Mortality Monitoring Bulletin

(Infant mortality, inequalities)

Update to include data for 2009

Published 8 December 2010

Key findings:

- In 2007-09 the infant mortality rate in England and Wales (based on infant deaths successfully linked to their birth records) was 4.5 deaths per 1,000 live births - the lowest three-year average infant mortality rate ever recorded for England and Wales.
- In 2007-09, infant mortality rates were higher than average for babies with fathers in routine and manual occupations (at 5.0 deaths per 1,000 live births), and for births registered by the mother alone (at 6.2 deaths per 1,000 live births).
- Rates were lowest for babies with fathers in managerial and professional occupations (3.2 deaths per 1,000 live births).
- Over recent years infant mortality rates have fallen across socio-economic groups, with larger falls in the Routine and Manual group, resulting in a narrowing of the social gradient. Between 2002-04 and 2007-09, rates fell by 16% in the Routine and Manual group, compared with 6% in the Managerial and Professional group.
- The absolute gap in infant mortality rates between the Routine and Manual group and the average for all births with socio-economic group assigned has narrowed since 2002-04. The relative gap also narrowed over the same period.

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Introduction

This statistical release presents data on infant mortality rates for England and Wales by socio-economic group, based on the National Statistics Socio-Economic Classification (NS-SEC). It updates previously published figures to include the most recent three year time period (2007-09) for which data are available. Trend data are shown starting from 2002-04 (the first period following the introduction of NS-SEC in 2001*), alongside the overall change since the start of this period.

This document follows the release by the Office for National Statistics (ONS) of infant mortality data by social and biological factors for the single year 2009 (these figures are provisional)[1].

Changes to this bulletin

This document updates the data reported in 2009, in the following bulletin:

- 'Mortality Target Monitoring (Infant mortality, inequalities), Update to include data for 2008.'[2]

The information presented in 2009 related to a target that was part of the previous administration's Public Service Agreements (PSA) framework for the 2007 Comprehensive Spending Review. The new government abolished the PSA system and has replaced this with a new Public Services Transparency Framework as part of the 2010 Spending Review. This will come into effect in April 2011. Future monitoring arrangements will also reflect consultations on outcomes frameworks related to the NHS White Paper[3] and the Public Health White Paper[4]. In the interim, this document updates the information presented in the bulletin in 2009.

Interim changes to this document include:

1. Removal from the main body of the bulletin (tables, charts, commentary) of any references to targets.
2. Change of the baseline that progress has been reported against. Trends are assessed from 2002-04 (the first period following the introduction of NS-SEC in 2001*), rather than referring to the 1997-99 target baseline as in our previous bulletins.
3. Inclusion of a specific annex (Annex B) that summarises progress against the former PSA target.

* Data for 2001 are also available for some, but not all, the NS-SEC groups presented in this document (see, for example, data presented in previous editions of this bulletin).

Infant mortality

The tables and charts below show recent trends in infant mortality rates in England and Wales by socio-economic group based on father's occupational status, using the three class version of the National Statistics Socio-Economic Classification (NS-SEC). Infant mortality rates are also shown for sole registered births (i.e. births registered by the mother alone), for which NS-SEC cannot be assigned. Figures are shown for rolling three-year periods from 2002-04 (the first period following the introduction of NS-SEC in 2001*) to the most recent period for which data are available.

All figures in this bulletin are based on infant deaths that have been successfully linked to their corresponding birth records (covering 98 per cent of infant deaths in 2007-09). Figures for 2007-09 are provisional.

Overall infant mortality

In 2007-09 there were 9,537 *linked* infant deaths in England and Wales, corresponding to a rate of 4.5 deaths per 1,000 live births. This is the lowest three-year average infant mortality rate ever recorded for England and Wales.

For births registered jointly by both parents (i.e. excluding sole registered births, for which NS-SEC cannot be assigned), there were 8,698 infant deaths in 2007-09. The corresponding infant mortality rate was 4.4 deaths per 1,000 live births, a decrease of 11% since 2002-04.

By NS-SEC

There is a social gradient in infant mortality by NS-SEC (three class version), with the lowest rates occurring among babies with fathers in managerial and professional occupations. In 2007-09, the rate for the Routine and Manual group was 5.0 deaths per 1,000 live births, compared with 3.2 deaths per 1,000 live births for the Managerial and Professional group.

Infant mortality rates are highest for the 'Other' group (6.8 deaths per 1,000 live births in 2007-09). This covers babies with fathers who have never worked, are long term unemployed or students, or whose occupational details could not be classified. Rates may vary between these different sub-groups, so figures for the 'Other' group should be interpreted with caution.

Infant mortality rates for all NS-SEC groups have fallen since 2002-04, with the largest falls in the Routine and Manual and Other groups, resulting in a narrowing of the social gradient. Between 2002-04 and 2007-09, rates fell by 28% in the Other group (with the largest falls in the most recent two time periods) and 16% in the Routine and Manual group, compared with 6% in the Managerial and Professional group.

Routine and Manual group vs average for all groups

Table 2 illustrates inequalities in infant mortality by comparing the rate for the Routine and Manual group with the average for all groups with NS-SEC

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* Data for 2001 are also available for some, but not all, the NS-SEC groups presented in this document (see, for example, data presented in previous editions of this bulletin).

assigned. The average for all births registered jointly by both parents is used as the relevant comparator here, because NS-SEC cannot be assigned for sole registered births.

The absolute gap – i.e. difference - in infant mortality rates between the Routine and Manual group and the average for all groups with NS-SEC assigned narrowed between 2002-04 and 2007-09. The relative gap – i.e. percentage difference – between the Routine and Manual group and the average for all groups with NS-SEC assigned also narrowed over the same period.

Figures for earlier years using an approximation to NS-SEC categories available for use with data prior to 2001 (not shown in Table 2) show that the relative gap had been widening for several years prior to 2002-04, from 12% in 1996-98 to 19% in 2001-03. For further details of earlier trends, see Annex B and the previous bulletin published in 2009[2].

Sole registrations

The infant mortality rate for sole registered births is higher than the rate for births registered jointly by both parents, and is also higher than the rate for the Routine and Manual group. Between 2004-06 and 2006-08 the three year average rate for sole registered births remained stable at around 6.6 deaths per 1,000 live births. In 2007-09 the rate for sole registered births fell to 6.2 deaths per 1,000 live births, 8% lower than the rate in 2002-04.

Measure

Infant deaths per 1,000 live births. Infant mortality rates are based on deaths occurring in each calendar year that have been successfully linked to their corresponding birth records. NS-SEC is assigned based on father's occupation (and so cannot be assigned for births registered by the mother alone). Figures are three year average rates.

Inequality measures

Absolute and relative gaps in infant mortality rates between the Routine and Manual group and the average for all groups (based on babies registered jointly by both parents).

Both the absolute and relative gaps are important measures of inequality, and should be used in combination to understand the extent of the inequalities. Data are presented for both measures in the table, and the absolute gap is illustrated in the chart.

For further details, including the interpretation of absolute and relative gaps, see Technical Notes (Annex A).

Frequency of Data

Annual. Monitoring data are three-year averages, produced by pooling infant deaths and live births across each three-year period.

Most Recent Data

For period 2007-09 (calendar years). The latest figures are provisional.

Data Source

Office for National Statistics (ONS). Figures for single years between 2002 and 2008 are taken from annual child mortality statistics volumes[5]. These may differ slightly from the provisional figures quoted in previous years' bulletins. Provisional 2009 figures are taken from the latest report on Infant and perinatal mortality in England and Wales by social and biological factors[1].

Table 1: Infant mortality[a] by National Statistics Socio-Economic Classification (NS-SEC)[b] and type of registration[c], England and Wales

Measure	Time period	Inside marriage / outside marriage joint registration					Sole registrations	All[f]
		Managerial and professional	Intermediate	Routine and manual	Other[g]	All[e]		
Infant deaths	2007-09P	2,318	1,583	3,650	820	8,698	839	9,537
Live births[d]	2007-09P	728,360	386,020	735,330	121,210	1,970,034	134,906	2,104,940
Infant deaths per 1,000 live births[d]	2002-04	3.4	4.7	5.9	9.4	5.0	6.7	5.1
	2003-05	3.4	4.4	5.7	8.8	4.9	6.9	5.0
	2004-06	3.3	4.5	5.6	8.7	4.8	6.6	4.9
	2005-07	3.3	4.3	5.4	8.7	4.7	6.6	4.8
	2006-08	3.2	4.2	5.3	7.8	4.5	6.5	4.7
	2007-09P	3.2	4.1	5.0	6.8	4.4	6.2	4.5
Change in rate since 2002-04		*-0.2*	*-0.6*	*-0.9*	*-2.6*	*-0.6*	*-0.5*	*-0.6*
Percentage change in rate since 2002-04		*-6%*	*-12%*	*-16%*	*-28%*	*-11%*	*-8%*	*-11%*

Note: Change figures are calculated based on unrounded mortality rates.
2007-09 data are provisional. Earlier periods reflect the latest final figures, and so may differ slightly from data reported previously.
a. Based on infant deaths successfully linked to their birth records.
b. NS-SEC based on father's occupation at death registration.
c. Information on father's occupation is not collected for births outside marriage if the father does not attend the registration of the baby's birth.
d. Figures for live births in NS-SEC groups (i.e. not including figures for All and Sole registrations) are based on a 10 per cent sample coded for father's occupation.
e. Based on births inside marriage or outside marriage registered jointly by both parents, including cases where father's occupation was not stated.
f. Based on all births, including cases where father's occupation was not stated.
g. Students; occupations inadequately described; occupations not classifiable for other reasons; never worked and long-term unemployed.
Source: ONS

Table 2: Infant mortality[a] – Routine and Manual group[b] compared with average for All groups (inside marriage / joint registrations)[c]

	Infant deaths per 1,000 live births[d]			
Time period	Routine and manual	All (inside marriage / joint registrations)	Absolute gap[e]	Relative gap[f]
2002-04	5.9	5.0	0.9	18%
2003-05	5.7	4.9	0.8	17%
2004-06	5.6	4.8	0.8	16%
2005-07	5.4	4.7	0.7	16%
2006-08	5.3	4.5	0.7	16%
2007-09P	5.0	4.4	0.5	12%
Change since 2002-04	*-0.9*	*-0.6*	*-0.4*	*-6*[g]
Percentage change since 2002-04	*-16%*	*-11%*	*-39%*	*-31%*

Note: Gap and change figures are calculated based on unrounded mortality rates.
2007-09 data are provisional. Earlier periods reflect the latest final figures, and so may differ slightly from data reported previously.
a. Based on infant deaths successfully linked to their birth records.
b. NS-SEC based on father's occupation at death registration.
c. Based on births inside marriage or outside marriage registered jointly by both parents, including cases where father's occupation was not stated. Information on father's occupation is not collected for births outside marriage if the father does not attend the registration of the baby's birth.
d. Figures for live births in Routine and Manual group are based on a 10 per cent sample coded for father's occupation.
e. Difference in rates between All and Routine and Manual group.
f. Difference in rates between All and Routine and Manual group as a percentage of the All rate.
g. Percentage point difference.
Source: ONS

Chart 1: Infant mortality by National Statistics Socio-Economic Classification (NS-SEC) (inside marriage / joint registration) and for sole registrations

Three year average infant mortality rates in England and Wales, 2002-2009

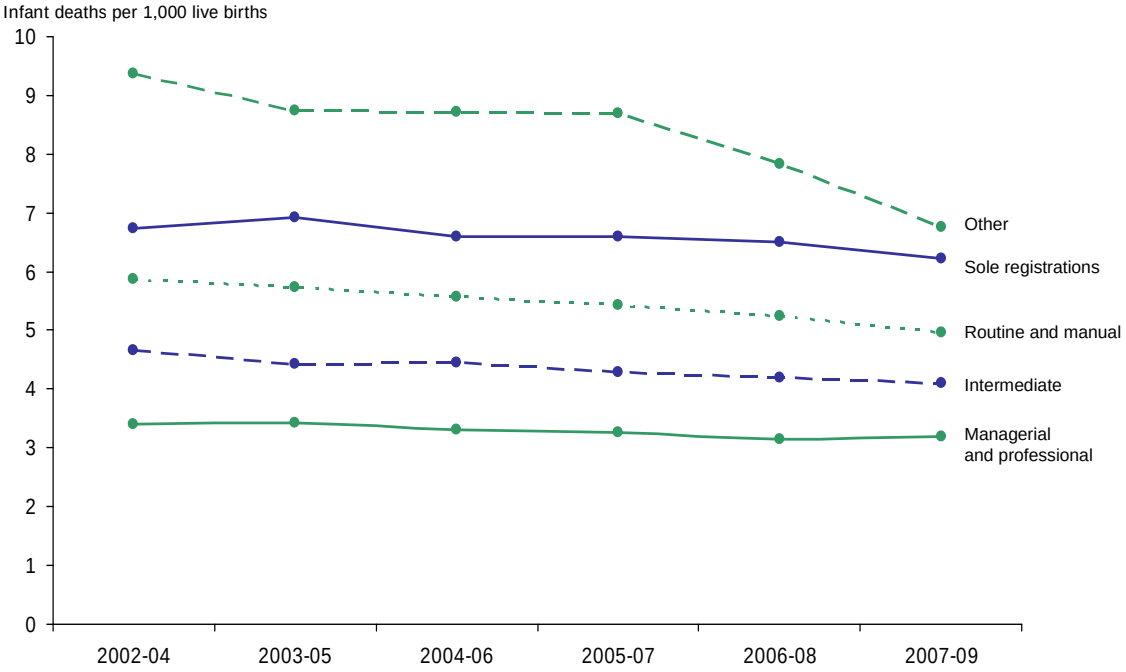
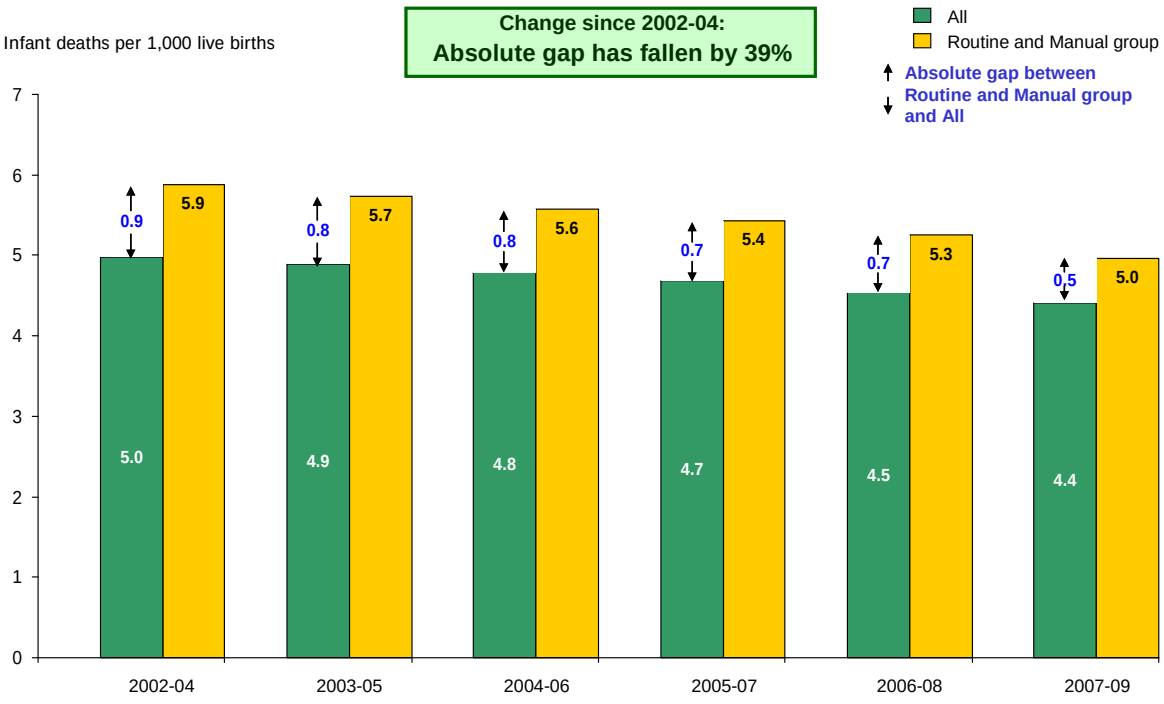


Chart 2: Infant mortality – Routine and Manual group and All groups (inside marriage / joint registration)

Three year average infant mortality rates in England and Wales, 2002-2009



See notes for Tables 1 and 2.
Source: ONS

Annex A: Technical Notes

These technical notes cover the following topics:

- Monitoring methodology
- Infant deaths and live births
- National Statistics Socio-Economic Classification (NS-SEC)
- Explanation of absolute and relative inequality gaps

Monitoring methodology

This statistical bulletin shows time-series for infant mortality rates by socio-economic group. The information presented has been derived from statistical products produced outside the Department of Health by the Office for National Statistics (ONS).

ONS publish data on infant mortality in England and Wales by social and biological factors, including NS-SEC and type of registration, on an annual basis. Figures for single years between 2002 and 2008 are taken from annual child mortality statistics volumes[5]. Provisional 2009 figures are taken from the latest report on Infant and perinatal mortality in England and Wales by social and biological factors[1].

In this bulletin, three-year rolling averages are used for monitoring purposes in preference to single year figures. This is in order to produce a smoothed trend from the data and to ensure the underlying trend is captured rather than year-on-year fluctuations.

Infant deaths and live births

The figures in this report are based on infant deaths and live births occurring in England and Wales in each calendar year. Infant deaths are deaths at ages under one year.

The figures in this report are based on infant deaths that have been linked to their birth records, so the overall infant mortality rate presented in this bulletin may differ slightly from figures quoted elsewhere based on all infant deaths. In 2007-09 the linked infant deaths covered 98 per cent of all infant deaths (a comparable linkage rate to previous time periods). The linkage enables analysis of infant deaths by birth registration status (i.e. whether the birth was registered jointly by both parents or was registered by the mother alone) - this is important for the analysis by NS-SEC category presented in this report because NS-SEC cannot be assigned for births registered by the mother alone, as explained below.

NS-SEC category is assigned based on the father's occupation and employment status. This information is collected at birth registration for babies born within marriage or outside marriage when registered jointly by both parents. Thus, NS-SEC based on father's occupation cannot be assigned for babies born outside marriage but registered by the mother alone. Father's occupation is also collected, where available, at death registration for infant deaths. Infant mortality rates are calculated using live births as a denominator. As father's NS-SEC is only available for the birth registration types named

above, infant mortality rates by NS-SEC can only be calculated for babies born within marriage or outside marriage registered jointly by both parents.

Information on occupation of the father is coded for all infant deaths, but only for a 10% sample of live births. Thus, figures for live births in NS-SEC groups used in this bulletin (i.e. Managerial and Professional, Intermediate, Routine and Manual, and Other) are based on a 10 per cent sample of live births.

National Statistics Socio-Economic Classification (NS-SEC)

The National Statistics Socio-Economic Classification (NS-SEC) was introduced in 2001 to replace the Registrar General's Social Classification (RGSC), the previous official classification of socio-economic group. Both the NS-SEC and RGSC are based on occupation and employment status (and for some occupations, number of employees in the workplace), but the NS-SEC was developed to reflect more accurately the socio-economic structure of 21st century societies and the major shift in the UK economy from manufacturing to service industries.

For data prior to 2001, ONS have provided a method for deriving an approximation to the NS-SEC categories, called NS-SEC 90. This method does not produce an exact match between NS-SEC 90 and NS-SEC, so time trends comparing data using the approximation to NS-SEC should be interpreted with caution.

ONS publish figures on infant mortality by NS-SEC using the eight class version set out below.

NS-SEC eight analytic class version, with examples:

1 Higher managerial and professional occupations
Directors and chief executives of major organisation, civil engineers, medical practitioners, IT strategy and planning professionals, legal professionals, architects, senior officials in national and local government
2 Lower managerial and professional occupations
Teachers in primary and secondary schools, quantity surveyors, public service administrative professionals, social workers, nurses, IT technicians
3 Intermediate occupations
Graphics designers, medical and dental technicians, Civil Service administrative officers and local government clerical officers, counter clerks, school and company secretaries
4 Small employers and own account workers
Hairdressing and beauty salon proprietors, shopkeepers, dispensing opticians in private practice, farmers, self-employed decorators
5 Lower supervisory and technical occupations
Bakers and flour confectioners, catering supervisor, head waitress, postal supervisor, sales assistant supervising others
6 Semi-routine occupations
Retail assistants, catering assistants, clothing cutters, dressmaker, traffic wardens, veterinary nurses and assistants, shelf fillers
7 Routine occupations
Hairdressing employees, floral arrangers, sewing machinists, bar staff, cleaners and domestics
Other
Full-time students, never worked, long-term unemployed, inadequately described, not classifiable for other reasons
Source: NS-SEC User Manual, Office for National Statistics, 2001

In this bulletin, data are aggregated into the three class version as follows:

NS-SEC 3 class version	NS-SEC 8 class version
Managerial and professional occupations	Higher managerial and professional occupations Lower managerial and professional occupations
Intermediate occupations	Intermediate occupations Small employers and own account workers
Routine and manual occupations	Lower supervisory and technical occupations Semi-routine occupations Routine occupations
Other	Other

Further details are available from the NS-SEC guidance section of the National Statistics website.[6]

Explanation of absolute and relative inequality gaps

For monitoring of inequalities, both the *absolute* gap and the *relative* gap between the Routine and Manual group and the average for All groups (inside marriage / joint registrations) are shown. The absolute gap is the numerical *difference* between the infant mortality rates for the Routine and Manual group and All groups. The relative gap is the *percentage difference* between the infant mortality rates for the Routine and Manual group and All groups (i.e. the difference in infant mortality rates as a percentage of the All group infant mortality rate).

Both the absolute and relative gaps are important measures of inequality, and should be used in combination to understand the extent of the inequalities. The absolute gap measures the impact of unequal health experience in absolute terms, eg how many more infant deaths (per 1,000 live births) occur in a disadvantaged group than average. The relative gap measures how unequal the health experience between groups is, i.e. how much more likely someone from a disadvantaged group is to experience poor health than average.

It is important to consider both absolute and relative measures and to interpret these carefully when assessing the extent of inequality. For example, a large social class gradient in a rare cause of death may be less important in public health terms than a smaller social class gradient in a common cause of death (for which absolute differences between social classes, and so the overall impact of the inequalities, are higher).

It is also important to assess trends in both absolute and relative measures of inequality when interpreting changes over time. For example, where indicator values are decreasing for the All group average (as is the case for infant mortality rates), it is possible for a narrowing in the absolute gap with the Routine and Manual group to be accompanied by a static or increasing relative gap. (If indicator values were increasing for the All group average, it would be possible for a narrowing in the relative gap to be accompanied by a static or increasing absolute gap).

In this bulletin both the absolute and relative gaps have been calculated and presented in Table 2. The absolute gap is additionally shown in Chart 2.

Annex B: The Previous Administration's Public Service Agreement Framework

The data presented in this document relate to a target that was part of Public Service Agreements (PSAs) published by the previous administration. The new government abolished the PSA system and has replaced this with a new Public Services Transparency Framework as part of the 2010 Spending Review. This will come into effect in April 2011. Future monitoring arrangements will also reflect consultations on outcomes frameworks related to the NHS White Paper[3] and the Public Health White Paper[4]. In the interim, this document updates the data published in previous years.

The main sections of this statistical bulletin present data and commentary on trends since 2002-04 (the first period following the introduction of the National Statistics Socio-Economic Classification (NS-SEC) in 2001*). The table below provides a summary of the latest position compared with the baseline period (1997-99) for the associated former target. Figures for 1997-99 are based on an approximation to NS-SEC categories (called NS-SEC 90) available for use with data prior to 2001.

The former PSA target on inequalities in infant mortality was as follows (note that the target date of 2010 was to be assessed using 2009-11 data):

- To reduce the relative gap in infant mortality between the Routine and Manual group and the population as a whole (England and Wales), by at least 10% by 2010 (from a 1997-99 baseline).

Table B1: Commentary on former PSA target

Former PSA indicator/ associated target	Baseline (1997-99)	Latest figures (2007-09)	Description of change
To reduce the relative gap in infant mortality between the Routine and Manual group and the population as a whole (England and Wales), by at least 10% by 2010	13%	12%	The relative gap in infant mortality between the Routine and Manual group and the population as a whole increased between 1997-99 and 2001-03, to a peak of 19%. Since then the gap has narrowed, and is currently 1 percentage point, or 4% lower than at baseline.

Note: Gap and change in gap figures are based on unrounded mortality rates.

For further details of the indicator definition, see commentary in the main section of the bulletin. For further information about the use of absolute and relative gaps, please refer to the Technical Notes (Annex A).

* Data for 2001 are also available for some, but not all, the NS-SEC groups presented in this document (see, for example, data presented in previous editions of this bulletin).

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4. *Healthy lives, healthy people: our strategy for public health in England*, Department of Health (Nov 2010): http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_121941

5. *Mortality Statistics: Childhood, infant and perinatal (Series DH3)* annual volumes (up to 2007) and *Child mortality Statistics 2008*, ONS: http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=15362

6. The National Statistics Socio-Economic Classification (NS-SEC) pages of the ONS website: http://www.ons.gov.uk/about-statistics/classifications/current/ns-sec/index.html