Office for National Statistics

Statistical bulletin

Unexplained deaths in infancy, England and Wales: 2013

Annual data on sudden infant deaths in England and Wales and infant deaths for which the cause remained unascertained after a full investigation, with associated risk factors.

Contact:
Alex Lloyd
alex.lloyd@ons.gsi.gov.uk
+44 (0)1633 455879

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1 . Main points

- 249 unexplained infant deaths occurred in England and Wales in 2013, a rate of 0.36 deaths per 1,000 live births. This is the first rise in unexplained infant deaths since 2008. Before 2013, the rate had fallen steadily from 0.41 in 2008 to 0.32 in 2012
- Almost two thirds (65%) of these deaths were recorded as sudden infant deaths, and 35% were recorded as unascertained (where no other cause of death is recorded)
- Unexplained infant deaths accounted for 9% of all infant deaths occurring in 2013
- Just over half (55%) of all unexplained infant deaths were boys in 2013 (138 deaths) compared with 64% in 2012 (150 deaths)
- The largest monthly rise in unexplained infant deaths was in February 2013. This coincided with a colder than average mean monthly temperature
- The rate of infant deaths rose from 0.92 to 1.27 for mothers aged under 20. Although numbers are very small, this was four times greater than the combined categories of babies born to mothers aged 20 and over (0.32)

2 . Background

This report on unexplained infant deaths (deaths under one year of age) includes both sudden infant deaths, often called “cot deaths”, and deaths for which the cause remained unascertained after a full investigation. Sudden infant death, which was first recognised in the early 1960s, is defined as “the sudden unexpected death of any infant or young child which is unexpected by history and in which a thorough post-mortem examination fails to demonstrate an adequate cause of death” (Beckwith, 1970). “Unascertained” is used by pathologists when the death does not fulfil the criteria used for sudden infant deaths and there is still doubt about its cause. However, there is evidence to suggest that these terms are used interchangeably by coroners (Limerick and Bacon, 2004) and research has shown that the characteristics of babies dying of these 2 causes are very similar (Corbin, 2005). Based on this, it is appropriate to include both groups in any analysis of unexplained infant deaths.

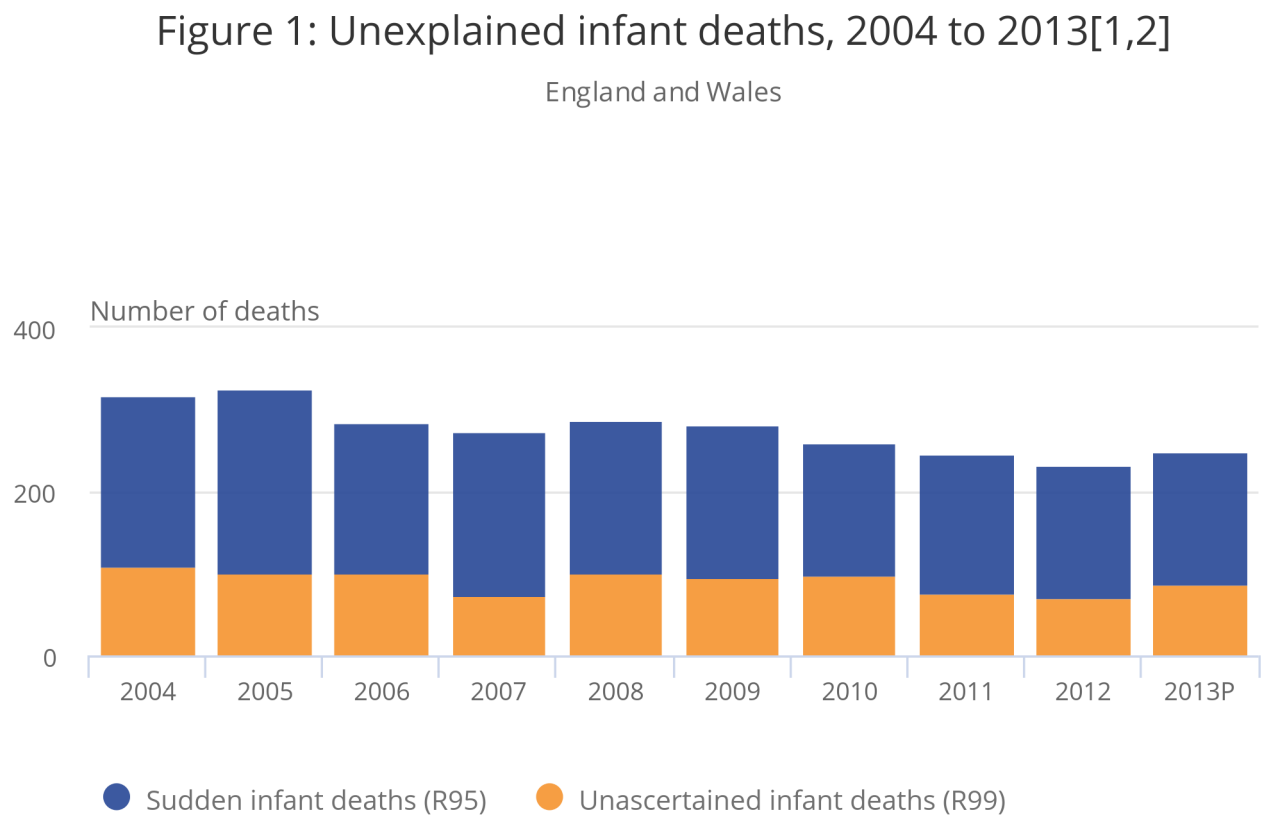
We have kept a database of unexplained infant deaths, using the above definition, since 2004. The figures show deaths occurring, rather than registered, in each calendar year. However, we are only notified of a death when it is registered. Unexplained deaths are nearly always certified by coroners, which can mean that there is a delay between when the death occurs and when it is registered. In 2013, the median registration delay for an unexplained infant death was 171 days. Because of these late registrations, figures for 2013 are provisional and will be revised in next year’s bulletin. The provisional number of deaths in 2012 of 221 was revised upward by 13 to 234.

3 . Main risk factors

Risk factors for unexplained infant death include the baby’s sex, birthweight, maternal age, parents’ marital status and socio-economic classification. These factors are looked at here and supporting data are included in the reference tables (available as a download to accompany this release). Other risk factors include sleeping position, sleep environments including unplanned bed-sharing and sleeping with a baby on a sofa, not breastfeeding, temperature and exposure to tobacco smoke (Ostfeld et al, 2010).

Figure 1: Unexplained infant deaths, 2004 to 2013[1,2]

England and Wales



Source: Office for National Statistics

Notes:

1. Data for 2013 are provisional
2. Based on deaths occurring in each calendar year

2013 was the first year since 2008 where unexplained infant deaths increased. The number of deaths increased from 234 (a rate of 0.32 per 1,000 live births) to 249 (a rate of 0.36). The 2013 figures are provisional and are likely to increase in the next publication. This is because all unexplained deaths must be investigated, which often result in death registration being delayed. Almost two thirds (65%) of these deaths were recorded as sudden infant deaths and 35% were recorded as unascertained. The sudden infant death rate and the unascertained infant death rate were 0.23 and 0.12 deaths per 1,000 live births respectively. In 2013, unexplained infant deaths accounted for 9% of all infant deaths, compared with 8% in 2012.

Figures for 2012 have been revised to include any late registrations. These final figures show that there were 234 unexplained infant deaths in 2012, an increase of 13 deaths compared with the provisional figure. The rate also increased from 0.30 to 0.32 deaths per 1,000 live births in 2012. Of these, 163 deaths (70%) were sudden infant deaths and 71 (30%) were recorded as unascertained.

The rise from 0.32 to 0.36 deaths per 1,000 live births between 2012 and 2013 is not a significant change. However, the fall from 0.50 deaths per 1,000 live births in 2004 to 0.36 in 2013 is a significant change. For further information about statistical significance, please refer to Background note 7.

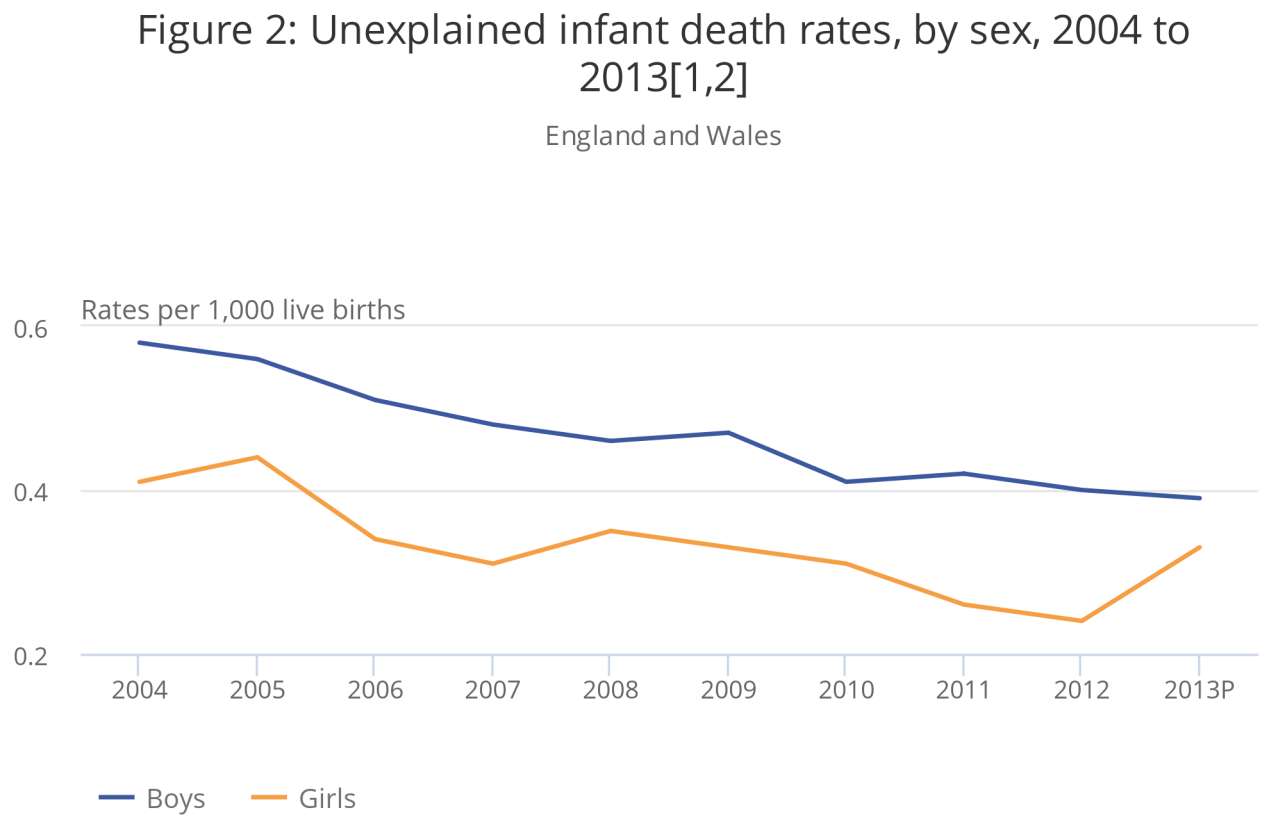
The data for unexplained, sudden and unascertained infant deaths can be seen in Table 1 of the Unexplained deaths in infancy reference table.

4 . Unexplained infant deaths by babies' age and sex

Most (70%) infant deaths are likely to occur in the first four weeks after birth (neonatal period) but unexplained infant deaths are more likely to happen after the first four weeks. In 2013, 82.3% of unexplained infant deaths occurred in the postneonatal period (at least 28 days but less than 1 year after birth). Over a quarter (27%) of unexplained infant deaths in the postneonatal period occurred after 28 completed days but before 2 completed months. Figures for unexplained infant deaths by the babies' age at death, for the years 2004 to 2013, can be seen in Table 2 of the Unexplained deaths in infancy reference table.

Figure 2: Unexplained infant death rates, by sex, 2004 to 2013[1,2]

England and Wales



Source: Office for National Statistics

Notes:

1. Data for 2013 are provisional
2. Based on deaths occurring in each calendar year

Overall, boys are at greater risk of infant death: boys made up 56% of all infant deaths in 2013, although they accounted for 51% of live births. Research shows that girls are less vulnerable to some perinatal conditions, congenital abnormalities and certain infectious diseases, giving them a biological advantage in terms of survival (United Nations, 2011). In 2013, 55% of unexplained infant deaths were boys (138 deaths), compared with 45% for girls (111 deaths). In comparison, in 2012, 64% of deaths (150 deaths) were boys and 36% (84 deaths) were girls. It should be noted that these percentages are based on small numbers.

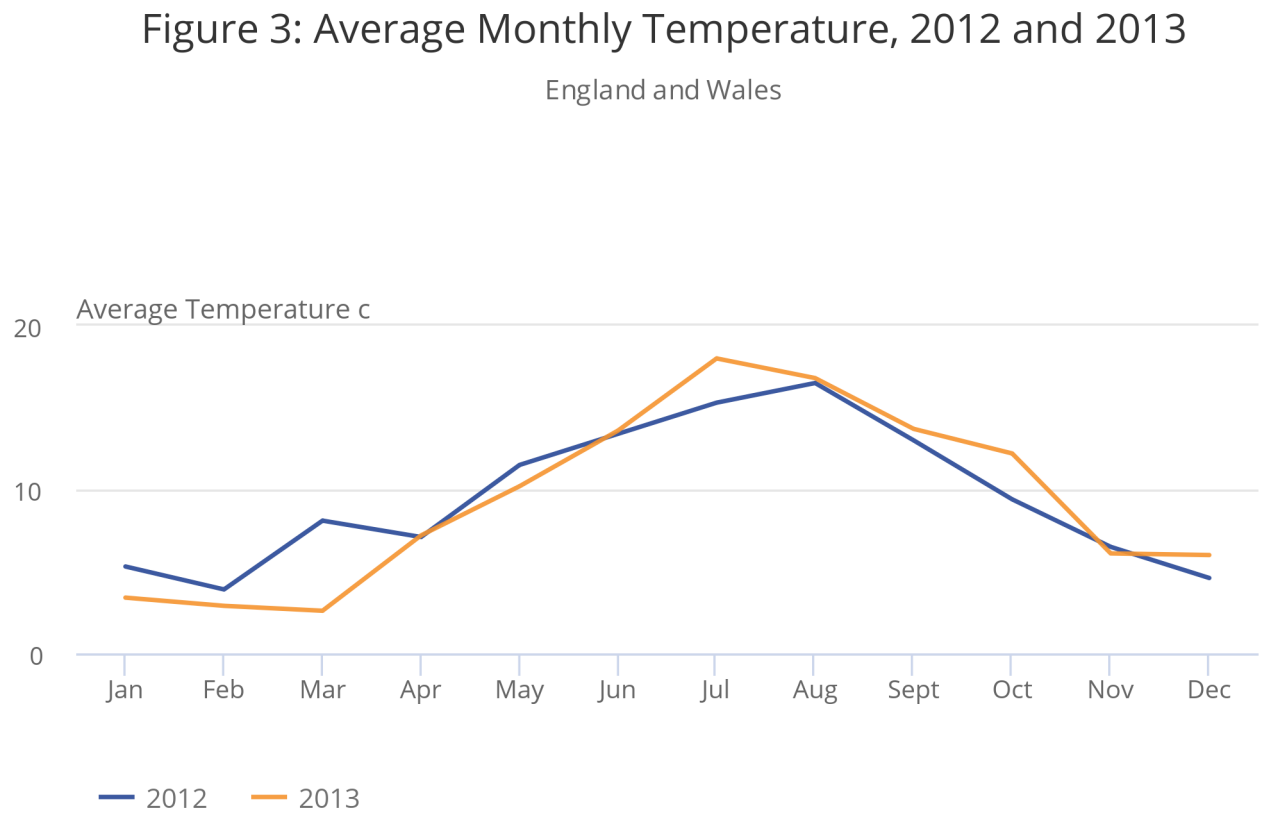
Figure 2 shows that in 2013 the rate of unexplained infant deaths among boys remained higher than the rate of unexplained infant deaths among girls. As Figure 2 shows, rates for boys decreased quite consistently, whereas the series for girls shows greater fluctuation.

5 . Unexplained infant deaths by month

Two risk factors for unexplained infant death are overheating and an unsafe sleeping environment, such as the baby's head being covered. These situations may be more likely to occur during winter, through the use of extra clothing or blankets, and central heating at night. The same pattern is seen in 2013, with more unexplained infant deaths occurring in the winter (28%) than in the summer (22%). The month with the highest number of unexplained infant deaths in 2013 was February (28 deaths) and June had the lowest (16 deaths).

Figure 3: Average Monthly Temperature, 2012 and 2013

England and Wales



Source: Met Office

The first half of 2013 was cooler than the previous year with a mean temperature of 3.7 degrees for winter 2012 to 2013 compared with 5.0 degrees for winter 2011 to 2012. This reflects the latest ONS Excess Winter Mortality report, where the number of deaths in February and March for 2013 were equivalent to the number of deaths in December. In February 2013, there were 28 unexplained infant deaths compared with 15 in 2012. Figure 3 shows the summer months were warmer than 2012 with the hottest month being July (18.0 degrees) in 2013 compared with 15.3 degrees in 2012 (Met Office, 2015). There were fewer unexplained infant deaths in July 2013 (22 deaths) compared with the previous year (26 deaths). The data for unexplained infant deaths by month, for the years 2004 to 2013, can be seen in Table 3 of the Unexplained deaths in infancy table.

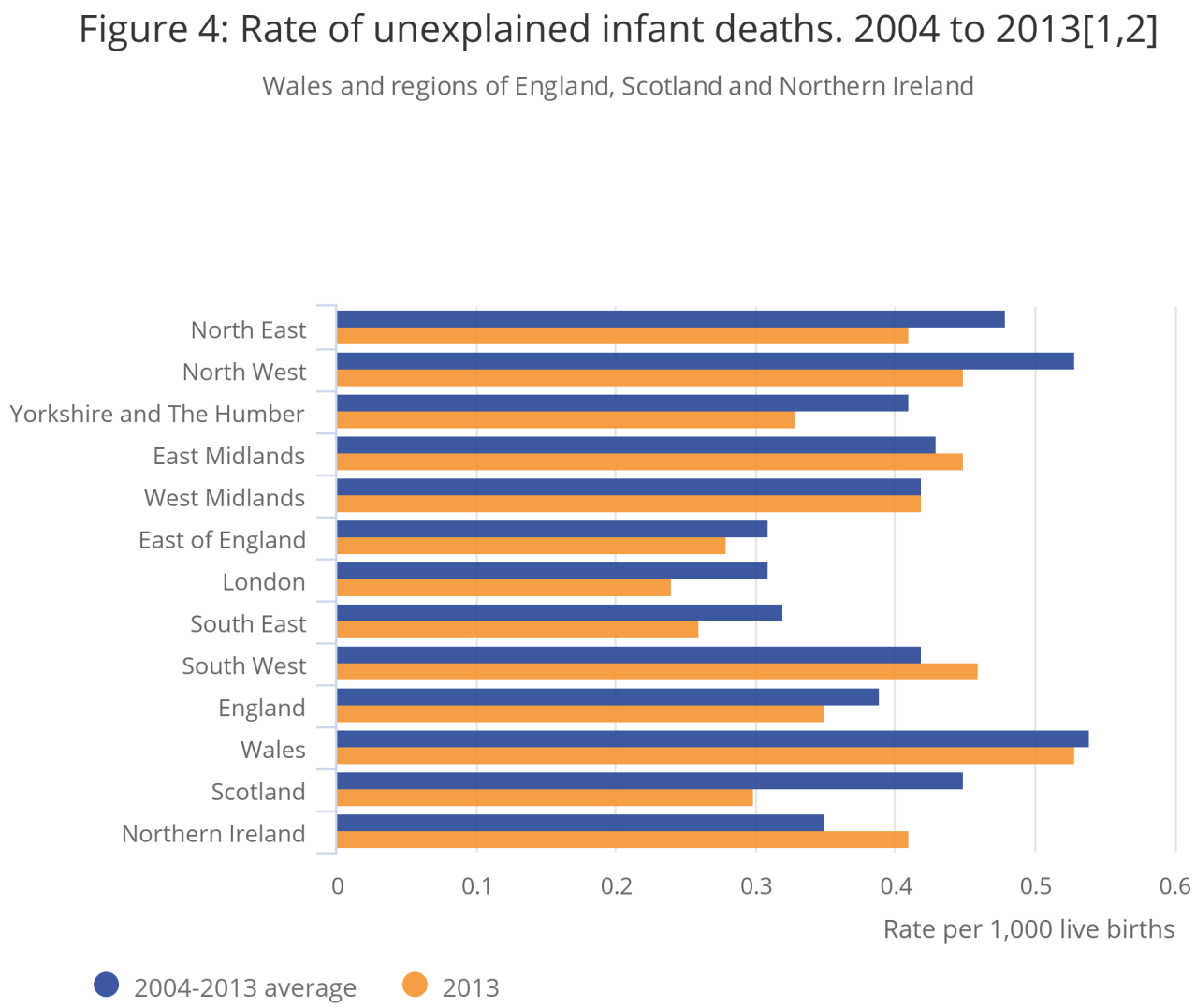
6 . Unexplained infant deaths by regions of England, and Wales

In 2013, the differences in rates between Wales and the regions of England were not statistically significant. London recorded the lowest rate, at 0.24 deaths per 1,000 live births and Wales had the highest rate at 0.53.

Figure 4 shows the rates of unexplained deaths for Wales and regions of England over the period 2004 to 2013 compared with their rate for 2013. Rates for Northern Ireland and Scotland are shown for comparison, although rates do not differ significantly from England and Wales. Rates for the ten year period in the East of England and London (both 0.31 deaths per 1,000 live births) were significantly lower than those for Wales and all other regions of England. Rates for Wales and 6 of the 10 English regions rose in 2013, compared to 2012. The highest rates over this period were in Wales and the North West at 0.54 and 0.53 deaths per 1,000 live births respectively. East Midlands and the South West were the only regions whose rate in 2013 was higher than their average rate for the ten year period. Figures for unexplained infant deaths for Wales and regions of England, for the years 2004 to 2013, can be seen in Table 4 of the Unexplained deaths in infancy reference table.

Figure 4: Rate of unexplained infant deaths. 2004 to 2013[1,2]

Wales and regions of England, Scotland and Northern Ireland



Source: Office for National Statistics, National Records of Scotland, Northern Ireland Statistics and Research Agency

Notes:

1. Data for 2013 are provisional
2. Based on deaths occurring in each calendar year

Two main risks associated with unexplained infant deaths are maternal smoking during pregnancy and postnatal exposure to tobacco smoke (Mitchell et al, 1993; MacDorman et al, 1997). Research shows that babies whose mothers smoke have an increased risk of sudden infant death syndrome, compared with babies whose mothers do not smoke, and that the level of risk is greater with increasing levels of maternal smoking (Mitchell et al, 1993). A more recent study in the USA found a statistical association between the decline in cases of sudden infant death between 1995 and 2006 and the increasing prevalence of smoke-free homes among homes with infants, even after controlling for sleeping position (Behm et al, 2012).

The Health and Social Care Information Centre (HSCIC)publishes data on mothers' smoking status at the time of delivery for England. Results for 2012 to 2013 show that 12.7% of women were recorded as being smokers at the time of delivery, with regional variations. The lowest percentage of smoking at time of delivery is London (5.7%) and the highest percentage is the North East (19.7%). Reducing smoking during pregnancy to 11.0% or less by the end of 2015 is one of 3 national ambitions laid out in The Tobacco Control Plan (Department of Health, 2011).

Following a change in the disclosure control guidelines for birth and death registration statistics in early 2014, we have published numbers and rates of unexplained deaths in infancy for local authorities. It should be noted that we do not calculate mortality rates where there were fewer than 3 deaths and advise caution when considering mortality rates based on fewer than 20 deaths. As the number of unexplained infant deaths by local authority is small, the commentary is based on the ten year aggregated data.

Over the period 2004 to 2013, only 4% of local authorities recorded no unexplained infant deaths. For local authorities where there were sufficient numbers of deaths to calculate rates, 4 local authorities recorded rates of 1 or more death per 1,000 live births, and 16 local authorities had rates that were significantly higher than the rate for England and Wales (0.40 deaths per 1,000 live births). Twelve of the local authorities had rates of unexplained infant deaths that were significantly lower than this figure. Only 5% of local authorities reported 20 or more unexplained infant deaths.

Figures for unexplained infant deaths by local authority, for the years 2004 to 2013, can be seen in Table 5 of the Unexplained deaths in infancy reference table.

7 . Unexplained infant deaths by birthweight and characteristics of the mother

Low birthweight is associated with infant mortality, premature birth and factors affecting foetal growth during pregnancy, such as maternal smoking. In 2013, the rate of unexplained infant deaths for low birthweight babies (less than 2,500 grams) was 1.04 deaths per 1,000 live births. This is more than 3 times higher than babies whose birthweight was 2,500 grams and over (0.3 deaths). Figures for unexplained infant deaths by birthweight, for the years 2004 to 2013, can be seen in Table 6 of the Unexplained deaths in infancy reference table.

In 2013, the rate of unexplained infant death was highest in mothers aged under 20 at 1.27 deaths per 1,000 live births. This was significantly higher than all other age groups.

Rates of infant deaths where the mother was aged between 20 and 24 years were also high (0.55 deaths per 1,000 live births) followed by babies born to mothers aged 40 and over (0.31 deaths per 1,000 live births). However, the rate for babies born to mothers aged 40 and over was based on just 9 deaths and so should be treated with caution. Figures for unexplained infant deaths by age of mother, for the years 2004 to 2013, can be seen in Table 7 of the Unexplained deaths in infancy reference table.

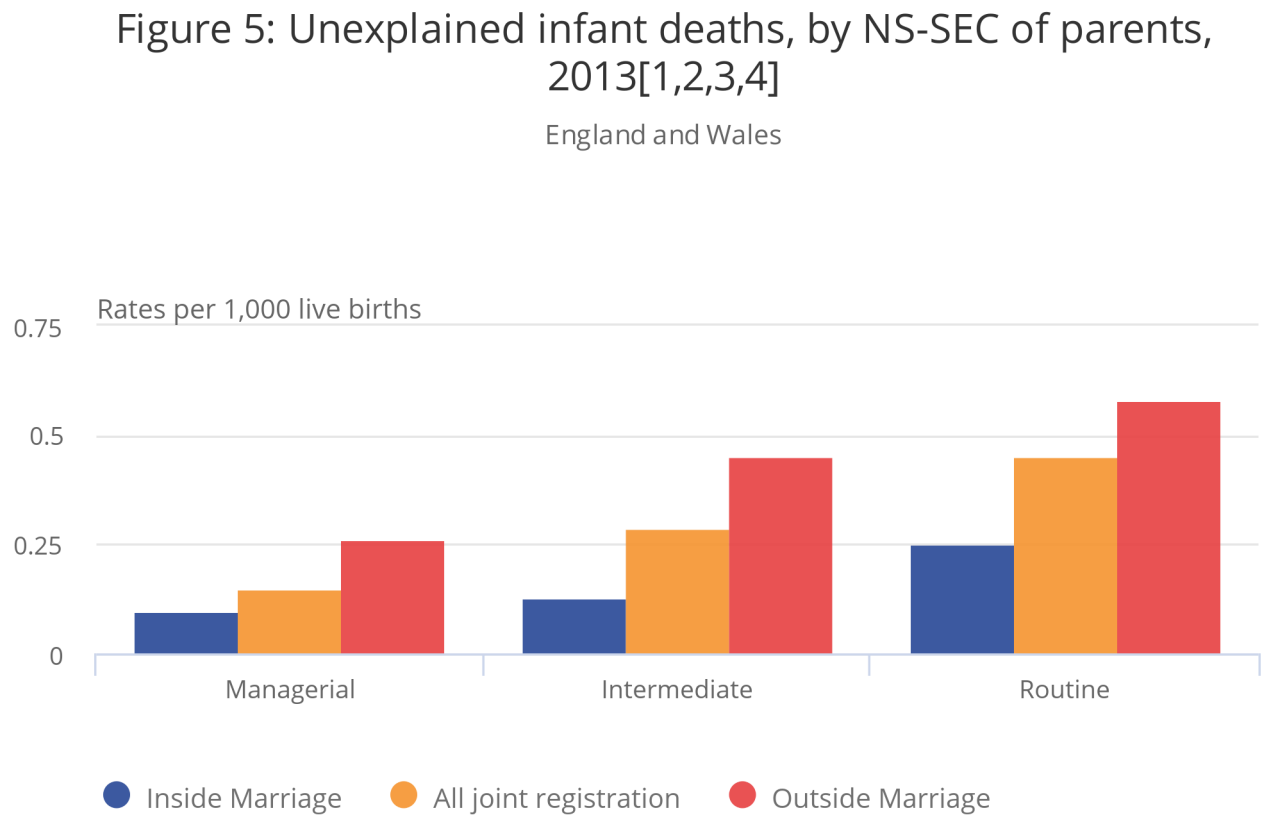
In 2013, the unexplained infant death rate was 0.41 per 1,000 live births for babies of mothers born in England and Wales and 0.22 for babies of mothers born in other countries. Figures for unexplained infant deaths by mother's country of birth, for the years 2004 to 2013, can be seen in Table 8 of the Unexplained deaths in infancy reference table.

8 . Unexplained infant deaths by parents' marital status and National Statistics Socio-economic Classification (NS-SEC)

Marital status is another main risk factor in unexplained infant deaths. In 2013 the unexplained infant death rate for babies born within marriage/civil partnership was 0.14 deaths per 1,000 live births. In comparison, the rate for babies born outside marriage/civil partnership was more than 4 times higher, at 0.59 deaths per 1,000 live births. The rate was highest for those babies born outside marriage/civil partnership whose birth was registered by the mother only, at 1.04 deaths per 1,000 live births. It is thought that differences in death rates by marital status and birth registration reflect complex factors including mother's age and social circumstances (Blair et al 2006).
Figures for unexplained infant deaths by mother's marital status and parity (previous number of children born to a mother), for the years 2004 to 2013, can be seen in Table 9 of the Unexplained deaths in infancy reference table.

Figure 5: Unexplained infant deaths, by NS-SEC of parents, 2013[1,2,3,4]

England and Wales



Source: Office for National Statistics

Notes:

1. Data for 2013 are provisional
2. Based on deaths occurring in each calendar year
3. Based on the dominant NS-SEC of the mother or father at death registration. Information on NS-SEC of the father outside marriage is not collected if the father does not attend the registration of the baby's birth. “All” will include cases where the father's NS-SEC is not stated
4. "Marriage" includes civil partnerships

Details of the father’s occupation are only recorded where the birth is inside marriage/civil partnership or is jointly registered by both parents outside marriage/civil partnership. Historically, tables showing infant mortality by NS-SEC were produced using only the father’s NS-SEC. However, the most advantaged socio-economic position of the parents is likely to have a direct impact on the household, whether it derives from the mother or the father (ONS, 2013). The tables in this release have been produced using the more advantaged NS-SEC in the household.

Comparing only those births that were jointly registered, unexplained infant death rates were highest for babies where the more advantaged NS-SEC of the parents was the routine and manual group and the parents were not married, at 0.58 deaths per 1,000 live births (see Figure 5). The rate was lowest for babies where the more advantaged NS-SEC of the parents was the managerial and professional group and the parents were married at 0.10 deaths per 1,000 live births. In most cases, these rates are based on very small numbers. Figures for unexplained infant deaths by NS-SEC based on the most advantaged socio-economic position of the parents, for the years 2004 to 2013, can be seen in Table 10 of the Unexplained deaths in infancy reference table.

9 . Methods

In England and Wales, deaths should be registered within 5 days of the death occurring. However, the majority of unexplained infant deaths are referred to a coroner for certification, either with or without an inquest, which means that there can be considerable delay between a death occurring and the death being registered. In 2013, 0.8% unexplained infant deaths were registered within 5 days; the median delay was 171 days. This report is based on data available up to 21 July 2015. Figures for 2013 are provisional, as we expect to receive a small number of registrations related to infant deaths that occurred in 2013 after this date.

Since 2004 we have maintained a database of unexplained deaths in infancy. This is created using a late extract from the standard deaths registrations database. The extract is taken late to allow enough time for registration following certification by a coroner. The deaths in this report occurred between 2004 and 2013 and 98% of all infant deaths in this period have been linked to their corresponding birth records. Of the 2% that remain unlinked, 45% were born outside England and Wales, and 55% were not linked because no record of the birth could be found.

From the linked records, information about parents that is routinely collected at birth registration can be used to analyse the data by certain risk factors.

10 . Users and uses of unexplained deaths in infancy statistics

There is a great deal of interest in the deaths of apparently healthy babies. Main users of these data include The Lullaby Trust, formerly the Foundation for the Study of Infant Deaths (FSID), who raise awareness about sudden infant deaths. Others include the Department of Health, Welsh Government and independent researchers, including academics.

The Office for National Statistics (ONS) is the only producer of National Statistics on unexplained deaths in infancy for England and Wales. Infant mortality statistics for Scotland and Northern Ireland are the responsibility of National Records of Scotland and the Northern Ireland Statistics and Research Agency (NISRA) respectively.

Statistics on infant mortality in Scotland are available at: NRS: Statistics.

Statistics on infant mortality in Northern Ireland are available at: Northern Ireland Statistics and Research Agency (NISRA).

11. Further information

The NHS and Welsh Government have worked with The Lullaby Trust, formerly the Foundation for the Study of Infant Deaths (FSID), to publish advice and guidance for parents that aims to reduce the risk of cot death. This information is available at:

NHS Choices

National Assembly for Wales website

The Lullaby Trust

A Quality and Methodological Information Report (234.9 Kb Pdf) is available to download on our website.

12. Results available to download

Unexplained deaths in infancy figures for England and Wales, England, Wales, and Regions in England can be found in Unexplained deaths in infancy reference table Microsoft Excel workbook on our website. The workbook contains the following tables:

Table 1: Sudden infant deaths, unascertained deaths and unexplained infant deaths by sex and age at death, England and Wales, 2004 to 2013 Table 2: Sudden infant deaths, unascertained deaths and unexplained infant deaths by age at death, England and Wales, 2004 to 2013 Table 3: Sudden infant deaths, unascertained deaths and unexplained infant deaths by month of occurrence, England and Wales, 2004 to 2013 Table 4: Unexplained infant deaths by Region, England and Wales, 2004 to 2013 Table 5: Aggregated unexplained infant deaths by local authority, England and Wales, 2004 to 2013 Table 6: Unexplained infant deaths (numbers and rates) by birthweight, England and Wales, 2004 to 2013 Table 7: Unexplained infant deaths by mother's age, England and Wales, 2004 to 2013 Table 8: Unexplained infant deaths by mother's country of birth, England and Wales, 2004 to 2013 Table 9: Unexplained infant deaths by marital status, parity (within marriage/civil partnership) and type of registration, England and Wales, 2004 to 2013 Table 10: Unexplained infant deaths by NS-SEC, England and Wales, 2004 to 2013

A second Excel workbook, Unexplained deaths in infancy: unexpected deaths reference table has been published accompanying this bulletin, using The Lullaby Trust’s definition of “unexpected”, unexplained deaths in infancy. Unexpected deaths are those where the death was certified by a coroner and not by a doctor. The workbook contains the following tables:

Table 1: Births and infant deaths, England and Wales, 2004 to 2013 Table 2: Unexpected infant deaths, England and Wales, 2004 to 2013 Table 3: Unexpected and unexplained infant deaths, England and Wales, 2004 to 2013 Table 4: Proportion of unexpected and unexplained deaths investigated at inquest, England and Wales, 2004 to 2013 Table 5: Unexpected postneonatal deaths by grouped cause, England and Wales, 2004 to 2013 Table 6: Unexpected postneonatal deaths by cause: accident and injury, England and Wales, 2004 to 2013

13. References

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Northern Ireland Statistics and Research Agency, accessed 3 August 2015.

14. Background notes

1. The deaths included in this report were those that occurred during 2004 to 2013 and were linked to their corresponding birth records. For this 10 year period, the linkage rate for all infant deaths was 98.0%. The linkage rate has been consistent since records began.

2. From the linked records, information about parents that was collected at birth registration can be used for analysis of the data according to certain risk factors including birthweight, mother's age at birth of child, mother's country of birth, marital status and parity, and mother or father's socio-economic status (whichever is higher) based on their occupation.

3. The majority of unexplained deaths are certified by a coroner, either with or without an inquest, and therefore there can be some delay between death and registration. This report is based on data available up to 8 July 2015 and figures for 2013 are provisional. Figures for 2013 will be finalised in next year's bulletin.

4. Definition of unexplained deaths in infancy:

   Unexplained deaths include both sudden infant deaths and unascertained deaths.

   Sudden infant deaths ICD–10 code R95 Sudden infant death syndrome: include any mention of "sudden infant death", "cot death", "SIDS", "crib death", or another similar term anywhere on the death certificate.

   Unascertained deaths ICD–10 code R99 other ill-defined and unspecified causes of mortality: include cases where the only mention on the death certificate is unascertained death.

5. Infant deaths are divided into neonatal (deaths under 28 days) and postneonatal (deaths between 28 days and 1 year).

6. Mortality rates are presented as deaths per 1,000 live births.

7. Within this bulletin, a difference which is described as "statistically significant" has been assessed using 95% confidence intervals. Confidence intervals are a measure of the statistical precision of an estimate and show the range of uncertainty around the estimated figure. Calculations based on small numbers are often subject to random fluctuations. As a general rule, if the confidence interval around a figure overlaps with the interval around another, we cannot say with certainty that there is more than a chance difference between the two figures.

8. Earlier reports for unexplained deaths in infancy for 2003 to 2007 were published annually in the autumn edition of Health Statistics Quarterly.

9. Special extracts and tabulations of unexplained deaths in infancy data for England and Wales are available to order for a charge (subject to legal frameworks, disclosure control, resources and agreement of costs, where appropriate). For such requests enquiries should be made to:

   Mortality Analysis Team, Life Events and Population Sources Division Office for National Statistics Government Buildings Cardiff Road Newport South Wales NP10 8XG Tel: +44 (0)1633 455898 E-mail: CIM@ons.gsi.gov.uk

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