Analysis of falling mortality rates in Edinburgh and Glasgow

Graham C. M. Watt and Russell Ecob

Abstract

Background The aims of the study were to describe and interpret trends in mortality in Glasgow and Edinburgh


Results All-cause mortality rates fell between 1979–1983 and 1989–1993 by a larger amount in Edinburgh than in Glasgow (24.5 versus 14.5 per cent in men; 20.4 versus 10.5 per cent in women). Differences in life expectancy between the cities at age 35 increased by 44 per cent to 4.7 years in men and by 19 per cent to 2.5 years in women. Mortality rates improved in all age and sex groups but trends were least favourable in Edinburgh men and women aged 35–44. Mortality rates in both cities fell by a larger amount than predicted, by 10 per cent in men and 6 per cent in women.

Conclusions The widening of differences in life expectancy between Glasgow and Edinburgh is mainly due to a historical trend of longevity increasing more quickly in Edinburgh. Although precise explanations are not possible, it seems likely that this difference between the cities is explained in large measure by their consistently and markedly contrasting socio-economic profiles. Comparison of the cities conceals, however, a trend of falling mortality rates in both populations, comprising most of the observed reduction in mortality rates in Glasgow, which appears to result in part from factors operating in the short term. Interpretation of trends in cause-specific mortality rates needs to take account of the possibility of long-term and short-term trends in all-cause mortality in different social groups.

Keywords: trends, life expectancy, inequalities

Introduction

Life expectancy in Glasgow is lower than in any other city in the United Kingdom.1 We have shown previously that the 40 per cent higher mortality rates in men and women aged 25–64 in Glasgow compared with Edinburgh in 1979–1983 were part of a pattern of increased mortality rates from all major categories of death in Glasgow compared with Edinburgh, which had been established by at least early adulthood in successive cohorts of citizens since the beginning of the century.2 In view of the stability of this pattern in the post-war period, we modelled mortality data on an age-cohort basis for both cities for quinquennia based on Census years 1961, 1971 and 1981, and predicted the differences in mortality rates between the cities that could be expected in 1989–1993 on the basis of extrapolation of the historical pattern. In this paper we report and discuss the changes that occurred.

Methods

Prediction of mortality rates

Predicted mortality rates for 1989–1993 were obtained by modelling mortality data for residents of Glasgow and Edinburgh aged 25–74 in quinquennia 1959–1963, 1969–1973 and 1979–1983 on an age-cohort basis using methods described previously.2 The dataset comprised 106 920 deaths in Glasgow and 46 020 deaths in Edinburgh. Briefly, mortality rates were expressed as logarithms to the base 10. Log-linear age-cohort models with a Poisson error structure were fitted to the data using the GLIM statistical modelling package.3 Separate models for men and women were used to predict age- and sex-specific mortality rates for 1989–1993 in Glasgow and Edinburgh.

Results are expressed and tests are based on odds ratios. These are converted into ratios of mortality rates in Table 1 for ease of interpretation.

Overall tests of the adequacy of prediction were obtained by fitting an age-cohort model to data from 1961 to 1991 and including dummy terms to distinguish 1991 data from those for other years. The dummy terms were allowed to interact with region and age.

Department of General Practice, University of Glasgow, 4 Lancaster Crescent, Glasgow G12 0RR.

Graham C. M. Watt, Professor of General Practice
MRC Social and Public Health Sciences Unit, University of Glasgow, 4 Lilybank Gardens, Glasgow G12 8RZ.

Russell Ecob, Statistician

Address correspondence to Professor Graham C. M. Watt.
E-mail: G.C.M.Watt@clinmed.gla.ac.uk

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Analysis of mortality data for 1989–1993

Because of suspected under-counting in younger age groups in the 1991 Census, we used the Registrar General’s final mid-year population estimates for the local government districts of Glasgow and Edinburgh in 1991, formed by rolling forward the 1981 Census population and making appropriate allowances for deaths and migration. Substitution of mid-year Registrar General population estimates for Census data made little difference to the main findings (data not shown). There were no significant boundary changes in either city between these years.

Numerators consisted of mortality data for all causes, ischaemic heart disease (ICD9 410–414), stroke (ICD9 430–438), all cancers (ICD9 140–208) and other causes for men and women in both cities for 10 year age groups in the age range 35–74 years.

Life expectancies were calculated as the age at which 50 per cent of 35-year-olds would have survived, assuming their successive exposure to current age-specific mortality rates.

Results

Mortality data for Glasgow and Edinburgh in 1989–1993 conform to the previously reported pattern whereby current differences in age-specific mortality rates are associated with higher mortality rates in Glasgow in successive cohorts from at least early adulthood (Figure 1).

The ratio of 10 year age-specific mortality rates in Glasgow and Edinburgh between 1939–1943 and 1989–1993 is shown in Table 1. Each cohort (a–h) is based on year of birth in 5 year periods shown: a, 1879–1883; b, 1888–1893; c, 1899–1903; d, 1909–1913; e, 1919–1923; f, 1929–1933; g, 1939–1943; h, 1949–1954.

Figure 1 Increasing log mortality rates in age range 25–74 years in successive cohorts of men and women in Glasgow and Edinburgh between 1939–1943 and 1989–1993. Each cohort (a–h) is based on year of birth in 5 year periods shown: a, 1879–1883; b, 1888–1893; c, 1899–1903; d, 1909–1913; e, 1919–1923; f, 1929–1933; g, 1939–1943; h, 1949–1954.
and Edinburgh increased as predicted between 1979–1983 and 1989–1993 in men and women aged 45–74 (Table 1, horizontal analysis). In the 35–44 year age group the relative excess in mortality rates in Glasgow narrowed from 55 per cent to 35 per cent in men and from 57 per cent to 17 per cent in women.

Comparing relative mortality in notional cohorts (e.g. linking data for people aged 35–44 in 1981, 45–54 in 1991, etc. as indicated by diagonal arrows in Table 1), the differences between the cities widened in men and women originally aged 35–44, remained similar in men aged 45–54 and women aged 45–64, and narrowed in men aged 55–64.

All-cause mortality rates fell in all age and sex groups in Glasgow and Edinburgh between 1979–1983 and 1989–1993 (Table 2, columns 1 and 2). In men aged 55–74 and women aged 45–74 the absolute reductions in mortality rates were larger in Edinburgh (Table 2, column 4), the percentage reductions in Edinburgh being over twice as large as in Glasgow (Table 2, column 6). In people aged 35–44 years, the percentage reduction was over twice as great in Glasgow men (20 versus 9 per cent) and over three times as great in Glasgow women (33 versus 9 per cent).

Compared with age- and sex-specific mortality rates observed in 1979–1983, the models predicted that in 1989–1993, in the absence of other factors influencing longevity, mortality rates in men and in older women would remain at a similar level (±5 per cent) in Glasgow, whereas a larger reduction (>5 per cent) would be observed in most age groups for both sexes in Edinburgh (Table 2, columns 3 and 5).

The observed percentage falls in mortality rates between 1979–1983 and 1989–1993 (Table 2, column 6) were larger than predicted (Table 2, column 5) in the majority of age and sex groups, the main exceptions being men and women aged 35–44 in Edinburgh, in whom mortality rates fell but by much less than predicted (Table 2, columns 5 and 6). Observed rates were just within the predicted range in Glasgow women aged 35–54 and Edinburgh women aged 45–64 (Table 2, columns 2 and 3).

Comparison of observed and predicted mortality rates, based on fitting a model to all of the data, found that for males and females the 1991 rates were lower than expected in both Edinburgh and Glasgow. In this respect no differences were found between the cities in mortality trends for men or women. Comparing mortality rates between 1979–1983 and 1989–1993 for females in both cities combined, the odds

<table>
<thead>
<tr>
<th>Age</th>
<th>1979–1983 observed mortality rates</th>
<th>1989–1993 observed mortality rates</th>
<th>Predicted mortality rates (95% CL)</th>
<th>Absolute change (%)</th>
<th>Predicted change (%)</th>
<th>Observed change (%)</th>
</tr>
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<tbody>
<tr>
<td><strong>Glasgow men</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35–44</td>
<td>38.2</td>
<td>30.5*</td>
<td>37.4 (33–43)</td>
<td>−7.7</td>
<td>−2.09</td>
<td>−20.25</td>
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<tr>
<td>45–54</td>
<td>116.2</td>
<td>98.2*</td>
<td>110.9 (103, 120)</td>
<td>−18.0</td>
<td>−4.56</td>
<td>−15.50</td>
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<tr>
<td>55–64</td>
<td>278.0</td>
<td>249.3*</td>
<td>293.2 (281, 306)</td>
<td>−28.7</td>
<td>+5.47</td>
<td>−10.33</td>
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<tr>
<td>65–74</td>
<td>615.6</td>
<td>554.5*</td>
<td>601.8 (584, 620)</td>
<td>−61.1</td>
<td>−2.24</td>
<td>−9.93</td>
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<td>35–74</td>
<td></td>
<td>35–2</td>
<td>--</td>
<td>−35.2</td>
<td></td>
<td>−14.54</td>
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<tr>
<td><strong>Glasgow women</strong></td>
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<tr>
<td>35–44</td>
<td>23.9</td>
<td>16.1</td>
<td>18.1 (16–21)</td>
<td>−7.9</td>
<td>−24.27</td>
<td>−32.77</td>
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<tr>
<td>45–54</td>
<td>61.5</td>
<td>55.0</td>
<td>53.9 (50–58)</td>
<td>−6.5</td>
<td>−12.36</td>
<td>−10.52</td>
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<tr>
<td>55–64</td>
<td>148.1</td>
<td>137.0</td>
<td>142.4 (136, 149)</td>
<td>−11.1</td>
<td>−3.85</td>
<td>−7.51</td>
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<tr>
<td>65–74</td>
<td>338.5</td>
<td>322.3*</td>
<td>347.9 (337, 359)</td>
<td>−16.3</td>
<td>+2.78</td>
<td>−4.80</td>
</tr>
<tr>
<td>35–74</td>
<td></td>
<td>35–2</td>
<td>--</td>
<td>−45.1</td>
<td></td>
<td>−10.49</td>
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<tr>
<td><strong>Edinburgh men</strong></td>
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</tr>
<tr>
<td>35–44</td>
<td>24.7</td>
<td>22.6</td>
<td>20.5 (17–25)</td>
<td>−2.2</td>
<td>−17.00</td>
<td>−8.75</td>
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<tr>
<td>45–54</td>
<td>72.6</td>
<td>59.5*</td>
<td>69.3 (61, 78)</td>
<td>−13.1</td>
<td>−4.55</td>
<td>−18.05</td>
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<tr>
<td>55–64</td>
<td>201.7</td>
<td>157.7*</td>
<td>187.0 (174, 201)</td>
<td>−44.0</td>
<td>−7.29</td>
<td>−21.82</td>
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<tr>
<td>65–74</td>
<td>525.0</td>
<td>428.4*</td>
<td>467.3 (446, 489)</td>
<td>−96.6</td>
<td>−10.99</td>
<td>−18.40</td>
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<tr>
<td>35–74</td>
<td></td>
<td>35–2</td>
<td>--</td>
<td>−15.3</td>
<td></td>
<td>−24.51</td>
</tr>
<tr>
<td><strong>Edinburgh women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35–44</td>
<td>15.2</td>
<td>13.9</td>
<td>13.2 (11–16)</td>
<td>−1.4</td>
<td>−13.16</td>
<td>−8.86</td>
</tr>
<tr>
<td>45–54</td>
<td>43.3</td>
<td>32.5</td>
<td>36.2 (31, 40)</td>
<td>−10.8</td>
<td>−18.71</td>
<td>−24.91</td>
</tr>
<tr>
<td>55–64</td>
<td>114.1</td>
<td>96.0</td>
<td>100.3 (94, 107)</td>
<td>−19.2</td>
<td>−12.09</td>
<td>−16.80</td>
</tr>
<tr>
<td>65–74</td>
<td>275.8</td>
<td>248.9*</td>
<td>270.9 (259, 283)</td>
<td>−26.9</td>
<td>−1.78</td>
<td>−9.74</td>
</tr>
<tr>
<td>35–74</td>
<td></td>
<td>35–2</td>
<td>--</td>
<td>−23.1</td>
<td></td>
<td>−20.38</td>
</tr>
</tbody>
</table>

Rates are expressed per 10 000 population. A positive value indicates that rates were predicted to rise.
*Observed rate is outside (below) 95 per cent confidence interval for predicted mortality rate.
ratios showed no statistically significant variation by age [0.94, 95 per cent confidence interval (CI) 0.91, 0.97]. In males the odds ratios showed a statistically significant variation with age, being 0.90 (0.79, 1.02) in men aged 35–44, 0.88 (0.81, 0.95) in men aged 45–54, 0.85 (0.81, 0.89) in men aged 55–64 and 0.92 (0.89, 0.95) in men aged 65–74 (for all, \( p < 0.0001 \), except for men 35–44, in whom the odds ratio did not reach statistical significance).

The largest percentage decreases in cause-specific mortality rates were for stroke, which fell by about 30 per cent in men and women in Glasgow and Edinburgh (Table 3). However, reductions in IHD mortality provided the largest absolute changes in mortality rates in both sexes in both cities. Percentage falls in mortality from cancer and coronary heart disease in Edinburgh were nearly twice as large as comparable changes in Glasgow. In Glasgow women, cancer mortality rates increased, as a result of trends in lung cancer mortality. Trends in mortality from causes other than stroke, IHD or cancer accounted for a larger proportion of the decrease in all-cause mortality rates in Glasgow than in Edinburgh for men (34.0 versus 19.8 per cent) and women (24.8 versus 16.4 per cent).

The smaller percentage reduction in mortality rates in the 35–44 year age group in Edinburgh compared with Glasgow was associated with increases in Edinburgh in cancer mortality rates in women and in mortality rates from ‘other causes’ in men (data not shown).

Life expectancy at age 35 rose from 69.0 to 70.5 years in Glasgow men (±1.44 years); from 72.3 to 75.1 years in Edinburgh men (±3.2 years); from 76.4 to 77.0 years in Glasgow women (±0.45 years); and from 78.5 to 79.4 years in Edinburgh women (±0.95 years) (Table 4).

The Glasgow population aged 35–74 fell from 150,933 in 1981 to 134,853 in 1991 in men (−10.7 per cent), and from 177,101 to 152,911 in women (−13.7 per cent). The Edinburgh population aged 35–74 rose from 85,742 to 88,433 in men (+3.1 per cent) and fell from 101,119 to 98,763 in women (−2.3 per cent). Sensitivity analyses based on estimates of net out-migration, using methods described previously, produced small changes in predicted age-specific mortality rates, which have only a marginal effect on the findings reported above.

### Table 3: Contribution of changes in disease-specific mortality rates to changes in all-cause mortality rates in Glasgow and Edinburgh men and women aged 35–74 between 1979–1983 and 1989–1993 (numbers, with percentages given in parentheses)

<table>
<thead>
<tr>
<th>Changes in mortality rates</th>
<th>All causes</th>
<th>Cancer</th>
<th>Stroke</th>
<th>IHD</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glasgow men</td>
<td>35.2 (14.5)</td>
<td>3.43 (5.0)</td>
<td>6.71 (29.1)</td>
<td>14.08 (16.0)</td>
<td>11.93 (18.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(9.8)</td>
<td>(16.3)</td>
<td>(40.1)</td>
<td>(34.0)</td>
</tr>
<tr>
<td>Glasgow women</td>
<td>15.3 (10.5)</td>
<td>−1.67 (−3.8)</td>
<td>4.56 (27.5)</td>
<td>8.18 (17.7)</td>
<td>4.21 (10.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(−9.9)</td>
<td>(26.9)</td>
<td>(48.3)</td>
<td>(24.8)</td>
</tr>
<tr>
<td>Edinburgh men</td>
<td>45.1 (24.5)</td>
<td>9.12 (17.0)</td>
<td>4.27 (27.7)</td>
<td>22.8 (31.9)</td>
<td>8.95 (20.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(20.2)</td>
<td>(9.5)</td>
<td>(50.6)</td>
<td>(19.8)</td>
</tr>
<tr>
<td>Edinburgh women</td>
<td>23.1 (20.4)</td>
<td>3.44 (8.9)</td>
<td>4.78 (34.7)</td>
<td>11.08 (32.0)</td>
<td>3.78 (14.3)</td>
</tr>
</tbody>
</table>

Data are absolute reductions in mortality rates per 10,000 population. Column percentages indicate per cent contribution to change in all-cause mortality rates. Row percentages indicate per cent change in mortality rates between 1979–1983 and 1989–1993. Mortality rates from cancer increased in Glasgow women (negative value).

### Table 4: Expected mean age of death for 35-year-olds

<table>
<thead>
<tr>
<th>Average age at death</th>
<th>Glasgow</th>
<th>Edinburgh</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1979–1993</td>
<td>69.03</td>
<td>72.27</td>
<td>−3.2 (4.7)</td>
</tr>
<tr>
<td>1989–1993</td>
<td>70.47</td>
<td>75.12</td>
<td>−4.7 (6.6)</td>
</tr>
<tr>
<td>% increase</td>
<td>2.1</td>
<td>3.9</td>
<td>43.5</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1979–1993</td>
<td>76.43</td>
<td>78.49</td>
<td>−2.1 (2.7)</td>
</tr>
<tr>
<td>1989–1993</td>
<td>76.98</td>
<td>79.44</td>
<td>−2.5 (3.2)</td>
</tr>
<tr>
<td>% increase</td>
<td>1.0</td>
<td>1.2</td>
<td>18.8</td>
</tr>
</tbody>
</table>

Life expectancy is calculated as the age in years at which 50 per cent of current 35-year-olds would have survived assuming successive exposure to current age-specific mortality rates.

### Discussion

Comparison of mortality rates in Glasgow and Edinburgh is of interest not only because of the large difference in life...
expectancy but also because the availability and volume of historical data make it possible to view current differences and trends from a longitudinal perspective.

Life expectancy at age 35 in 1989–1993 was shorter in Glasgow than in Edinburgh by 4.7 years in men and 2.5 years in women, representing widening of these differences in life expectancy during the previous decade by 44 and 19 per cent, respectively (Table 4). The observation is consistent with previous reports of widening inequalities in mortality between areas of relative affluence and deprivation within the United Kingdom, Scotland and Glasgow. Mortality rates have fallen generally, but at a faster rate in areas with more favourable socio-economic profiles.

The pattern of steady improvement in longevity in the United Kingdom is associated with social stability and general economic development, and contrasts with marked trends in the opposite direction in countries where these features are not present, most notably in the former communist countries of Eastern Europe. Faster rates of improvement in life expectancy have been recorded in the ‘tiger economies’ of the Pacific rim. For example, all-cause mortality rates of Japanese men exceeded those of Scottish men in 1950, but by 1980 had fallen to the lowest level observed in an industrial economy. Less dramatic and less easily explained changes in life expectancy have been observed within Europe, for example, in Denmark where life expectancy has fallen and in Sweden where it continues to rise.

In our earlier paper we suggested that mortality rates during 1989–1993 would be determined not only by underlying historical trends but also by shorter-term changes in mortality rates for specific diseases, as subsequently happened with respect to cancer mortality rates in Edinburgh women aged 35–44, mortality from ‘other causes’ in Edinburgh men aged 35–44 and lung cancer mortality in Glasgow women. Environmental and behavioural factors can be lethal at any age but it appears to be only when these factors affect large numbers of people that the underlying pattern of improving mortality is disturbed. For example, AIDS was a new reported cause of death in 1989–1993, which accounted for 8 per cent of deaths in men aged 35–44 in Edinburgh and may explain the unexpected trend in this group of deaths from ‘other causes’. AIDS accounted for less than 2 per cent of deaths in Glasgow men and Edinburgh women in this age group.

In contrast to trends in Edinburgh, Glaswegians aged 35–44 showed large reductions in all-cause mortality, by 20 per cent in men and 33 per cent in women. It should be noted, however, that this study excludes men and women aged 20–29, in whom mortality rates in severely deprived areas in Scotland increased by 29 per cent and 11 per cent, respectively, between 1980–1982 and 1990–1992. AIDS was also more prevalent in this age group and accounted for 17 per cent of deaths in Edinburgh men.

The observation that mortality rates fell by more than predicted, by 10 per cent in men and 6 per cent in women in both Glasgow and Edinburgh, is statistically significant in 8 of the 12 oldest age–sex groups, including all men aged 45–74, and seems likely to represent a real effect. This unexpected fall in mortality rates made up most of the observed decrease in mortality rates in Glasgow (Table 2, columns 5 and 6).

It is less easy to conclude what factors might have been responsible for the beneficial effect in all groups, whether the changes in mortality reflect trends in incidence (possibly as a result of primary preventive measures to reduce risk) and/or case-fatality (possibly as a result of secondary preventive measures to prevent disease complications), and to what extent the favourable trends are the continuing result of factors operating during the 1980s or earlier.

However, the predictable nature of both the general improvements in mortality and the widening of the differences in mortality between the cities suggests that these are both the result of processes acting over the long term. Our findings suggest that additional factors have operated over the short term. This finding is important because unlike many recent reports such as those from Eastern Europe, which show how mortality rates can quickly increase, our data suggest that mortality rates can also improve in the short term and that this effect may be in addition to long-term trends.

Possible explanations – behavioural factors

Part of the explanation of the cross-sectional difference in life expectancy between the cities may be found in current differences in health behaviours such as cigarette smoking and consumption of fruit and vegetables. The pattern is also consistent with the effect of lifetime exposure to socio-economic adversity, and associated higher mortality rates for a given level of risk factor exposure.

A greater proportion of the reduction in all-cause mortality in Edinburgh was due to deaths from cancer and IHD than was the case in Glasgow, both for men (70.8 versus 49.9 per cent) and women (62.9 versus 38.4 per cent). It is not known to what extent these differences are associated with changes in disease-risk profiles that might help to explain the trends. No epidemiological monitoring data are available for Edinburgh, but in Glasgow North of the Clyde, population surveys carried out as part of the MONICA project in 1986, 1989, 1992 and 1995 show reductions in the prevalence of cigarette smoking and high blood pressure and an increase in the prevalence of obesity (C. Morrison, personal communication, 1998).

However, telephone surveys of men and women aged 18–60 in Glasgow and Edinburgh between 1988 and 1995 showed no significant decrease in smoking prevalence among men; no significant increase in reported participation in physical activity for exercise for men or women, and a significant decrease in frequency of exercise for women (18–20). The frequency of ‘drinking heavily on occasion’ increased for both men and women. The authors concluded, ‘examination of the trends . . . [does] not give grounds for optimism about any likely
narrowing of differences in health-related behaviours between the upper and lower occupational groups’. These observations may help to explain why coronary mortality rates in Glasgow fell by only half as much as rates in Edinburgh and by a similar amount to mortality rates for ‘other’ and all causes. It is interesting to note that the percentage falls in stroke mortality were similar in men and women in both cities, possibly because of favourable trends in blood pressure levels.

**Possible explanations – treatment factors**

Capewell et al.\(^2\) have claimed that up to 50 per cent of the decline in coronary mortality rates in Scotland between 1975 and 1994 may be due to the effect of clinical interventions. It is not known to what extent such interventions have been applied in the two cities. However, a difference in the delivery of effective care would be consistent with the Inverse Care Law\(^2\) and could help to explain the much larger absolute and percentage falls in coronary mortality rates in Edinburgh (Table 3).

**Possible explanations – socio-economic factors**

The differences in life expectancy between Glasgow and Edinburgh are associated with markedly contrasting socio-economic profiles: 66 per cent of postcode sectors in Glasgow are in areas of severe deprivation (Carstairs categories 6 and 7) compared with 7 per cent of postcode sectors in Edinburgh. Five per cent of postcode sectors in Glasgow are in areas of relative affluence (Carstairs categories 1 and 2) compared with 31 per cent in Edinburgh.\(^2\)

Male unemployment levels were twice as high in Glasgow as in Edinburgh throughout the decade (21.6 versus 9.9 per cent in 1981; 23.8 versus 11.1 per cent in 1991); the situation for women was similar (13.2 versus 6.2 per cent in 1981; 13.7 versus 6.3 per cent in 1991).\(^2\) These differences are consistent with the pattern of widening health inequalities but are difficult to reconcile with an underlying pattern of improving mortality in all socio-economic groups. A possible explanation is increased social mobility. For example, the proportion of economically active men aged 16–64 in social classes 1 and 2 increased between 1981 and 1991 by 10 per cent in Edinburgh, from 31 to 41 per cent, and by 11 per cent in Glasgow, from 15 to 26 per cent.\(^2\)

In the mid-1980s government policies led to a substantial widening of income distribution within the United Kingdom,\(^2\) which could be expected to favour Edinburgh rather than Glasgow, but it is probably too soon to assess the effects of these policies and, in particular, their effects on the health and development of children.\(^2\)

**Conclusions**

Analysis of mortality trends in Edinburgh and Glasgow identifies three main features: a predicted improvement in longevity based on the continuation of historical trends in mortality rates; a predicted widening of the differences in life expectancy between the two cities as a result of a faster rate of decline of mortality rates in Edinburgh; and an unpredicted reduction in mortality rates in both cities in addition to that predicted from historical trends.

Explanations of the trends are made difficult by the limited availability of data, the likelihood of several interacting factors and the possibility of lag effects. It seems likely, however, that the main differences between the cities in their absolute mortality rates and in their diverging historical trend are explained in large measure by their consistently and markedly contrasting socio-economic profiles.

Comparison of the cities conceals a reduction in mortality rates in both populations, but forming a larger proportion of the total observed fall in mortality rates in Glasgow, which is not explained by historical trends and seems more likely to be explained by factors operating in the short term. Possible, though unproven, explanations include population trends in blood pressure and social mobility, and the introduction of effective clinical interventions.

In addition to their obvious local relevance, these observations may be helpful in informing the more general interpretation of mortality trends. For example, interpretation of trends in cause-specific mortality rates\(^2\),\(^7\) should take into account the possibility of long- and short-term trends in all-cause mortality in different social groups.

**Key points**

1. Differences in life expectancy between Glasgow and Edinburgh increased between 1981 and 1991 by 44 per cent to 4.7 years in men and by 19 per cent to 2.5 years in women, with shorter life expectancy in Glasgow.
2. Mortality rates fell in all age–sex groups but by twice as much in Edinburgh as in Glasgow men and women aged 45–74, mainly as a result of trends in mortality from cancer and coronary heart disease.
3. The greatest percentage decrease in mortality rates in Glasgow and the smallest in Edinburgh occurred in men and women aged 35–44.
4. Mortality rates fell by more than predicted in people aged 35–74 in both cities, by 10 per cent in men and 6 per cent in women.
5. Interpretation of disease-specific mortality rates may need to take into account not only population trends of increasing longevity but also differences in the rates at which longevity is increasing in contrasting socio-economic groups.

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References


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