Mapping health inequalities across London

Justine Fitzpatrick, Health Analyst
Dr. Bobbie Jacobson, Director

September 2001
List of tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Infant mortality rates by borough and proposed strategic health authority 1993-98</td>
<td>13</td>
</tr>
<tr>
<td>Table 2</td>
<td>Life expectancy by borough and proposed strategic health authority 1997-99</td>
<td>25</td>
</tr>
</tbody>
</table>

List of figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure ES1</td>
<td>Infant mortality rates in Europe’s capital cities 1995/1996</td>
<td>V</td>
</tr>
<tr>
<td>Figure 1</td>
<td>Infant mortality inequalities targets – exponential projections</td>
<td>3</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Life expectancy inequalities targets – males, exponential projections</td>
<td>5</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Life expectancy inequalities targets – females, exponential projections</td>
<td>6</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Infant mortality rates in Europe’s capital cities 1995/1996</td>
<td>7</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Infant mortality rates by region 1999</td>
<td>8</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Infant mortality rates by social class, country and region 1993-97</td>
<td>9</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Infant mortality rates by social class and registration type, by proposed strategic health authority 1993-98</td>
<td>11</td>
</tr>
<tr>
<td>Figure 8</td>
<td>Infant mortality rates by birthweight, London 1993-98</td>
<td>12</td>
</tr>
<tr>
<td>Figure 9</td>
<td>Infant mortality rates by age of mother, London 1993-98</td>
<td>12</td>
</tr>
<tr>
<td>Figure 10</td>
<td>Infant mortality rates by mother’s country of birth, London 1993-98</td>
<td>12</td>
</tr>
<tr>
<td>Figure 11</td>
<td>Infant mortality rates by borough 1993-98 against DETR index of multiple deprivation 2000</td>
<td>16</td>
</tr>
<tr>
<td>Figure 12</td>
<td>Infant mortality rates by deprivation quintile and proposed strategic health authority 1993-98</td>
<td>21</td>
</tr>
<tr>
<td>Figure 13</td>
<td>Trends in infant mortality rates by social class and registration type, London 1993-98</td>
<td>22</td>
</tr>
<tr>
<td>Figure 14</td>
<td>Life expectancy by region 1997-99</td>
<td>24</td>
</tr>
<tr>
<td>Figure 15</td>
<td>Life expectancy by borough 1997-99 against DETR index of multiple deprivation 2000</td>
<td>28</td>
</tr>
<tr>
<td>Figure 16</td>
<td>Life expectancy by deprivation quintiles and proposed strategic health authority 1997-99</td>
<td>29</td>
</tr>
<tr>
<td>Figure 17</td>
<td>Trends in life expectancy in males and females by borough and proposed strategic health authority 1992-2010</td>
<td>32</td>
</tr>
</tbody>
</table>

List of maps

<table>
<thead>
<tr>
<th>Map</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Map ES1</td>
<td>Infant mortality rates by borough 1993-98</td>
<td>VI</td>
</tr>
<tr>
<td>Map ES2</td>
<td>Male life expectancy in years 1997-99</td>
<td>VIII</td>
</tr>
<tr>
<td>Map ES3</td>
<td>Female life expectancy in years 1997-99</td>
<td>VIII</td>
</tr>
<tr>
<td>Map 1</td>
<td>Infant mortality rates by borough 1993-98</td>
<td>15</td>
</tr>
<tr>
<td>Map 2</td>
<td>Percentage of births that were sole registered by borough 1993-98</td>
<td>17</td>
</tr>
<tr>
<td>Map 3</td>
<td>Percentage of births with a low birthweight by borough 1993-98</td>
<td>17</td>
</tr>
<tr>
<td>Map 4</td>
<td>Percentage of births that were to mothers &lt; 20 by borough 1993-98</td>
<td>18</td>
</tr>
<tr>
<td>Map 5</td>
<td>Percentage of births that were to mothers born outside England and Wales by borough 1993-98</td>
<td>18</td>
</tr>
<tr>
<td>Map 6</td>
<td>Deprivation quintiles by ward using DETR index of multiple deprivation 2000</td>
<td>20</td>
</tr>
<tr>
<td>Map 7</td>
<td>Male life expectancy in years 1997-99</td>
<td>27</td>
</tr>
<tr>
<td>Map 8</td>
<td>Female life expectancy in years 1997-99</td>
<td>27</td>
</tr>
</tbody>
</table>
Acknowledgements

We would like to acknowledge the help and advice of the LHO Health Inequalities Advisory Group, the London Directors of Public Health, the LHO Steering Group and other colleagues at the Department of Health. In addition, thanks go to Kath Moser at the Office for National Statistics for preparing our dataset.
Executive Summary

This paper reports on the first phase of a study assessing differentials and trends in the two national health inequalities targets within London. It aims to help health and other agencies to understand better the extent of inequality in London, and provides common information across the capital, that is comparable with national targets. This forms an important part of the London Health Observatory’s (LHO) work programme in support of the London Health Strategy. The work has been undertaken with support from our LHO Health Inequalities Advisory Group (See Appendix 1). The national health inequalities targets are presented in Box ES 1.

Box ES 1 The national health inequalities targets

1. Infant mortality (deaths in the first year of life)

Starting with children under one year, by 2010 to reduce by at least 10 per cent the gap in mortality between manual groups and the population as a whole (excludes sole registrations).

2. Expectation of life

Starting with health authorities, by 2010 to reduce by at least 10% the gap between the fifth of areas with the lowest life expectancy at birth and the population as a whole.

The Department of Health released a consultation document on 23rd August 2001: Tackling Health Inequalities: consultation on a plan for delivery. Its purpose is to support the development of a cross-Government Action Plan to deliver the national inequalities targets. The national targets are high level or summary targets and are influenced by a wide range of factors within and outside the NHS. The consultation also seeks views on a broader lower level ‘basket’ of inequality indicators that will focus on local action to help to achieve the high level targets outlined above. This report Mapping health inequalities across London aims to contribute to a London perspective on the consultation.

Our report presents inequalities in life expectancy and trends throughout the 1990s for the smallest geographic area possible, and the likely picture of inequality in 2010 if current trends continue. We present inequalities in infant mortality rates by social class for the 1990s for the smallest geographic area possible. Trends in infant mortality by social class are presented along with the likely picture of inequality by social class if current trends continue.

Conclusions

Infant mortality – the international and national picture

- Work by the Health of Londoners Programme has shown that London had high infant mortality rates compared with other Western European cities in 1995/1996 (Figure ES 1). Other cities that had high rates include Athens, Amsterdam, Rome, Brussels and Lisbon. The lowest infant mortality rates were observed in Stockholm, Helsinki, and Lyon with values of around 4 deaths per 1,000 live births. A comparison of inequalities within cities showed that those parts of London with the lowest infant mortality had similar rates to those parts of Stockholm with the highest infant mortality.

Figure ES1  Infant mortality rates in Europe’s capital cities 1995/1996

- London as a whole had a similar infant mortality rate to England and Wales. This however, conceals wide inequalities within London.

Infant mortality – inequalities within London

- Looking at infant mortality by social class, within London and within each of the five proposed strategic health authorities (SHA), we found that the infant mortality rate in the manual group was greater than the infant mortality rate in the population as a whole (excluding sole registrations), although this difference was small and not significant. The


gap between these groups in London is the same as that in England and Wales as a whole. Appendix II shows a map of London boroughs and proposed SHAs.

- The monitoring of this target at proposed strategic health authority, London borough or primary care trust level is not feasible as the differences seen from year to year could be occurring randomly. Therefore, it is necessary to develop a ‘proxy’ indicator for infant mortality by social class, or to monitor infant mortality by some other characteristic.

- In all proposed strategic health authorities and in London as a whole, the infant mortality rate for sole registered births (births registered by the mother alone) was significantly higher than the rate in the manual social class group. In London as a whole, the infant mortality rate for sole registered births for 1993-98 was 9.5 deaths per 1000 live births compared to 6.1 in the manual group and 5.7 in the population as a whole (excluding sole registrations). Thus, there were much larger differences between the rate for sole registered births and the population as a whole than the difference between the rate in the manual group and the population as a whole.

- Within London, babies born with a low birthweight, those born to mothers who were themselves born outside England and Wales and those born to mothers under the age of 20, all had a higher infant mortality rate than the population as a whole.
• Bexley was the borough that had the lowest infant mortality rate of 3.6 infant deaths per 1000 live births and Hackney the borough which had the highest infant mortality rate of 8.9 infant deaths per 1000 live births. Other boroughs that had rates significantly higher than the average for London include Lambeth, Southwark and Lewisham (Map ES 1).

• More deprived boroughs generally had higher infant mortality rates than less deprived boroughs and within each proposed strategic health authority, the most deprived areas had higher infant mortality rates than the least deprived areas.

• If current trends in infant mortality by social class continue, in London as a whole there will be a widening of the gap between the infant mortality rate in the manual group and the infant mortality rate in the population as a whole. Therefore, the infant mortality target is extremely challenging, as it requires a reversal of current trends.

Life expectancy – the national picture and inequalities within London

• London as a whole had a very similar average life expectancy to England, however, there were wide inequalities within London.

• Within London there were areas that experienced some of the shortest life expectancy in England located alongside areas which had some of the longest life expectancy in England (Maps ES 2 and ES 3). Westminster had the longest life expectancy for both males and females within London and ranked 26th and 13th respectively within England out of a total of 352 authorities. Newham had the shortest life expectancy within London, for both males and females, and ranked 349 and 320 respectively within England. The difference between average life expectancy in these two areas is 5.7 years for males and 4 years for females.
Map ES 2  Male life expectancy in years, 1997-99

England = 75.2
London = 75.1

Map ES 3  Female life expectancy in years, 1997-99

England = 80.1
London = 80.4

Source: ONS
• The difference in life expectancy between boroughs in the early 1990s was 5.2 years for males and 3.8 years for females. Therefore the gap in life expectancy between boroughs has widened.

• Average life expectancy for both males and females at borough level within London was more closely related to deprivation than was infant mortality. The most deprived boroughs had lower life expectancies than less deprived boroughs. This relationship was clearer for males than for females.

• However, even within boroughs there were huge differences in average life expectancy between areas. The most deprived areas within boroughs in every proposed strategic health authority within London had a shorter life expectancy than the least deprived areas.

• If current trends in life expectancy continue, the gap between the proposed strategic health authorities (SHA) with the longest and the shortest life expectancy is set to increase. Within each proposed SHA, the gap between the boroughs with the longest and shortest life expectancy will increase. Therefore, a reduction in the life expectancy gap between the areas with the longest and the shortest life expectancy is extremely challenging, as it requires a reversal of current trends.

• The widening of the gap between the boroughs with the shortest and longest life expectancy is greatest in the North West London SHA. This is largely due to the fact that the boroughs of Westminster and Kensington & Chelsea have seen a very large increase in life expectancy for both males and females in recent years. If these trends continue, then by 2010 life expectancy for males in these two boroughs will be at least 7 years longer than the rest of the boroughs in the proposed SHA.

• No useful conclusions can be drawn about ethnic differences in life expectancy, as the only available data, by country of birth, is not meaningful. To calculate life expectancy by ethnic group, the recording of ethnicity on death certificates is needed and this requires legislation. In addition, there is no available robust local data to enable us to calculate up-to-date estimates of life expectancy by social class for London.

• It should be noted that whilst many boroughs were showing the ‘worst’ health on both national targets, there are important differences in the inequality maps presented for the two targets. The differences appear to be greater in outer London where many boroughs were showing high levels of infant mortality, but average or good life expectancy or visa versa in the case of Barking and Dagenham.

**Implications for further work**

This report completes the first phase of our work mapping the health inequalities targets for London. It highlights a number of potential areas for further work:
• An analysis of the infant mortality target using the new Government social classification that will replace Social Class, the National Statistics socio-economic classification.

• A more detailed analysis of sole registered births, in particular to try to allocate a social class to these births.

• An analysis of the contribution of different causes of death to patterns and trends in life expectancy, to help target more effective action in deprived populations.

• A review of the available data on the determinants of life expectancy and infant mortality by ethnic group, such as birthweight, smoking in pregnancy and adulthood, late antenatal booking and breastfeeding in London, to support more effective action in diverse populations at borough or primary care trust level.

We will consult on these and other suggestions to inform phase two of our work. It will be particularly important to be able to provide data that is useful at borough or primary care trust level and data that can help monitor ethnic differences and time trends across London.

**Further information**

Further copies of the Executive Summary and the full report ‘Mapping health inequalities across London’ can be obtained from the London Health Observatory website [www.lho.org.uk](http://www.lho.org.uk) or by telephoning 020 7307 2826/2833. Also available is a question and answer document explaining the findings for London ‘What do the health inequalities targets mean for London?’ and a technical supplement ‘Calculating life expectancy and infant mortality rates’.

Further information on the national targets and a detailed question and answer document explaining the targets can be obtained from the Department of Health website [www.doh.gov.uk/healthinequalities/index.htm](http://www.doh.gov.uk/healthinequalities/index.htm).

---

Introduction

This paper reports on the first phase of a study assessing differentials and trends in the two national health inequalities targets within London. It aims to help health and other agencies to understand better the extent of inequality in London, and provides common information across the capital that is comparable with national targets. This forms an important part of the London Health Observatory’s (LHO) work programme in support of the London Health Strategy. The work has been undertaken with support from our LHO Health Inequalities Advisory Group (See Appendix 1).

This report presents inequalities in life expectancy and trends throughout the 1990s for the smallest geographic area possible, and the likely picture of inequality in 2010 if current trends continue. It presents inequalities in infant mortality rates by social class for the 1990s for the smallest geographic area possible. Trends in infant mortality by social class are presented along with the likely picture of inequality by social class if current trends continue.

Section 1 The national context

In 1998 the Independent Inquiry into Inequalities in Health undertook a comprehensive review of health inequalities in England including analysis by geography, age, class, gender and ethnicity, and made 39 recommendations for action. In July 1999 the White Paper Saving Lives: Our Healthier Nation was published. It aims to ‘improve the health of everyone and the worst off in particular’. Following this the Government gave a commitment to reducing health inequalities in the NHS Plan. New targets for reducing health inequalities were announced in February 2001 and are listed in Box 1.

<table>
<thead>
<tr>
<th>Box 1 The national health inequalities targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Infant mortality (deaths in the first year of life)</td>
</tr>
<tr>
<td>Starting with children under one year, by 2010 to reduce by at least 10 per cent the gap in mortality between manual groups and the population as a whole (excludes sole registrations).</td>
</tr>
<tr>
<td>2. Expectation of life</td>
</tr>
<tr>
<td>Starting with health authorities, by 2010 to reduce by at least 10% the gap between the fifth of areas with the lowest life expectancy at birth and the population as a whole.</td>
</tr>
</tbody>
</table>

In addition to these two targets, there are three other existing national targets that have an inequalities dimension and are closely related to the two headline targets above. These are:

- To reduce smoking rates among manual groups from 32% in 1998 to 26% by 2010, so that we can narrow the gap between manual groups and non-manual groups.
• By achieving agreed local conception reduction targets, to reduce the national under 18 conception rate by 15% by 2004 and 50% by 2010, while reducing the gap in rates between the worst fifth of wards and the average by at least a quarter.

• The Government is committed to halving child poverty in ten years and eradicating it within a generation.

The Department of Health released a consultation document on 23rd August 2001: *Tackling Health Inequalities: consultation on a plan for delivery*. The purpose of that document is to consult on developing a cross-Government Action Plan to deliver the national inequalities targets. The national targets are high level and are influenced by a wide range of factors within and outside the NHS.

The consultation document sets out six priority themes around which an action plan could be developed, to deliver these targets. The six priority themes are:

1. Developing a sure foundation through a healthy pregnancy and early childhood
2. Improving opportunity for children and young people
3. Improving NHS primary care services
4. Tackling the major killers: coronary heart disease and cancer
5. Strengthening disadvantaged communities
6. Tackling the wider determinants of health inequalities

The document seeks views on these priorities and on what more can be done to address them. It also seeks views on a broader lower level ‘basket’ of inequality indicators that will focus on local action to help to achieve the high level targets outlined above.

This report *Mapping health inequalities across London* aims to contribute to a London perspective on that consultation.

**Infant mortality**

The infant mortality target aims for a reduction in the gap between the infant mortality rate in the manual classes (social classes IIIim-skilled manual occupations, IV-partly skilled occupations and V-unskilled occupations) and the population as a whole (excluding sole registrations). Therefore the target relates to a reduction in inequality and not just a reduction in the rates in the lower social classes.

Although a target relating to social class is difficult to monitor at a local level, this target was set particularly to include deprived individual children not necessarily living in deprived areas. The Government has announced the introduction of a new social classification, the National Statistics Socio-economic classification. This infant mortality target will be reset using the new National Statistics Socio-economic classification when data become available.
Trends in infant mortality

Figure 1 shows the trend in infant mortality rates in the population as a whole and the manual classes for England between 1993 and 1999. The chart shows that if current trends continue there will be a widening of the gap between the rate in the manual classes and the rate in the population as a whole. The current target is challenging as it relates to a reduction in the gap and therefore a reversal of current trends.

Figure 1

Source: ONS and Department of Health

The infant mortality target has been set using data from the Office for National Statistics (ONS) linked infant mortality file. It links information collected at birth registration such as social class of mother and father, birthweight and mother’s country of birth with information collected at death registration such as cause of death and social class of mother and father. For the calculation of infant mortality rates by social class, social class is determined by the occupation and employment status of the father at birth and death. Therefore, a class can not be allocated to births registered by the mother alone and therefore sole registered births are not included in any rates by social class.

The ‘population as a whole’ in these targets also excludes all sole registered births. Therefore this group is now referred to as the ‘inside marriage/couple registrations’ group as it is made up of all births inside marriage and all those births outside marriage that are registered by both parents. The effect of excluding the sole registered births from the ‘population as a whole’ in this target makes the target more challenging. This is because sole registered births have a higher mortality rate than the inside marriage/couple registrations group, and the rate
for all these groups combined is therefore closer to the rate in the manual group. More information on this is available in the technical supplement to this report 9.

Sole mothers are a relatively disadvantaged group and as infants born to sole mothers have a very high mortality rate it seems important to include a target to improve the health of lone mothers and their babies within the ‘basket of indicators’7 currently being consulted on.

The infant mortality rate in England and Wales in the inside marriage/couple registrations group in 1997-99 was 5.6 deaths per 1000 live births. The rate in the manual classes in 1997-99 was 6.0 deaths per 1000 live births. Therefore, the current gap between the manual classes and the inside marriage/couple registrations group is small, however, as Figure 1 shows, extrapolation of current trends suggests that this gap will widen without targeted efforts to reduce inequalities.

**Life expectancy**

Average life expectancy is an estimate of how long a baby would be expected to live if current age specific mortality rates remain constant. It is not a forecast of how long babies born will actually be expected to survive as it is unlikely that age specific mortality rates will remain constant for an extended length of time. It is best interpreted as a summary measure of mortality like any other. More details on the interpretation and the calculation of average life expectancy is provided in the technical supplement to this report ‘Calculating life expectancy and infant mortality rates’9.

The national life expectancy target relates to a reduction in the gap in life expectancy between the 20% of health authorities that had the lowest life expectancy in 1997-99 and the population as a whole (average life expectancy in England). Average life expectancy in England in 1997-99 was 75.2 for males and 80.1 for females. The average life expectancy for the bottom 20% of health authorities in 1997-99 was 72.9 for males and 78.2 for females. Thus the gap between the average for England and the bottom 20% of health authorities is 2.3 for males and 1.9 for females.

Looking at health authorities in London, for males, 2 out of the existing 16 London health authorities (HA) were in the bottom 20% in 1997-99, East London and the City HA and Lambeth, Southwark and Lewisham HA. For females, no London health authorities were in the bottom 20%. However, it is important to remember that life expectancy is unlikely to be uniform across a health authority and therefore local analysis of variations within health authorities is vital for informing action for health authorities not in the bottom 20%.

It is also important to note that in each year the health authorities included in the 20% of health authorities with the lowest life expectancy may vary. Thus, the target does not relate to reducing the gap between the national average and the bottom 20% of health authorities as they were in 1997-99, but the bottom 20% as they will be in 2010. The move towards larger strategic health authorities will also change the implications of this target by 2010, and it seems likely that the target will be redefined using a different geography. Given the importance of the wider determinants of health in influencing life expectancy, it may make sense to use areas that are consistent with local government organisations rather than with health service delivery. In London this would mean that the basic unit for comparison would be London boroughs. In London, nearly all primary care trusts (PCT) will, by 2002, be
coterminous with boroughs, thus strengthening the argument for analysis at this level. Primary care trusts will take on certain functions that were previously the responsibility of health authorities and will be responsible for commissioning most of the health services required, on behalf of their local community. Therefore, most of the data presented in this report is for London boroughs.

Trends in life expectancy

Figures 2 and 3 show trends in life expectancy between 1981 and the present for males and females separately in England. The charts also show the likely picture of inequality in 2010 if these trends continue. This extrapolation of recent trends suggests that there will be a **widening** of the gap between the bottom 20% of health authorities and the population as a whole for both males and females if current trends continue. Therefore the target is challenging in that it requires a **reversal** of current trends, and that the gap narrows by 10%.

The life expectancy target does not define how this narrowing of the gap might be achieved in practice. There are many possibilities. The target could be achieved by a rise in life expectancy in the 20% of health authorities with the shortest life expectancy, while the average for the population as a whole remains stable. It could also be achieved while life expectancy in the population as a whole rises, as long as the rise in the 20% of authorities with the shortest life expectancy is greater.

Figure 2

![Life expectancy inequalities targets - males, exponential projections](chart)

Source: ONS and Department of Health

---

6
Figure 3

Life expectancy inequalities targets - females, exponential projections

Source: ONS and Department of Health
Section 2 Analysis of health inequalities in London

This section examines the position of London on these two targets relative to other regions of England and relative to other cities within Europe. It also focuses on within-London variations in the two targets and presents data by London borough and the proposed new strategic health authorities (SHA). The reasons for choosing London Boroughs have been explained in Section 1. Strategic health authorities are used where the number of deaths involved makes analysis at smaller areas unreliable.

Infant mortality

London compared to the rest of England and other cities in Europe

Figure 4 shows infant mortality rates for European cities participating in the Megapoles Project. In most cases the data presented in Figure 4 is for 1995 or 1996, although in the case of Lyon and Rome, the data is for 1994. This work by the Health of Londoners Programme has shown that London had high infant mortality rates compared with other Western European cities. Other cities that had high rates include Athens, Amsterdam, Rome, Brussels and Lisbon. The lowest infant mortality rates were observed in Stockholm, Helsinki, and Lyon with values of around 4 deaths per 1,000 live births. A comparison of inequalities within cities showed that those parts of London with the lowest infant mortality had similar rates to those parts of Stockholm with the highest infant mortality.

Figure 4 Infant mortality rates in Europe’s capital cities 1995/1996

Source: Project Megapoles
Figure 5 shows infant mortality rates by NHS Regional Office for 1999. The northern regions of England had higher infant mortality rates than the southern regions of England. The infant mortality rate in London as a whole was very similar to the rate for England as a whole (6.0 infant deaths per 1000 live births compared to 5.7 for England as a whole). The range in infant mortality rates by region was 2.3 between the West Midlands (6.9) and the Eastern region (4.6). The infant mortality rate in the West Midlands was one and a half times the infant mortality rate in the Eastern region.

Figure 6 shows infant mortality rates by social class for all the Government Office Regions of England and for England and Wales as a whole in 1993-97. The chart shows that in England as a whole, babies whose fathers were in Social Class V had an infant mortality rate of 8.8 deaths per 1000 live births, nearly double the rate of 4.5 for those whose fathers were in Social Class I. The chart also shows that the social class gradient in infant mortality does vary by region, with the largest differences between the rates in Social Class I and V being seen in Yorkshire and the Humber.

There were also large variations in the infant mortality rates by region for each social class. London had the highest infant mortality rates for babies born to fathers within Social Class V of all the regions and Wales.
Figure 6  Infant mortality rates by social class, country and region 1993-97

Source: Cooper (2001)
Inequalities in infant mortality rates within London by socio-economic characteristics

Figure 7 shows infant mortality by social class and by registration type for each of the five proposed strategic health authorities (SHA) and for London (the actual rates for London and the SHAs as a whole are presented later in Table 1). The charts also show infant mortality rates for sole registered births that are not included within any social class group and for births inside marriage/couple registrations. Confidence intervals around these rates have been calculated to determine whether or not the infant mortality rates in the different groups are statistically significantly different from each other, very few rates were found to be significantly different from each other. This is either because the infant mortality rates in the groups were very similar, or because the number of deaths was too small to say that the rate obtained could not have occurred by chance. More details on this and the source data used can be found in the technical supplement to this report ‘Calculating life expectancy and infant mortality rates’.

The infant mortality target aims for a reduction in the gap between the rate in the manual classes and the rate in the population as a whole (referred to as the inside marriage/couple registrations group as it excludes sole registrations (see Section 1)). In London as a whole and within each proposed strategic health authority, although the rate in the manual group was higher than the rate in the inside marriage/couple registration group the difference was not statistically significant in any case and therefore could have occurred by chance or due to random variation. The rate in the manual group for London was 6.1, compared to 5.7 in the inside marriage/couple registration group (1993-98). The rate in the inside marriage/couple registration group for London is slightly less than the rate in England and Wales (5.8) in this group for the years 1993-98. The rate in the manual group in London is slightly less than the rate in this class group for England and Wales (6.2). Therefore, the gap between the manual group and the inside marriage/couple registrations group is the same in London as in England and Wales.

The monitoring of this target at proposed strategic health authority, London borough or primary care trust level is not feasible as the differences occurring from year to year could be seen due to random variation. Therefore, it is necessary to develop a ‘proxy’ indicator for infant mortality by social class or to monitor infant mortality by some other characteristic.

In London as a whole and within each proposed strategic health authority, the infant mortality rate among sole registered births was much greater than the infant mortality rate in the manual, non-manual and the inside marriage/couple registrations group (Figure 7). In London as a whole the infant mortality rate in the sole registered group was 9.5 compared to 5.7 in the inside marriage/couple registrations group.
The infant mortality rate for sole registrations (9.5) was significantly greater than the rate in the non-manual (5.0), manual (6.1) and the inside marriage/couple registrations group (5.7). The gap between the manual group and the inside marriage/couple registration group was small and very similar to the gap in England and Wales as a whole.

The infant mortality rate for sole registrations was significantly greater than the rate in the inside marriage/couple registrations group. This SHA had the lowest infant mortality out of all SHAs in the non-manual group. This SHA also had the lowest infant mortality out of all SHAs in the sole registrations group.

In this SHA the infant mortality rates in the different groups were the most similar and none were significantly different from each other. This SHA had the highest infant mortality out of all SHAs in the manual group and the inside marriage/couple registrations group despite the rates in the two groups being very similar.

The infant mortality rate for sole registrations was significantly greater than the rate in the non-manual and the inside marriage/couple registrations group. The sole registrations infant mortality rate of 11.6 deaths per 1000 live births was the highest of all SHAs in London. In addition, in this SHA there was very little difference between the rates by social class.
The rate for sole registrations was significantly greater than the rate in the non-manual and the couple registrations/inside marriage group. This SHA had the lowest infant mortality rate for the inside marriage/couple registration group out of all SHAs.

Other factors, collected at birth registration that are known to be associated with the health of the infant in the first year of life are birthweight, mother’s country of birth and age of mother at birth. Figures 8, 9 and 10 show infant mortality rates in London by these three characteristics.

**Figure 8** Infant mortality rates by birthweight, London 1993-98

Babies born with a very low birthweight in London had by far the highest infant mortality rate, much higher than the rate in all social classes and the sole registrations. The rate in all proposed strategic health authorities and in London was around 200 deaths per 1000 live births. Babies born with a birthweight between 1500-2500 grams also had an increased mortality rate.

**Figure 9** Infant mortality rates by age of mother, London 1993-98

In London as a whole and in every proposed strategic health authority, births to mothers under the age of 20 had higher infant mortality rates than mothers in any other age group. These rates were also higher than the rates in any social class group and around the same level as the rate in the sole registrations. The infant mortality rate in the sole registrations group in London was 9.5, compared to 10.0 in births to mothers under the age of 20. Infant mortality rates were lowest in babies born to mothers in their late 20s and early 30s.

**Figure 10** Infant mortality rates by mother’s country of birth, London 1993-98

Births to mothers who were themselves born outside England and Wales had a higher infant mortality rate (6.9) than births to mothers who were born inside England and Wales (5.7). This applied in every proposed strategic health authority although the differences were not statistically significant.

Source: ONS linked mortality file
Table 1  Infant mortality rates by borough and proposed strategic health authority 1993-98

<table>
<thead>
<tr>
<th>Borough</th>
<th>Infant mortality rate</th>
<th>lower confidence interval</th>
<th>upper confidence interval</th>
<th>significantly high or low</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of London</td>
<td>3.7</td>
<td>-3.5</td>
<td>10.9</td>
<td></td>
</tr>
<tr>
<td>Barking and Dagenham</td>
<td>5.7</td>
<td>4.5</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>Barnet</td>
<td>5.5</td>
<td>4.6</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>Bexley</td>
<td>3.6</td>
<td>2.7</td>
<td>4.5</td>
<td>low</td>
</tr>
<tr>
<td>Brent</td>
<td>6.8</td>
<td>5.7</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>Bromley</td>
<td>5.1</td>
<td>4.2</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>Camden</td>
<td>4.6</td>
<td>3.5</td>
<td>5.7</td>
<td>low</td>
</tr>
<tr>
<td>Croydon</td>
<td>6.7</td>
<td>5.8</td>
<td>7.7</td>
<td></td>
</tr>
<tr>
<td>Ealing</td>
<td>4.8</td>
<td>3.9</td>
<td>5.6</td>
<td>low</td>
</tr>
<tr>
<td>Enfield</td>
<td>5.8</td>
<td>4.9</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>Greenwich</td>
<td>6.4</td>
<td>5.3</td>
<td>7.6</td>
<td></td>
</tr>
<tr>
<td>Hackney</td>
<td>8.9</td>
<td>7.7</td>
<td>10.2</td>
<td>high</td>
</tr>
<tr>
<td>Hammersmith and Fulham</td>
<td>6.2</td>
<td>4.9</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Haringey</td>
<td>6.3</td>
<td>5.2</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>Harrow</td>
<td>6.9</td>
<td>5.6</td>
<td>8.1</td>
<td></td>
</tr>
<tr>
<td>Havering</td>
<td>5.6</td>
<td>4.4</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>Hillingdon</td>
<td>5.4</td>
<td>4.4</td>
<td>6.4</td>
<td></td>
</tr>
<tr>
<td>Hounslow</td>
<td>4.9</td>
<td>3.9</td>
<td>5.9</td>
<td>low</td>
</tr>
<tr>
<td>Islington</td>
<td>4.7</td>
<td>3.6</td>
<td>5.8</td>
<td>low</td>
</tr>
<tr>
<td>Kensington and Chelsea</td>
<td>6.8</td>
<td>5.3</td>
<td>8.3</td>
<td></td>
</tr>
<tr>
<td>Kingston upon Thames</td>
<td>3.9</td>
<td>2.7</td>
<td>5.1</td>
<td>low</td>
</tr>
<tr>
<td>Lambeth</td>
<td>7.8</td>
<td>6.7</td>
<td>8.8</td>
<td>high</td>
</tr>
<tr>
<td>Lewisham</td>
<td>8.4</td>
<td>7.2</td>
<td>9.6</td>
<td>high</td>
</tr>
<tr>
<td>Merton</td>
<td>5.3</td>
<td>4.2</td>
<td>6.4</td>
<td></td>
</tr>
<tr>
<td>Newham</td>
<td>7.3</td>
<td>6.3</td>
<td>8.3</td>
<td></td>
</tr>
<tr>
<td>Redbridge</td>
<td>4.8</td>
<td>3.8</td>
<td>5.8</td>
<td>low</td>
</tr>
<tr>
<td>Richmond upon Thames</td>
<td>4.4</td>
<td>3.3</td>
<td>5.5</td>
<td>low</td>
</tr>
<tr>
<td>Southwark</td>
<td>8.2</td>
<td>7.1</td>
<td>9.3</td>
<td>high</td>
</tr>
<tr>
<td>Sutton</td>
<td>4.6</td>
<td>3.5</td>
<td>5.8</td>
<td>low</td>
</tr>
<tr>
<td>Tower Hamlets</td>
<td>6.7</td>
<td>5.5</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>Waltham Forest</td>
<td>7.1</td>
<td>6.0</td>
<td>8.2</td>
<td></td>
</tr>
<tr>
<td>Wandsworth</td>
<td>5.5</td>
<td>4.6</td>
<td>6.4</td>
<td></td>
</tr>
<tr>
<td>Westminster</td>
<td>7.2</td>
<td>5.8</td>
<td>8.6</td>
<td></td>
</tr>
</tbody>
</table>

**Proposed SHA**

<table>
<thead>
<tr>
<th>Proposed SHA</th>
<th>Infant mortality rate</th>
<th>lower confidence interval</th>
<th>upper confidence interval</th>
<th>significantly high or low</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Central</td>
<td>5.5</td>
<td>5.0</td>
<td>5.9</td>
<td>low</td>
</tr>
<tr>
<td>North East</td>
<td>6.7</td>
<td>6.3</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>North West</td>
<td>6.0</td>
<td>5.6</td>
<td>6.4</td>
<td></td>
</tr>
<tr>
<td>South East</td>
<td>6.8</td>
<td>6.4</td>
<td>7.2</td>
<td>high</td>
</tr>
<tr>
<td>South West</td>
<td>5.4</td>
<td>5.0</td>
<td>5.8</td>
<td>low</td>
</tr>
</tbody>
</table>

London                                | 6.1                   | 5.9                        | 6.3                        |                           |

England and Wales                    | 6.0                   |                            |                            |                           |

Source : ONS linked mortality file
Inequalities in infant mortality within London by borough and deprivation

Table 1 shows infant mortality rates by London borough and proposed strategic health authority for the years 1993-98. Due to the small numbers of deaths involved the rates by borough are not put in rank order as these could change from year to year due to random variation. In addition the confidence interval showing the likely range of the infant mortality rate, allowing for random variation, is also shown in the table. The final column in the table states whether the rate in the borough is significantly higher or lower than the rate for London as a whole. A rate will be significantly higher than the rate in London if the confidence interval range for the borough rate is higher and outside the confidence interval range for the London rate. A rate will be significantly lower than the rate in London if the confidence interval range for the borough rate is lower and outside the confidence interval range for the London rate. More details on this is presented in the report ‘Calculating life expectancy and infant mortality rates’.

Table 1 clearly shows that despite the fact that London as a whole had very similar infant mortality rates to England as a whole, there were wide differentials in infant mortality rates within London itself. The North West London proposed Strategic Health Authority (SHA) and the North East London SHA had average overall infant mortality rates. The South East London SHA had higher mortality rates than the London average and the South West and the North Central proposed SHAs had lower mortality than the London average.
Map 1 shows the distribution of infant mortality rates by London borough between 1993-98. This is the same information that is presented in Table 1. Lambeth, Southwark, Lewisham and Hackney had the highest rates and all were significantly higher than the London rate. The lowest rates were found in parts of outer south west and outer south east London. Therefore, within each proposed strategic health authority there were large variations in infant mortality rates by borough. Although the South East London SHA had a higher mortality rate than London as a whole, parts of this proposed strategic health authority had very low infant mortality rates, and Bexley had the lowest rate of all boroughs in London at 3.6. Hackney had the highest infant mortality rate of 8.9. The range in rates between these two boroughs is 5.3 and the rate in Hackney was 1.4 times higher than the rate in Bexley.

Map 1  Infant mortality rates by borough 1993-98

<table>
<thead>
<tr>
<th>Borough</th>
<th>Infant mortality rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td>6.1 (5.9-6.3)</td>
</tr>
<tr>
<td>England</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Source: ONS linked mortality file
Figure 11 shows the relationship between borough level infant mortality rates and the level of deprivation within the borough. Deprivation was measured by the DETR Index of Multiple Deprivation 2000. The borough scores presented are a weighted average of the ward scores presented later in Map 6. The higher the DETR deprivation score, the more deprived the borough.

The chart shows that there was a general increase in infant mortality with an increase in the level of deprivation within each borough. The line on the chart shows the line of best fit, however, there is a lot of scatter about this line showing that the relationship between infant mortality and deprivation is not clear. A linear regression of the association between infant mortality and deprivation for each borough showed that deprivation could explain 35% of the variation in infant mortality.

Figure 11 and Figures 8, 9 and 10 make it clear that there are a number of factors that may help to explain the variation in infant mortality rates by London Borough that are measurable using routine data including, variations in the percentage of births that are sole registered, the percentage of babies whose mother was born outside England and Wales and the percentage of births to mothers under the age of 20. Maps 2 to 5 present variations in these indicators by borough.

Boroughs in east inner London (with the exception of Tower Hamlets) had the highest percentage of births that were sole registered. Boroughs in outer London had the lowest percentages. The east inner London boroughs south of the river: Lambeth, Southwark, Lewisham and Greenwich also had a high percentage of births with a low birthweight and a high percentage born to mothers aged under 20. The east inner London boroughs north of the river: Tower Hamlets, Hackney and Newham also had high values for these indicators, as well as a high proportion of babies born to mothers who were themselves born outside England and Wales. Lambeth, Southwark, Lewisham and Greenwich had lower values for this. Brent had a high percentage of babies born to mothers who were born outside England and Wales and a high percentage of births with a low birthweight. These two factors are often found to be related.
Map 4  Percentage of births that were to mothers < 20 by borough 1993-98

Map 5  Percentage of births that were to mothers born outside England and Wales by borough 1993-98

% births to mother < 20

- ≤ 3  (5)
- 3 to 4  (6)
- 4 to 6  (0)
- 5 to 6  (6)
- 0%  (7)

% births mother born outside E&W

- < 25  (8)
- 25 to 34.9  (7)
- 35 to 44.9  (7)
- 45 to 54.9  (7)
- 55+  (4)
However, the level of these indicators and infant mortality are unlikely to be uniform across boroughs. For this reason it is useful to find a means of examining variations within boroughs. For the analysis in Figure 12 infant mortality rates are presented for areas of similar deprivation within each proposed strategic health authority. Electoral wards were divided into fifths on the basis of their relative deprivation score within England. These are now referred to as ‘deprivation quintiles’. For example the 20% of wards with the highest deprivation score were allocated to quintile 5, the most deprived quintile. The 20% of wards with the lowest deprivation scores were allocated to quintile 1, the least deprived quintile. Map 6 shows the distribution of wards by quintile within London. Figure 12 presents infant mortality for London and for each proposed strategic health authority by these ‘quintiles’. It is not possible to accurately examine infant mortality by electoral ward as the number of infant deaths is relatively small. By allocating electoral wards to deprivation quintiles it is possible to look at within-borough differences in infant mortality without the problem of small numbers.
Electoral wards were divided into fifths on the basis of their rank deprivation score in England. These are now referred to as ‘deprivation quintiles’.

The 20% most deprived wards were allocated to quintile 5 and the 20% least deprived wards were allocated to quintile 1.

Many boroughs, for example, Merton, Camden and Bexley had wards that fell into all 5 categories. However, Islington, Hackney, Tower Hamlets and Newham only had wards in the most deprived quintile and Richmond only had wards in the two least deprived quintiles.
Figure 12  Infant mortality rates by deprivation quintile and proposed strategic health authority 1993-98

The London Region

The infant mortality rate in the most deprived group (quintile 5) was significantly greater than the rate in the least deprived group (quintile 1). The difference between the rate in quintile 5 (7.1) and the rate in quintile 1 (3.8) was 3.3 which is greater than the difference between the manual group and the inside marriage/couple registrations group.

North Central London Proposed SHA

The differences between the infant mortality rates in each quintile in this proposed SHA were small and could have occurred by chance. This proposed SHA showed the smallest difference between the rate in quintile 5 (5.7) and the rate in quintile 1 (4.3).

North East London Proposed SHA

The infant mortality rate in the most deprived group (quintile 5) was significantly greater than the rate in the least deprived group (quintile 1). This area had the lowest rate of all proposed SHAs in quintile 1 of only 2.6 and therefore showed the largest differences between the rate in this group and the rate in quintile 5 (7.4).
The infant mortality rate in the most deprived group (quintile 5) was significantly greater than the rate in the least deprived group (quintile 1). This area had the highest rate of all proposed SHAs in quintile 1 of 5.0.

The infant mortality rate in the most deprived group (quintile 5) was significantly greater than the rate in the least deprived group (quintile 1). This area had the highest rate of all proposed SHAs in quintile 5 of 7.7.

The infant mortality rate in the most deprived group (quintile 5) was significantly greater than the rate in the least deprived group (quintile 1). This is the only SHA where the rate in quintile 4 was greater than the rate in quintile 5, although the differences were not significant.

Source: ONS linked mortality file
Trends in infant mortality

Figure 13 shows trends in infant mortality rates by social class and registration type throughout the 1990s. The graph shows that the sole registered group has seen the largest decline in infant mortality. In addition, infant mortality is generally decreasing in the non-manual and the inside marriage/couple registrations groups. However, the rate in the manual classes has remained relatively stable. If the current trends in infant mortality continue we are likely to see an increase in the difference in infant mortality rates between social classes. The difference between the rate in the manual group in 1996-98 (6.1) and the rate in the inside marriage/couple registrations group in 1996-98 (5.6) is 0.5. If current trends continue the range in rates will increase to 0.7 between the manual group and the inside marriage/couple registrations group. However, this estimate is based on a very small time period and does not take account of any other changes that may occur.

Source: ONS linked mortality file
Life expectancy

London compared with the rest of England

Figure 14 shows average life expectancy by NHS Regional Office for 1997-99. This chart clearly shows that the northern regions of England had much lower life expectancy than the southern regions for both males and females. Life expectancy in London as a whole is around the national average with values of 75.1 for males and 80.4 for females. The range in male life expectancy was 2.8 years between the North West (73.6) and the South West (76.4). The range in female life expectancy was 2.5 years between the North West (78.7) and the South West (81.2).

Figure 14  Life expectancy by region 1997-99

Inequalities in life expectancy within London by borough and deprivation

Table 2 shows the average life expectancy for London boroughs in 1997-99 and their rank out of 32 London boroughs (City of London is excluded from the rankings because of small numbers) and 352 local authorities in England. A rank of 1 indicates that the area had the highest life expectancy.

The table clearly shows that despite the fact that London as a whole had a very similar average life expectancy to England as a whole, there were areas within London that experienced some of the longest or the shortest life expectancy in the country. Westminster was the borough with the best life expectancy in London for both males and females and ranked 26th and 13th in England for males and females respectively. In contrast Newham, which had the shortest life expectancy in London for both males and females, ranked 349 and 320 for males and females respectively out of a total of 352 local authorities. In the case of males, only the centres of Manchester, Liverpool and Newcastle had lower life expectancy than Newham. The range in life expectancy between these two boroughs is 5.7 years for males and 4 years for females. This is much greater than the difference in life expectancy between the health regions of England. The gap in life expectancy between London boroughs in the early 1990s was 5.2 years for males and 3.8 years for females, thus the gap has widened.
<table>
<thead>
<tr>
<th>Local Authority</th>
<th>Male</th>
<th>Female</th>
<th>Male</th>
<th>Female</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of London</td>
<td>78.60</td>
<td>82.50</td>
<td>30</td>
<td>28</td>
<td>327</td>
<td>288</td>
</tr>
<tr>
<td>Barking and Dagenham</td>
<td>72.98</td>
<td>79.16</td>
<td>3</td>
<td>10</td>
<td>31</td>
<td>135</td>
</tr>
<tr>
<td>Barnet</td>
<td>77.51</td>
<td>80.76</td>
<td>9</td>
<td>12</td>
<td>139</td>
<td>152</td>
</tr>
<tr>
<td>Bexley</td>
<td>76.19</td>
<td>80.61</td>
<td>18</td>
<td>22</td>
<td>237</td>
<td>217</td>
</tr>
<tr>
<td>Brent</td>
<td>74.94</td>
<td>80.03</td>
<td>5</td>
<td>5</td>
<td>67</td>
<td>58</td>
</tr>
<tr>
<td>Bromley</td>
<td>77.00</td>
<td>81.51</td>
<td>7</td>
<td>7</td>
<td>89</td>
<td>86</td>
</tr>
<tr>
<td>Camden</td>
<td>73.95</td>
<td>81.20</td>
<td>13</td>
<td>13</td>
<td>33</td>
<td>31</td>
</tr>
<tr>
<td>Croydon</td>
<td>76.08</td>
<td>80.35</td>
<td>10</td>
<td>11</td>
<td>187</td>
<td>181</td>
</tr>
<tr>
<td>Ealing</td>
<td>75.27</td>
<td>79.97</td>
<td>17</td>
<td>23</td>
<td>218</td>
<td>222</td>
</tr>
<tr>
<td>Enfield</td>
<td>75.67</td>
<td>81.21</td>
<td>14</td>
<td>6</td>
<td>180</td>
<td>84</td>
</tr>
<tr>
<td>Greenwich</td>
<td>73.76</td>
<td>79.04</td>
<td>24</td>
<td>30</td>
<td>299</td>
<td>296</td>
</tr>
<tr>
<td>Hackney</td>
<td>73.15</td>
<td>79.73</td>
<td>28</td>
<td>25</td>
<td>322</td>
<td>250</td>
</tr>
<tr>
<td>Hammersmith and Fulham</td>
<td>73.53</td>
<td>80.09</td>
<td>26</td>
<td>20</td>
<td>312</td>
<td>211</td>
</tr>
<tr>
<td>Haringey</td>
<td>74.59</td>
<td>80.59</td>
<td>20</td>
<td>14</td>
<td>257</td>
<td>156</td>
</tr>
<tr>
<td>Harrow</td>
<td>76.40</td>
<td>82.00</td>
<td>11</td>
<td>11</td>
<td>142</td>
<td>149</td>
</tr>
<tr>
<td>Havering</td>
<td>75.98</td>
<td>80.77</td>
<td>11</td>
<td>9</td>
<td>157</td>
<td>134</td>
</tr>
<tr>
<td>Hillingdon</td>
<td>76.17</td>
<td>80.66</td>
<td>16</td>
<td>17</td>
<td>211</td>
<td>189</td>
</tr>
<tr>
<td>Hounslow</td>
<td>75.34</td>
<td>80.29</td>
<td>12</td>
<td>17</td>
<td>211</td>
<td>189</td>
</tr>
<tr>
<td>Islington</td>
<td>73.86</td>
<td>80.05</td>
<td>23</td>
<td>21</td>
<td>292</td>
<td>215</td>
</tr>
<tr>
<td>Kensington and Chelsea</td>
<td>77.27</td>
<td>82.26</td>
<td>4</td>
<td>3</td>
<td>47</td>
<td>21</td>
</tr>
<tr>
<td>Kingston upon Thames</td>
<td>76.81</td>
<td>80.57</td>
<td>6</td>
<td>15</td>
<td>86</td>
<td>158</td>
</tr>
<tr>
<td>Lambeth</td>
<td>73.26</td>
<td>80.24</td>
<td>27</td>
<td>19</td>
<td>318</td>
<td>193</td>
</tr>
<tr>
<td>Lewisham</td>
<td>73.03</td>
<td>78.61</td>
<td>29</td>
<td>31</td>
<td>326</td>
<td>315</td>
</tr>
<tr>
<td>Merton</td>
<td>75.81</td>
<td>80.61</td>
<td>13</td>
<td>13</td>
<td>172</td>
<td>155</td>
</tr>
<tr>
<td>Newham</td>
<td>71.93</td>
<td>78.48</td>
<td>32</td>
<td>32</td>
<td>349</td>
<td>320</td>
</tr>
<tr>
<td>Redbridge</td>
<td>76.30</td>
<td>80.94</td>
<td>8</td>
<td>8</td>
<td>128</td>
<td>121</td>
</tr>
<tr>
<td>Richmond upon Thames</td>
<td>77.52</td>
<td>82.43</td>
<td>2</td>
<td>2</td>
<td>30</td>
<td>16</td>
</tr>
<tr>
<td>Southwark</td>
<td>73.58</td>
<td>79.12</td>
<td>15</td>
<td>18</td>
<td>187</td>
<td>190</td>
</tr>
<tr>
<td>Sutton</td>
<td>72.69</td>
<td>79.57</td>
<td>31</td>
<td>26</td>
<td>333</td>
<td>261</td>
</tr>
<tr>
<td>Tower Hamlets</td>
<td>74.25</td>
<td>79.51</td>
<td>21</td>
<td>27</td>
<td>275</td>
<td>266</td>
</tr>
<tr>
<td>Waltham Forest</td>
<td>74.69</td>
<td>79.77</td>
<td>19</td>
<td>24</td>
<td>251</td>
<td>245</td>
</tr>
<tr>
<td>Wandsworth</td>
<td>77.64</td>
<td>82.50</td>
<td>1</td>
<td>1</td>
<td>26</td>
<td>13</td>
</tr>
</tbody>
</table>

**Proposed SHA**

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Central</td>
<td>75.39</td>
<td>80.76</td>
</tr>
<tr>
<td>North East</td>
<td>74.04</td>
<td>79.77</td>
</tr>
<tr>
<td>North West</td>
<td>75.78</td>
<td>80.90</td>
</tr>
<tr>
<td>South East</td>
<td>74.55</td>
<td>79.93</td>
</tr>
<tr>
<td>South West</td>
<td>75.95</td>
<td>80.57</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td>75.12</td>
<td>80.37</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>75.20</td>
<td>80.10</td>
</tr>
</tbody>
</table>

Source: ONS 16
Eleven London boroughs were in the 20% of English local authorities with the lowest male life expectancy in 1997-99. These were:

- Barking and Dagenham
- Camden
- Greenwich
- Hackney
- Hammersmith and Fulham
- Islington
- Lambeth
- Lewisham
- Newham
- Southwark
- Tower Hamlets

Five London boroughs were in the 20% of English local authorities with the lowest female life expectancy in 1997-99. These were:

- Barking and Dagenham
- Greenwich
- Lewisham
- Newham
- Southwark

However, 4 London boroughs were in the 20% of English local authorities with the highest life expectancy for both males and females:

- Bromley
- Kensington and Chelsea
- Richmond-upon-Thames
- Westminster

In addition to this, Barnet was in the top 20% in terms of male life expectancy and Harrow was in the top 20% in terms of female life expectancy.

Maps 7 and 8 show the distribution of average life expectancy by London borough in 1997-99. This is the same information that is presented in Table 2. For males a band of boroughs in north east London had the lowest life expectancy, Tower Hamlets, Newham and Barking and Dagenham. The highest life expectancy was seen in Kensington and Chelsea, Westminster, Richmond-upon-Thames and Barnet. Generally boroughs in east inner London had the lowest life expectancy.

For females the picture is slightly different. Newham and Lewisham had the lowest life expectancy while the boroughs with the highest life expectancy were the same as for males: Kensington and Chelsea, Westminster and Richmond-upon-Thames.
Map 7  Male life expectancy in years, 1997-99

England = 75.2
London = 75.1

Map 8  Female life expectancy in years, 1997-99

England = 80.1
London = 80.4

Source: ONS
Figure 15 shows that at borough level within London, average life expectancy was closely related to the level of deprivation. Deprivation was measured here using the DETR index of multiple deprivation in the same way as in Figure 11. The higher the DETR deprivation score, the more deprived the borough. Boroughs which had high deprivation scores generally had lower life expectancies than areas which had low deprivation scores. A linear regression of the association between life expectancy and deprivation for each borough showed that deprivation could explain 74% of the variation in life expectancy for females, however, only 42% of the variation in male life expectancy by borough can be explained by the deprivation index. Therefore, there is a stronger association between life expectancy and deprivation for males than for females.
For both males and females average life expectancy is greater in the least deprived areas than more deprived areas.

The range of inequality in life expectancy was 4.6 years for males and 2.1 years for females. This is less than the range in life expectancy between boroughs, but greater than the range between regions for males.

Quintile 5 showed the greatest differences between males and females of 6.7 years, compared to 4.2 years in quintile 1.

For both males and females average life expectancy is greater in the least deprived areas than more deprived areas for males, but there was no clear pattern for females.

The range of inequality in life expectancy was 5 years for males and 1.9 years for females. This was greater than the range in life expectancy between boroughs in this area.

Quintile 5 showed the greatest differences between males and females of 7.7 years, compared to 3.1 years in quintile 1.

For both males and females average life expectancy is greater in the least deprived areas than more deprived areas.

The range of inequality in life expectancy was 5.1 years for males and 3.1 years for females. This is greater than the range in life expectancy between boroughs.

Quintile 5 shows the greatest differences between males and females of 6.7 years, compared to 4.2 years in quintile 2.
For both males and females, average life expectancy is greater in the least deprived areas than more deprived areas.

The range of inequality in life expectancy was 6 years for males and 4.6 years for females. This is greater than the range in life expectancy between boroughs.

Quintile 5 shows the greatest differences between males and females of 6.3 years, compared to 4.3 years in quintile 2.

Source: ONS and GLA population projections
Inequalities in life expectancy within London by other socio-economic characteristics

No useful conclusions can be drawn about ethnic differences in life expectancy as the only available data, by country of birth, is not meaningful. In addition, there is no available robust local data to enable us to calculate up-to-date estimates of life expectancy by social class for London. Analysis of data for England and Wales using the ONS Longitudinal Study showed that although life expectancy has increased for all social classes over the last couple of decades the difference in life expectancy between the social classes had risen. In 1972 the difference in male life expectancy between Social Classes I (professional occupations) and Social Class V (unskilled occupations) was 5.5 years. In 1996 it stood at 9.5 years. For women the corresponding figures are 5.3 years and 6.4 years respectively.

Trends in life expectancy

In following charts (Figure 17) London boroughs are grouped into proposed strategic health authorities, and for each borough the trend in life expectancy during the 1990s is presented along with the likely picture of inequality in 2010 if current trends are to continue. No other factors were taken into account, these are simple extrapolations of current trends.
Male life expectancy is increasing in all areas and if current trends continue will rise steadily in all areas until 2010.

The range of inequality in life expectancy will increase by 85% from 2 years to 3.7 years if current trends continue.

Female life expectancy is increasing in all areas and if current trends continue will rise steadily in all areas until 2010.

The range of inequality in life expectancy will increase by 127% from 1.1 years to 2.5 years if current trends continue.
Male life expectancy is increasing in all boroughs and if current trends continue will rise steadily in all boroughs until 2010.

Enfield is showing the slowest increase and if current trends continue will have the lowest life expectancy in the area by 2010.

The range of inequality in life expectancy will increase by 8% from 3.6 years to 3.9 years if current trends continue.

Female life expectancy is increasing in all boroughs except Barnet where life expectancy has reached a plateau. If current trends continue Barnet will have the lowest life expectancy in the area by 2010.

The range of inequality in life expectancy will increase by 383% from 1.2 years to 5.8 years if current trends continue.
Male life expectancy is generally increasing in all boroughs. Newham and Barking and Dagenham are showing the slowest increases.
The range of inequality in life expectancy will increase by 70% from 4.4 years to 7.5 years if current trends continue.

Female life expectancy is generally increasing in all boroughs. Hackney is showing the largest increase.
The range of inequality in life expectancy will increase by 138% from 2.4 years to 5.7 years if current trends continue.
North West London Proposed SHA – males

Male life expectancy is increasing in all boroughs.

Westminster and Kensington & Chelsea will experience the largest increase if current trends continue and male life expectancy will be equal to female life expectancy by 2010.

The range of inequality in life expectancy will increase by 229% from 4.1 years to 10.3 years if current trends continue.

North West London Proposed SHA – females

Female life expectancy is generally increasing in all boroughs.

Westminster and Kensington & Chelsea will experience the largest increase if current trends continue and Brent, Hillingdon and Ealing will experience the smallest increase.

The range of inequality in life expectancy will increase by 212% from 2.5 years to 7.8 years if current trends continue.
Male life expectancy is increasing in all boroughs and if current trends continue will rise steadily in all boroughs. Currently there is a north-south divide within this area as outer London boroughs had higher life expectancy than inner London boroughs.

Southwark and Lambeth will show the largest increases in life expectancy by 2010 if current trends continue. Lewisham will show the smallest increase.

The range of inequality in life expectancy will increase by 62% from 4 years to 6.5 years if current trends continue.

Not all boroughs have seen an increase in female life expectancy throughout the 1990s and if current trends continue Lewisham, Greenwich, Bromley and Bexley will not show an increase by 2010.

The range of inequality in life expectancy will increase by 145% from 2.9 years to 7.1 years if current trends continue.
Male life expectancy is increasing in all boroughs and if current trends continue will rise steadily in all boroughs until 2010.

If current trends continue, Wandsworth will move from having the lowest life expectancy in the area to the second highest behind Richmond in 2010. Sutton has experienced the slowest increase and will have the shortest life expectancy in the area if current trends continue.

The range of inequality in life expectancy will increase by 136% from 2.8 years to 6.6 years if current trends continue.

Not all boroughs have seen a steady increase in female life expectancy throughout the 1990s and if current trends continue Sutton will not show an increase and will have the shortest life expectancy in the area by 2010.

As for men, if current trends continue, Wandsworth will move from having the lowest life expectancy in the area to the second highest behind Richmond in 2010.

The range of inequality in life expectancy will increase by 104% from 2.6 years to 5.3 years if current trends continue.
Section 3 Discussion and interpretation of findings

Socio-economic inequalities

Within London and within each proposed strategic health authority, infant mortality in the manual group was greater than infant mortality in the ‘population as a whole’ although these differences were not statistically significant. The ‘population as a whole’ in this report excludes sole registered births and is referred to as the ‘inside marriage/couple registration’ group. The gap between the infant mortality rate in the manual group and the rate in the inside marriage/couple registration group is the same in London as in England and Wales. The national health inequalities target on infant mortality aims for a reduction in this gap.

However, infant mortality in the manual group is not the highest of any social group. In all proposed strategic health authorities and in London as a whole, infant mortality among sole registered births was higher than infant mortality in the manual group, the non-manual group and the inside marriage/couple registrations group. In London as a whole the infant mortality rate for sole registered births for 1993-98 was 9.5 deaths per 1000 live births compared to 6.1 in the manual group and 5.7 in the inside marriage/couple registration group. Thus, there were much larger differences between the rate for sole registered births and the inside marriage/couple registration rate than the difference between this group and the rate in the manual group. Within London, babies born with a low birthweight, those born to mothers under the age of 20 and those born to mothers who were themselves born outside England and Wales, particularly those born in the Caribbean, also had higher infant mortality than the inside marriage/couple registration group as whole. Variations in these characteristics by social class within London will affect the ability of London to contribute to the national inequalities target.

If the manual group had the same infant mortality rate as the inside marriage/couple registrations group, 14 infant deaths per year would be saved in London. However, a 10% reduction in the relative gap between the infant mortality rates in these two groups in only going to reduce the actual number of infant deaths per year by a very small amount. This could occur by chance or due to random variation. The monitoring of this target at proposed strategic health authority, London borough or primary care trust level is not feasible as the differences seen from year to year could be occurring randomly. Therefore, it is necessary to develop a ‘proxy’ indicator for infant mortality by social class, or to monitor infant mortality by some other characteristic. Low birthweight and effective action to increase it such as smoking prevention/cessation programmes, social support and early antenatal attendance, may provide a better means of focusing local monitoring and contributions to the infant mortality target.

In addition, mortality in infancy has been shown to be a large determinant of average life expectancy. As the achievement of the infant mortality target is likely to involve the reduction of only a few deaths, its impact on average life expectancy will be minimal.

No useful conclusions can be drawn about ethnic differences in life expectancy as the only available data, by country of birth, is not meaningful. To calculate life expectancy by ethnic group, the recording of ethnicity on death certificates is needed and this requires legislation.
In addition, there is no available robust local data to enable us to calculate up-to-date estimates of life expectancy by social class for London.

**Geographical inequalities**

London as a whole had very similar life expectancy to England as a whole. However, within London there were wide inequalities. At borough level, variations in life expectancy between areas have been shown to be closely related to the level of deprivation in the area. This is the cumulative effect of many different factors that influence the level of deprivation in an area, for example, poor housing, unemployment and education.

The life expectancy figures presented in this report are not an estimate of how long people are expected to live. Like other measures of mortality, such as the Standardised Mortality Ratio (SMR) they are a summary measure of overall mortality for that period in time. The advantage over other measures of mortality is that life expectancy is easier to understand and is easily comparable between areas. More information on this is provided in the technical supplement to this report ‘Calculating life expectancy and infant mortality rates’ and the report titled ‘What do the health inequalities targets mean for London’.

Wide inequalities in infant mortality by borough have also been presented. Infant mortality at borough level was found, statistically, to be less related to the average level of deprivation in the borough than life expectancy. Part of the reason for this is that the small number of infant deaths every year introduces random variation. However, we also know that the prevalence of other known risk factors such as birthweight and mothers age at birth varies between London boroughs.

Variation in known risk factors for infant mortality are significant issues to bear in mind in plans to level up and reduce inequalities in London. There is scope for further work in London on how infant mortality by these different risk factors in London might be analysed and integrated into local action plans. Another important risk factor is smoking in pregnancy and type of infant feeding, with breastfeeding reducing the risk of death. London’s maternity units collect data on smoking in pregnancy and feeding type. There is scope for further work exploring these data.

It should be noted that whilst many boroughs were showing the ‘worst’ health on both national targets, there are important differences in the inequality maps presented for the two targets. The differences appear to be greater in outer London where many boroughs were showing high levels of infant mortality, but average or good life expectancy or visa versa in the case of Barking and Dagenham. Local action will need to reflect these differences.

Within each proposed strategic health authority, analysis by electoral wards grouped into ‘deprivation quintiles’ showed that there were areas within all boroughs, health authorities and primary care trusts that had equivalent or shorter life expectancy than the average bottom 20 per cent of health authorities. Similar variations were seen in infant mortality. Therefore, local action to reduce inequalities should be aimed at deprived areas and individuals in all boroughs, health authorities and primary care trusts and not just those health authorities in the bottom 20 per cent. In addition research has shown that the higher mortality risk in those living in deprived areas is in some way accounted for by the concentration of deprived individuals in deprived areas with some residual risk of the area itself. In addition similarly
disadvantaged individuals have a high mortality risk wherever they live\textsuperscript{20}. Therefore, policy to reduce health inequalities in life expectancy should be aimed at both deprived individuals and deprived areas.

\textbf{Gender inequalities}

The relationship between deprivation and life expectancy is stronger for male life expectancy than female life expectancy. Although female life expectancy is greater than male life expectancy in every borough, the difference between the sexes is most marked in areas of high deprivation. For example, Tower Hamlets, Newham and Hackney were the most deprived areas in London and had an excess female life expectancy of 6.9, 6.5 and 6.6 years respectively. Richmond and Kingston were the least deprived areas in London and had an excess female life expectancy of 4.9 and 3.8 years respectively. Similar results had also been found in previous studies\textsuperscript{21}. This previous study speculated that possible reasons for this might be, relatively higher migration of men in poor health to more deprived areas, excess mortality from accidents and suicide among men in deprived areas and that deprivation might be more strongly associated with health risk behaviour in men than women.

Measuring deprivation at ward level also shows that male life expectancy is more closely related to deprivation than female life expectancy in London. This has been shown in other studies for other measures of mortality and for most causes of death. However, when looking at coronary heart disease and accidents female mortality seemed to be more closely associated with deprivation than male mortality\textsuperscript{22}.

\textbf{Contribution of causes of death to inequalities}

Mortality and therefore health determine average life expectancy at all ages and so the range of influences on life expectancy is vast. Coronary heart disease, cancers, stroke, accidents and suicide are the biggest killers in London making up over 50\% of all deaths. Targets to reduce overall mortality from these causes have been expressed in \textit{Saving Lives: Our Healthier Nation}\textsuperscript{3}, the \textit{NHS Plan}\textsuperscript{4}, the Coronary Heart Disease National Service Framework (NSF)\textsuperscript{23}, the Cancer Plan\textsuperscript{24}, and the Mental Health NSF\textsuperscript{25}. A targeted reduction of mortality from these causes in the most deprived areas and groups of the population will also help to achieve the inequalities targets explained in this document. Plans to reduce accident and injury, an important cause of inequality in life expectancy, not yet the subject of a NSF, will also be needed. Further work could be completed on the impact of different causes of death on average life expectancy in London and the relationship of these causes of death to the level of deprivation in the area.

Smoking reduction is an intervention common to many of these causes of death. It has been shown that men who never smoke have a 78\% chance of reaching age 73 whereas those who start smoking by age 20 and never stop have a 42\% chance of reaching age 73\textsuperscript{26}. Smoking prevalence has been shown to be highest among the manual social groups and among those living in the most deprived areas\textsuperscript{27}. This is reflected in higher smoking prevalence in inner versus outer London\textsuperscript{28}. However, the lack of regular smoking prevalence data representative of local populations but comparable to national data is a serious omission.
Trends in inequalities

Inequalities in life expectancy by London boroughs have been increasing throughout the 1990s and therefore, if these current trends continue, by 2010 inequalities in life expectancy will be even greater than they are today. We have used the same assumptions in our analysis of trends in London as were used in the analysis of national data. Many of the boroughs with the longest average life expectancy in 1997-99 (Kensington and Chelsea, Westminster and Richmond) have shown the largest increases during the 1990s and many of the boroughs with the shortest average life expectancy in 1997-99 (Newham, Lewisham and Barking and Dagenham) have shown the smallest increases during the 1990s. To reduce inequalities in life expectancy within London relatively larger improvements need to happen in the boroughs that are worst off.

From the data available it is not possible to determine the contribution of migration to the trends in life expectancy by London borough presented. It is likely that the boroughs that have seen the largest increases in life expectancy have also experienced an influx of ‘healthy’ people. The extrapolations of recent trends that we show here do not take migration into consideration. Large movements of people between areas will have an impact on the trends in life expectancy experienced by the boroughs.

For London as a whole, the gap between the infant mortality rates in the manual and the inside marriage/couple registration groups is increasing and therefore if current trends continue, this gap, the number of excess deaths in the manual group and the extent of inequality is likely to increase not decrease. Therefore the target is challenging.

Infant mortality rates among sole registered births have been decreasing faster than infant mortality rates in the inside marriage/couple registration group. This has also been shown nationally. In England and Wales as a whole, most of the decline in the mortality rate of the sole registered births was seen in the neonatal period (the first month of the babies life). The health of babies in this period is sensitive to the quality of health care given and therefore it seems possible that improvements in health care have contributed to the decline. However, the sole registered births still experience higher mortality than the inside marriage/couple registrations so there is a need for further work to examine the reasons for this and to look at deaths in the first month of life separately.

Potential areas for further work

This report completes the first phase of our work mapping the health inequalities targets for London. It highlights a number of potential areas for further work:

- An analysis of the infant mortality target using the new Government social classification that will replace Social Class, the National Statistics socio-economic classification.
- A more detailed analysis of sole registered births, in particular to try to allocate a social class to these births.
- An analysis of the contribution of different causes of death to patterns and trends in life expectancy, to help target more effective action in deprived populations.
A review of the available data on the determinants of life expectancy and infant mortality by ethnic group, such as birthweight, smoking in pregnancy and adulthood, late antenatal booking and breastfeeding in London, to support more effective action in diverse populations at borough or primary care trust level.

We will consult on these and other suggestions to inform phase two of our work. It will be particularly important to be able to provide data that is useful at borough or primary care trust level and data that can help monitor ethnic differences and time trends across London.

References

Available from http://www.statistics.gov.uk/OnlineProducts/default.asp#health
19 The London Health Observatory. What do the health inequalities targets mean for London.
Available from http://www.lho.org.uk
Available from http://www.statistics.gov.uk/OnlineProducts/default.asp#health
Available from http://www.doh.gov.uk/dfc/mentalhealth.htm
Appendix I

LHO Virtual Advisory Group Members

Dr. Martin Bardsley, Consultant, Health of Londoners Programme/LHO
Ms. Liza Cragg, London Health Commission Co-ordinator
Dr. John Fox, Director of Statistics, Department of Health
Mr. John Hamm, Head of Public Health Intelligence and Evaluation Unit, Kensington, Chelsea and Westminster Health Authority
Mr. George Leahy, Public Health Lead, Tower Hamlets Primary Care Trust
Mr. Rob Lewis, Head of Data Management and Analysis Group, Greater London Authority
Dr. Hugh Markowe, Director, Central Health Monitoring Unit, Department of Health
Mr. Paul Plant, Health Inequalities Lead, London Regional Office
Dr. John Wilkinson, Director, Northern and Yorkshire Public Health Observatory
Appendix II
London boroughs and proposed strategic health authorities