Report:

Unexplained deaths in infancy, England and Wales, 2007

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Key findings

- There were 264 unexplained infant deaths in England and Wales in 2007 giving a rate of 0.38 deaths per 1,000 live births compared to the rate of 0.43 in 2006
- Of all unexplained infant deaths in 2007, 76 per cent occurred among babies born with a normal birthweight (2,500 grams and over) and 90 per cent occurred between 28 days and one year of age
- The unexplained infant death rate in 2007 was highest for babies born outside marriage where only the mother registered the birth (1.42 per 1,000 live births); this rate was nearly eight times the rate for babies born inside marriage (0.18 per 1,000 live births)
- For babies born inside marriage and outside marriage jointly registered by both parents, the unexplained infant death rate in the routine and manual occupations was over twice that in the managerial and professional group (0.33 per 1,000 live births and 0.13 per 1,000 live births respectively)
- During the period 2003–07, the unexplained infant death rate in boys was over 1.3 times the rate in girls
- Over the same five-year period, the North East government office region had the highest unexplained infant death rate in England and Wales (0.66 per 1,000 live births) and the East of England region had the lowest (0.32 per 1,000 live births)

Box one

Definition of unexplained deaths in infancy

Sudden infant deaths	ICD–10 code R95 Sudden infant death syndrome: includes 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: includes cases where the only mention on the death certificate is unascertained death
Unexplained deaths	Includes both sudden infant deaths and unascertained deaths
Infant deaths are divided into neonatal (less than 28 days after live birth) and postneonatal (28 days and over but under one year).	

Results

This report on unexplained infant deaths in England and Wales from 2003 to 2007 includes both sudden infant deaths and deaths for which the cause remained unascertained after a full investigation (Box One). There is some evidence to suggest that these terms are used interchangeably by coroners certifying these deaths.¹ Research has also shown that the characteristics of babies dying of these two causes are very similar.² Based on this evidence it is appropriate to include both groups in any analysis of unexplained infant deaths. Figures for 2007 are provisional.

There were 264 unexplained infant deaths in England and Wales in 2007, comprising 8 per cent of all infant deaths. This was a 7 per cent decrease from the 285 unexplained infant deaths recorded in 2006. The rate however fell by 10 per cent during this period from 0.43 to 0.38 deaths per 1,000 live births (Table 1). Between 2003 and 2005 the unexplained infant death rate was fairly constant, but the rate fell by 15 per cent in 2006.

Of the 264 unexplained infant deaths in 2007, 193 were sudden infant deaths and 71 were unascertained deaths. Between 2006 and 2007, the number of sudden infant deaths increased from 184 to 193 while the number of unascertained deaths decreased from 101 to 71. This suggests that there is a diagnostic transfer from unascertained to sudden infant deaths and other causes. This change is in line with the recommendation made by Baroness Kennedy's working group for coroners to stop using the term unascertained as a final cause of death.³

During the period 2003–07, 64 per cent of all unexplained deaths occurred in babies aged less than 3 months. Of all unexplained deaths, 18 per cent occurred in the first 27 days of life and 26 per cent occurred in babies aged between 28 days and less than 2 months (Table 2).

Between 2003 and 2007, 28 per cent of unexplained deaths occurred over the winter period (December–February), whereas 21 per cent occurred over the summer (June–August) (Table 3). December had the highest number of unexplained deaths over the whole period with 146 deaths (10 per cent of the total) and August had the lowest with 82 deaths (5 per cent).

Over the same five-year period, the North East government office region had the highest unexplained infant death rate in England and Wales at 0.66 per 1,000 live births and the East of England region had the lowest at 0.32 per 1,000 live births (Table 4).

Of all unexplained infant deaths in 2007, 76 per cent occurred among babies born with a normal birthweight (2,500 grams and over) and 90 per cent occurred in the postneonatal period (Table 5).

The unexplained infant death rate in 2007 was highest for babies of mothers aged under 20 years at the time of birth (1.12 per 1,000 live births). The rate fell with increasing age of the mother (Table 6). For babies of mothers born in England and Wales the unexplained infant death rate was 0.45 per 1,000 live births compared to 0.38 per 1,000 live births for all babies (Table 7). The rate for babies of mothers born outside England and Wales was 0.18 per 1,000 live births.

For babies born within marriage the unexplained infant death rate for 2007 for babies of mothers with two or more previous births (0.31 per 1,000 live births) was three times the rate in babies of mothers with no previous births (0.10 per 1,000 live births) (Table 8).

The unexplained infant death rate in 2007 was highest for babies born outside marriage where only the mother registered the birth (1.42 per 1,000 live births); this rate was nearly eight times the rate for babies born inside marriage (0.18 per 1,000 live births) and three times the rate for babies born outside marriage jointly registered by both parents giving the same address (0.43 per 1,000 live births) (Table 8).

For births inside marriage and outside marriage jointly registered by both parents, the unexplained infant death rate for babies with fathers in routine and manual occupations was over twice that the rate for babies with fathers in the managerial and professional group (0.33 per 1,000 live births and 0.13 per 1,000 live births respectively). The figures in Table 9 exclude 'sole registrations' where only details of the mother are recorded. Less than 7 per cent of all births are sole registrations while almost 25 per cent of all unexplained deaths are sole birth registrations. It is thought that differences in death rates by marital and birth registration status reflect complex factors including mother's age and social circumstances.⁴

The data

The deaths included in this report occurred in 2003–07 and 98 per cent of all infant deaths in this period have been linked to their corresponding

birth records.⁵ Of the 2 per cent of infant deaths that remained unlinked, 165 were born outside England and Wales, and 187 were not linked because no record of the birth could be found. For this five-year period, 43 unexplained deaths remain unlinked and are omitted from this report.

From the linked records, information about parents, which was collected at birth registration, can then be used to enable analysis of the data according to certain risk factors. Data for 2007 have been analysed by these risk factors, and include birthweight (Table 5), mother's age at birth of child (Table 6), mother's country of birth (Table 7), marital status and parity (Table 8), and father's socio-economic status based on his occupation (Table 9).

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 10 June 2009 and figures for 2007 are provisional.

References

1. Limerick S R and Bacon C J (2004) 'Terminology used by pathologists in reporting on SIDS', *Journal of Clinical Pathology* **57**, 309–11.
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3. The report of a working group convened by The Royal College of Pathologists and The Royal College of Paediatrics and Child Health (2004) *Sudden unexpected deaths in infancy. A multi-agency protocol for care and investigation*. Chair: The Baroness Helena Kennedy QC.
4. Blair P S, Sidebotham P, Berry P J *et al* (2006) 'Major epidemiological changes in sudden infant death syndrome: a 20-year population-based study in the UK', *Lancet* **367**, 314–19.
5. Office for National Statistics (2009) *Mortality statistics: Childhood, infant and perinatal, 2007*, Series DH3 no. **40**. Available on the Office for National Statistics website at: www.statistics.gov.uk/statbase/Product.asp?vlnk=6305

Table 1

Sudden infant deaths, unascertained deaths and all unexplained infant deaths by sex and age at death, 2003–07

England and Wales																	Numbers and rates		
Year	Numbers									Rates ¹									
	Boys			Girls			All babies			Boys			Girls			All babies			
	Neonatal deaths	Post-neonatal deaths	Infant deaths	Neonatal deaths	Post-neonatal deaths	Infant deaths	Neonatal deaths	Post-neonatal deaths	Infant deaths	Neonatal deaths	Post-neonatal deaths	Infant deaths	Neonatal deaths	Post-neonatal deaths	Infant deaths	Neonatal deaths	Post-neonatal deaths	Infant deaths	
Sudden infant deaths																			
2003	15	89	104	14	67	81	29	156	185	0.05	0.28	0.33	0.05	0.22	0.27	0.05	0.25	0.30	
2004	24	101	125	18	64	82	42	165	207	0.07	0.32	0.39	0.06	0.21	0.26	0.07	0.26	0.32	
2005	15	119	134	22	67	89	37	186	223	0.05	0.36	0.41	0.07	0.21	0.28	0.06	0.29	0.35	
2006	18	98	116	11	57	68	29	155	184	0.05	0.29	0.34	0.03	0.17	0.21	0.04	0.23	0.27	
2007	10	110	120	7	66	73	17	176	193	0.03	0.31	0.34	0.02	0.20	0.22	0.02	0.26	0.28	
Unascertained deaths																			
2003	13	54	67	21	42	63	34	96	130	0.04	0.17	0.21	0.07	0.14	0.21	0.05	0.15	0.21	
2004	17	47	64	12	34	46	29	81	110	0.05	0.15	0.20	0.04	0.11	0.15	0.05	0.13	0.17	
2005	9	43	52	12	38	50	21	81	102	0.03	0.13	0.16	0.04	0.12	0.16	0.03	0.13	0.16	
2006	14	44	58	15	28	43	29	72	101	0.04	0.13	0.17	0.05	0.09	0.13	0.04	0.11	0.15	
2007	5	38	43	4	24	28	9	62	71	0.01	0.11	0.12	0.01	0.07	0.08	0.01	0.09	0.10	
Unexplained infant deaths																			
2003	28	143	171	35	109	144	63	252	315	0.09	0.45	0.54	0.12	0.36	0.48	0.10	0.41	0.51	
2004	41	148	189	30	98	128	71	246	317	0.13	0.46	0.59	0.10	0.31	0.41	0.11	0.38	0.50	
2005	24	162	186	34	105	139	58	267	325	0.07	0.49	0.56	0.11	0.33	0.44	0.09	0.41	0.50	
2006	32	142	174	26	85	111	58	227	285	0.09	0.41	0.51	0.08	0.26	0.34	0.09	0.34	0.43	
2007	15	148	163	11	90	101	26	238	264	0.04	0.42	0.46	0.03	0.27	0.30	0.04	0.34	0.38	

¹ Rates per 1,000 live births.

Note: Neonatal deaths under 28 days after live birth; Postneonatal deaths at least 28 days but under one year after live birth; Infant deaths under one year after live birth. Rates based on less than 10 deaths are in italics.

Table 2

Sudden infant deaths, unascertained deaths and all unexplained deaths by age at death, 2003–07

England and Wales																Numbers and percentages
Year	Numbers								Percentages							
	Age at death								Age at death							
	Under 28 days	28 days and over but less than 2 months	2 completed months	3 completed months	4 completed months	5 completed months	Between 6 and 11 completed months	All babies	Under 28 days	28 days and over but less than 2 months	2 completed months	3 completed months	4 completed months	5 completed months	Between 6 and 11 completed months	All babies
Sudden infant deaths																
2003	29	57	30	20	12	10	27	185	15.7	30.8	16.2	10.8	6.5	5.4	14.6	100.0
2004	42	53	38	30	19	10	15	207	20.3	25.6	18.4	14.5	9.2	4.8	7.2	100.0
2005	37	58	47	29	17	11	24	223	16.6	26.0	21.1	13.0	7.6	4.9	10.8	100.0
2006	29	48	36	32	14	9	16	184	15.8	26.1	19.6	17.4	7.6	4.9	8.7	100.0
2007	17	54	48	24	29	11	10	193	8.8	28.0	24.9	12.4	15.0	5.7	5.2	100.0
Unascertained deaths																
2003	34	26	32	16	6	3	13	130	26.2	20.0	24.6	12.3	4.6	2.3	10.0	100.0
2004	29	27	18	10	9	4	13	110	26.4	24.5	16.4	9.1	8.2	3.6	11.8	100.0
2005	21	18	24	13	7	5	14	102	20.6	17.6	23.5	12.7	6.9	4.9	13.7	100.0
2006	30	32	15	8	2	6	8	101	29.7	31.7	14.9	7.9	2.0	5.9	7.9	100.0
2007	9	22	11	5	9	4	11	71	12.7	31.0	15.5	7.0	12.7	5.6	15.5	100.0
Unexplained infant deaths																
2003	63	83	62	36	18	13	40	315	20.0	26.3	19.7	11.4	5.7	4.1	12.7	100.0
2004	71	80	56	40	28	14	28	317	22.4	25.2	17.7	12.6	8.8	4.4	8.8	100.0
2005	58	76	71	42	24	16	38	325	17.8	23.4	21.8	12.9	7.4	4.9	11.7	100.0
2006	59	80	51	40	16	15	24	285	20.7	28.1	17.9	14.0	5.6	5.3	8.4	100.0
2007	26	76	59	29	38	15	21	264	9.8	28.8	22.3	11.0	14.4	5.7	8.0	100.0

Table 3

Sudden infant deaths, unascertained deaths and all unexplained infant deaths by month of occurrence, 2003–07

England and Wales													Numbers
Year	Month												
	January	February	March	April	May	June	July	August	September	October	November	December	Total
Sudden infant deaths													
2003	30	15	16	14	15	14	10	12	12	16	14	17	185
2004	15	19	23	15	16	15	19	12	19	13	24	17	207
2005	20	19	20	16	27	8	17	12	14	25	25	20	223
2006	12	13	10	12	14	19	19	9	25	16	13	22	184
2007	13	14	18	16	15	18	9	12	10	23	22	23	193
Unascertained deaths													
2003	10	8	11	16	9	12	16	7	9	10	7	15	130
2004	15	12	7	12	10	7	10	3	5	9	7	13	110
2005	11	7	13	9	6	4	11	4	11	10	9	7	102
2006	13	10	5	9	5	10	8	6	10	9	7	9	101
2007	5	12	9	6	5	6	8	5	5	5	2	3	71
Unexplained infant deaths													
2003	40	23	27	30	24	26	26	19	21	26	21	32	315
2004	30	31	30	27	26	22	29	15	24	22	31	30	317
2005	31	26	33	25	33	12	28	16	25	35	34	27	325
2006	25	23	15	21	19	29	27	15	35	25	20	31	285
2007	18	26	27	22	20	24	17	17	15	28	24	26	264

Table 4 All unexplained infant deaths by Government Office Regions in England, and Wales, 2003–07

England and Wales											Numbers and rates
Year	England and Wales	Government Office Region									Wales
		North East	North West	Yorkshire and The Humber	East Midlands	West Midlands	East	London	South East	South West	
Numbers											
2003	315	17	55	34	26	46	22	45	32	21	17
2004	317	20	64	28	20	28	20	42	46	20	29
2005	325	20	62	23	23	40	22	57	35	28	15
2006	285	18	46	30	23	21	19	43	32	27	26
2007	264	18	34	32	20	27	21	35	31	31	15
Rates ¹											
2003	0.51	0.63	0.71	0.59	0.55	0.72	0.35	0.41	0.35	0.41	0.54
2004	0.50	0.72	0.79	0.47	0.41	0.42	0.31	0.37	0.49	0.38	0.90
2005	0.50	0.71	0.76	0.38	0.47	0.61	0.34	0.49	0.37	0.53	0.46
2006	0.43	0.62	0.55	0.48	0.45	0.31	0.28	0.36	0.32	0.49	0.77
2007	0.38	0.61	0.40	0.50	0.38	0.39	0.30	0.28	0.31	0.54	0.44

¹ Rates per 1,000 live births.**Table 5 Live births and all unexplained infant deaths by birthweight, 2007**

England and Wales					Numbers and percentages		
Birthweight (grams)	Numbers				Percentages		
	Births	Deaths			Deaths		
	Live births	Neonatal	Postneonatal	Infant	Neonatal	Postneonatal	Infant
All	690,013	26	238	264	9.8	90.2	100.0
Under 1,500	7,860	1	15	16	6.3	93.8	100.0
1,500–1,999	9,905	1	14	15	6.7	93.3	100.0
2,000–2,499	31,540	1	27	28	3.6	96.4	100.0
2,500–2,999	114,429	11	65	76	14.5	85.5	100.0
3,000–3,499	244,555	5	67	72	6.9	93.1	100.0
3,500 and over	274,147	7	45	52	13.5	86.5	100.0
Not stated	7,577	–	5	5	–	100.0	100.0

Note: Neonatal deaths under 28 days after live birth; Postneonatal deaths at least 28 days but under one year after live birth; Infant deaths under one year after live birth.

Table 6 Live births and all unexplained infant deaths by mother's age, 2007

England and Wales					Numbers and rates		
Mother's age	Numbers				Rates ¹		
	Births	Deaths			Deaths		
	Live births	Neonatal	Postneonatal	Infant	Neonatal	Postneonatal	Infant
All	690,013	26	238	264	0.04	0.34	0.38
Under 20	44,805	4	46	50	0.09	1.03	1.12
20–24	130,784	8	73	81	0.06	0.56	0.62
25–29	182,570	7	61	68	0.04	0.33	0.37
30–34	191,124	4	30	34	0.02	0.16	0.18
35 and over	140,730	3	28	31	0.02	0.20	0.22

¹ Rates per 1,000 live births.

Note: Neonatal deaths under 28 days after live birth; Postneonatal deaths at least 28 days but under one year after live birth; Infant deaths under one year after live birth. Rates based on less than 10 deaths are in italics.

Table 7

Live births and all unexplained infant deaths by mother's country of birth, 2007

England and Wales							
Numbers and rates							
Country of birth	Numbers				Rates ¹		
	Births	Deaths			Deaths		
	Live births	Neonatal	Postneonatal	Infant	Neonatal	Postneonatal	Infant
All	690,013	26	238	264	0.04	0.34	0.38
England and Wales	519,449	25	208	233	0.05	0.42	0.45
Outside England and Wales	170,564	1	30	31	0.01	0.17	0.18

1 Rates per 1,000 live births.

Note: Neonatal deaths under 28 days after live birth; Postneonatal deaths at least 28 days but under one year after live birth; Infant deaths under one year after live birth. Rates based on less than 10 deaths are in italics.

Table 8

Live births and all unexplained infant deaths by marital status, parity (within marriage) and type of registration, 2007

England and Wales							
Numbers and rates							
Marital status Parity/type of registration	Numbers				Rates ¹		
	Births	Deaths			Deaths		
	Live births	Neonatal	Postneonatal	Infant	Neonatal	Postneonatal	Infant
All	690,013	26	238	264	0.04	0.34	0.38
Inside marriage							
All	384,463	9	59	68	0.02	0.15	0.18
0	164,771	4	12	16	0.02	0.07	0.10
1	134,984	1	25	26	0.01	0.19	0.19
2 and over	84,708	4	22	26	0.05	0.26	0.31
Outside marriage							
All	305,550	17	179	196	0.06	0.59	0.64
Joint registration/same address	198,470	12	73	85	0.06	0.37	0.43
Joint registration/diff address	61,379	4	42	46	0.07	0.68	0.75
Sole registration	45,701	1	64	65	0.02	1.40	1.42

1 Rates per 1,000 live births.

Note: Neonatal deaths under 28 days after live birth; Postneonatal deaths at least 28 days but under one year after live birth; Infant deaths under one year after live birth. Rates based on less than 10 deaths are in italics.

Table 9

Live births¹ and unexplained infant deaths² by National Statistics Socio-economic Classification (NS-SEC), 2007

England and Wales							
Numbers and rates							
NS-SEC Three-class version	Numbers				Rates ³		
	Births	Deaths			Deaths		
	Live births	Neonatal	Postneonatal	Infants	Neonatal	Postneonatal	Infant
All ⁴	644,312	25	174	199	0.04	0.27	0.31
Inside marriage							
All ⁵	384,463	9	59	68	0.02	0.15	0.18
Managerial and professional	18,136	5	15	20	0.03	0.08	0.11
Intermediate	7,317	2	7	9	0.03	0.10	0.12
Routine and manual	11,238	2	22	24	0.02	0.20	0.21
Outside marriage joint registration							
All ⁵	259,849	16	115	131	0.06	0.44	0.50
Managerial and professional	6,103	1	11	12	0.02	0.18	0.20
Intermediate	5,082	4	12	16	0.08	0.24	0.31
Routine and manual	12,802	6	50	56	0.05	0.39	0.44
Inside marriage and outside marriage joint registration							
All ⁵	644,312	25	174	199	0.04	0.27	0.31
Managerial and professional	24,239	6	26	32	0.02	0.11	0.13
Intermediate	12,399	6	19	25	0.05	0.15	0.20
Routine and manual	24,040	8	72	80	0.03	0.30	0.33

1 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. Figures for live births in NS-SEC groups are a 10 per cent sample coded for father's occupation.

2 NS-SEC based on father's occupation at death registration.

3 Rates per 1,000 live births.

4 Inside marriage and outside marriage/joint registration only, including cases where father's occupation was not stated.

5 Includes cases where father's occupation was not stated.

Note: Neonatal deaths under 28 days after live birth; Postneonatal deaths at least 28 days but under one year after live birth; Infant deaths under one year after live birth. Rates based on less than 10 deaths are in italics.