviours
- Genetics
- The weather...
Trying to make sense of excess mortality in Glasgow/Scotland

1. It's horribly complicated…
2. Lots (and lots and lots) of theories have been proposed – lots (and lots and lots) seem very unlikely…
3. We have a sophisticated understanding of the determinants of health. They apply to population health across the globe. The globe includes Glasgow.
4. 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 Glasgow
   - National and local political decisions

4. Likely to be protective factors operating in other cities
And finally...

• Spot the missing words...?

‘thoughtful’  ‘insightful’  ‘thoughtful’ and ‘insightful’?
Skottene lever seks år kortere enn engelskmenn. Ingen vet hvorfor.

Glasgow (VG) Skottene lever i snitt seks år kortere enn engelskmenn. Energi Norge Blair 70. Kan forklaringen være frystrekt Mars-sjokolade?


Det er ikke nøyaktig kjent hvem som først fant ut at frystrekt Mars-sjokolade hjeltar. Noen vet at det var en skotsk forsker som fikk ideen, men det er også mulig at det var en engelsk forsker.

Frystrekt Mars-sjokolade er berømt for sin kjemiske innehåll. Den inneholder en rekke stoffer som spesielt er kjent for å forlenges levetidens. Noen av dem er:

- **Caffeine**: En stimulans som hjelper til å fordele levetid.
- **Theobromine**: En kjemikal som har en positiv effekt på hjertesettet.
- **Antioxidanter**: Disse hjelper til å bekjempe oxidasjonsprosesser, som kan føre til for tidlig død.

Frystrekt Mars-sjokolade og liknende produkter er blant de mest konsumentene reknere for å forlenges levetidens.

**Kompisert**

Det er også viktig å tenke på at frystrekt Mars-sjokolade er en del av en helsevitenskapelig livsstil.

**Frystrekt Mars-sjokolade**

1. **Dyppes**: For å dyppre sjokoladen i en smeltet sjokoladen for kringling. Man kan slipp Stokker fortalerne for Mars.

2. **Ned i fettet**: Sjokoladen er klar for kringling.

3. **Klissete og sot**: Frystrekt Mars-sjokolade smeller senere enn den mer visuell, oppgir en forsker.

**DEN SKOTSK MYSSTERN**

Forskeren David White pakker med å forberede skottene. Han har foreløpig foreløpig foreslått at frystrekt Mars-sjokolade kan ha en del av årsaken til at skottene lever så kortere enn engelskmenn.

**Iverst**: Frystrekt Mars-sjokolade kan være en del av årsaken til at skottene lever i snitt seks år kortere enn engelskmenn. Ingen vet hvorfor.

**Bedømmelse**: Den skotske mystiften hos frystrekt Mars-sjokolade kan ha en del av årsaken til at skottene lever i snitt seks år kortere enn engelskmenn. Ingen vet hvorfor.
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