Acknowledgements

We wish to express our thanks and appreciation to the families of the infants who died, the families of the control infants, and the health care and other professionals, whose support and cooperation make this work possible. The willingness of the families to share with us many aspects of their lives, in the hope that we would be able to help prevent other babies dying in this way was inspiring.

We also wish to acknowledge the continued funding allocated to us by the Department of Health and Children.

Contents

ISIDA'S register's twelfth report, as with other years highlights a number of factors, which appear to be important in Sudden Infant Death Syndrome. However, when reading this report it is important to bear in mind that in the light of current information available, no one factor on its own can be directly linked to the death of an individual infant. Furthermore, it is ill advised to interpret data, which is based on small numbers.

1. Summary of Main Findings

1. The infant mortality rate for 2003 (5.1 per 1,000 live births) is similar to that observed in 2002 (5.2), both of which are slightly lower than that of previous years (2001 rate = 5.8 per 1000 live births).

2. The low SIDS rate observed in 2002 was not repeated in 2003. Fifty five sudden/unexpected infant deaths were reported to the register for 2003, forty two of which were classified as SIDS. This corresponds to a SIDS rate of 0.68 per 1,000 live births, which indicates an increase from the previous year's rate of 0.6 (lowest recorded in Ireland to date). Six sudden infant deaths were certified as unascertained and if included give a rate of 0.78.

3. Regionally, the highest rate in 2003 was in the Midland Health Board area (2.18 per 1,000 livebirths). The Southern, South-Eastern and Midland Health board areas also had SIDS rates higher than the national average.

4. SIDS continues to be the leading cause of death in babies aged four weeks to one year. Based on the Central Statistics Office (CSO) infant mortality figures for 2003, 43% of all deaths in this age group were due to SIDS. Seventy six percent of cases occurred in infants older than 28 days and less than one year, with the greatest number occurring in the 2-4 month age group. More males than females were affected (2:1) and the majority of cases (83%) occurred during the night-time sleep in the infants' home environment. One third of all cases occurred on a Saturday.

5. The proportion of SIDS cases in 2003 that were born prematurely (10%) and of low birth weight (14%) was higher than the national averages for 2003 (5% and 3% respectively), a trend which has been apparent since 1992. Almost half of the cases in 2003 were among families of lower socioeconomic status. The average maternal age (26.8 years) was slightly less than observed in previous years but as before this figure is less than the national average maternal age for 2003.

6. Levels of parental smoking among SIDS families dropped again this year and are now equivalent to 50%. However this remains higher than the national average of 30%. For twelve consecutive years (1992-2003), parental smoking has been evident in greater proportions among SIDS families than national average figures.

7. There was an increase in the proportion of cases found in the prone position; 48% of the 25 cases for which data was available were found prone. The proportion of cases found dead whilst co-sleeping has also increased further this year to 57%. Most of these were found co-sleeping in beds with adult(s) (49%) and the remainder on sofas or armchairs (8%).

8. Two thirds of all SIDS infants had reported some form of illness or symptoms during their lifetimes, most of which proved to be respiratory or other infections. Only 25% had symptoms or problems in the forty eight hours prior to death.

9. An examination of 35 SIDS cases for which information was available on at least one of the three most commonly associated risk factors i.e. sleep position, maternal smoking status and infant-parent co-sleeping, revealed only two cases which were not associated with at least one of these three variables.

National Sudden Infant Death Register

Report for the year, 1st January 2003 to 31st December 2003.

2. Background

2.1 The infant mortality rate in the Republic of Ireland has declined from a rate of 8 per 1,000 live births in 1991 to 5.1 per 1,000 live births in 2003. The rates for 2001 and 2000 were 5.8 and 6.0 per 1,000 respectively (App A). The infant mortality in Ireland remains one of the lowest among the developed countries. This decline is due to a drop in the neonatal mortality rate, especially the decline in the SIDS rate in the post neonatal period (from 28 days to under one year of age).

2.2 In 2003 the aims of the Register were to:

(a) Identify and categorise all deaths in children from birth to 2 years of age in the Republic of Ireland;

(b) Establish the incidence and causes of mortality from birth to 2 years of age;

(c) Provide a National Register of all sudden, unexpected deaths for which cause of death is not identifiable following a post-mortem examination, in the infant population;

(d) Collect comprehensive epidemiological data on all the cases of sudden unexpected deaths in infancy (SUDs) described above;

(e) Continue the nation-wide case control study on all sudden, unexpected infant deaths;

(f) Conduct comprehensive analysis of the eight-year nation-wide SIDS case control study (1994 to 2001).

3. Structure and Study Methodology

3.1 Deaths in children under two years of age

Each quarter, the Central Statistics Office (CSO), by special arrangement, issues to the Register details of deaths in children from birth to two years. For each death, a medical certificate of the cause of death and CSO Form 102 are provided. The Register compiles this data in accordance with the Data Protection Act.

3.2 Sudden Infant Death Syndrome National Epidemiological Survey

A system of notification ensures that the appropriate professionals report suspected cases of SIDS to the Register within 48 hours. For each reported case, the Register obtains the following information:

Birth details;
Post-mortem report;
Medical certificate of the cause of death;
Central Statistics Office Form 102;
Medical histories (baby's, mother's and related family histories);
Medical report from the General Practitioner.

Parents were invited to participate in home interviews. A questionnaire was used which collected the

following information: socio-demographic data; information relating to the pregnancy and birth; infant's medical history; environmental characteristics; current child care parenting practices, lifestyle practices, details of events in the 48 hours preceding the infant's death and in the immediate period afterwards.

For each sudden and unexpected death reported to the Register similar information on four living babies (controls) born within 72 hours of the case and living in the same community care area was gathered. The data collected from the completed questionnaires was coded and entered into a database.

3.3 The information collected by the Register provides comprehensive data on all sudden, unexpected deaths amongst the infant population in the Republic of Ireland for which a cause of death is not identifiable and therefore enables the trend of SIDS in Ireland to be monitored over time and compared to data collected in the years from 1992 to the present. Control data was gathered to enhance the research value of this data by providing norms for the Irish infant population.

3.4 Limitations of the Register

3.4.1 Direct early notification by professionals to the Register of all sudden, unexpected deaths was required in order to ensure complete ascertainment of suspected SIDS deaths in 2003. Infant mortality data, issued on a quarterly basis by the CSO, refers to deaths registered during that period. Due to delays in registration, the figures in some cases relates to deaths that occurred in the previous year, i.e. 2002. This means that SIDS figure for CSO may differ from those of the register since the register's figures are based on year of occurrence. The register also includes SIDS deaths in infants over one year of age whereas the CSO restricts it's figure to those deaths which occurred in infants under one year of age only.

3.4.2 Biases:

Selection bias: Parent(s) participation in the epidemiological survey is voluntary. Self-selection may therefore bias results. However, analysis of socio-demographic data on responders and non-responders did not indicate any major differences.

Recall bias: Data collected from personal interview with parent(s) is subject to recall bias, i.e. however reliable their memory of the event is.

Interviewer bias: The questionnaire was pre-tested. Interviewers were specifically trained to implement the questionnaire and their pilot interviews were assessed. Each interviewer was issued with a guide to ensure uniformity of application. Comparing responses with record charts checked validity of recorded responses.

3.4.3 Interpretation of data based on small numbers should be treated with caution.

4. Definitions

4.1 The Register records information on all deaths in children from birth to two years within the Republic of Ireland which are sudden and unexpected and for which a cause of death is not immediately identifiable. Cause of death for cases other than SIDS is recorded in accordance with the International Classification of Diseases (ICD) code assigned by the CSO. Cases of suspected SIDS are confirmed by post-mortem report.

4.2 For the purposes of this report, the following definitions are applied:

4.2.1 **Sudden Unexpected Death in Infancy (SUDI):** The sudden, unexpected death of an infant or young child, for which a cause of death is not immediately identifiable.

4.2.2 **Sudden Infant Death Syndrome (SIDS):** The sudden death of an infant or young child, which is unexpected by history and in which a thorough postmortem examination fails to demonstrate an adequate cause of death.

4.2.3 **Sudden Infant Death Syndrome Rate:** The number of deaths, in children classified as SIDS, in a given time period (usually in one year) per 1,000 live births in that same period.

4.2.4 **Infant Mortality Rate:** The number of deaths in children less than one year of age in a given period (usually in one year) per 1,000 live births in that same period.

4.2.5 **Neonatal Mortality Rate:** The number of deaths in a given period (usually in one year) of infants under 28 days of age per 1,000 live births in that same period.

4.2.6 **Post-neonatal Mortality Rate:** The number of deaths in a given period of time infants aged from 28 days to one year per 1,000 live births in that same period.

4.2.7 **Case:** Child whose death was attributed to Sudden Infant Death Syndrome.

4.2.8 **Control:** Living children born within 72 hours of the case and living in the same community care area.

4.2.9 **Case Control study:** An investigation into the extent to which persons selected because they have a specific disease (the cases) and comparable persons who do not have the disease (the controls) have been exposed to the disease's possible risk factors in order to evaluate the hypothesis that one or more of these is a risk factor for the disease.

5. Results

5.1.1 This section of the report describes the cases of Sudden Infant Death Syndrome that occurred in the Republic of Ireland in 2003. National rates and percentages are quoted where possible. For some parameters, such as the place where the baby slept, no national figures are available. However, data from the case control study regarding these same parameters is presented. Furthermore, in examining some parameters, the term "occurred" refers to events that took place in 2003. CSO mortality figures quoted refer to births and deaths registered in 2003, some of which took place in the previous year.

5.1.2 As CSO figures refer only to events registered in that year, it was not possible at the time of this report to determine ascertainment percentages. Ascertainment of deaths due to SIDS was from post mortem reports and F102 forms supplied by coroners. Two cases in 2003 were not reported to the register and thus questionnaires were not obtained. Either post mortem details or coroner's reports were available for all SUDS cases. For suspected SIDS cases, post mortem reports and F102 forms were available for 96% of cases. Due to late registration of some infant deaths, the SIDS figure for 2003 from CSO is different from that of the register which publishes data based on the year of occurrence. In total, 62% (n = 26/42) of SIDS families participated fully in the epidemiological survey while incomplete data was available for 88% of families.

5.2 Infant Mortality Figures

5.2.1 There were 61,517 births registered during 2003. During this period, 311 infant (aged between birth and one year) deaths were registered, 231 of which occurred at ages under 28 days. This gives an infant mortality rate of 5.1 per 1,000 live births, a neonatal mortality rate of 3.8 per 1,000 live births and a post-neonatal mortality rate of 1.3 per 1,000 live births (n = 80).

5.2.2 The major categories of neonatal and post-neonatal deaths for 2003 are outlined in Figures 1 & 2. The difference in proportions between the neonatal and postneonatal figures is due to the large number of babies with congenital anomalies and perinatal problems who die during the first four weeks of life. A comparison of the specific causes of all infant deaths which occurred between 1992 and 2002 with those occurring in 2003 is given in Table 1 (grouped according to the appropriate ICD coding).

5.2.3 From 1988 to 2002, the SIDS rate per 1,000 live births fell by 74% (2.3 v 0.6 per 1,000). In 2003 the proportion of infant deaths due to SIDS, in the post-neonatal period, was 39% (31/80) indicating that SIDS remains a leading cause of death in infants aged four weeks to one year. The corresponding figure for the years 1992 – 2002 combined was 37%. Figures 1 and 2 and table 1 relate to CSO data of deaths registered in 2003. Thirteen cases registered in 2003 actually occurred in 2002, hence difference between CSO SIDS figure and register's SIDS figure which is based on year of occurrence. For comparisons to be valid, CSO data is used.

TABLE 1: DEATHS OF INFANTS UNDER ONE YEAR OF AGE CLASSIFIED BY CAUSE OF DEATH IN THE YEARS 1992 TO 2003.

N = Neonatal, PN = Postneonatal	1992		1993		1994		1995		1996		1997		1998		1999		2000		2001		2002		2003	
	N	PN	N	PN	N	PN	N	PN	N	PN	N	PN	N	PN	N	PN	N	PN	N	PN	N	PN	N	PN
Infectious & parasitic diseases (ICD:001-139)	2	7	2	4	0	2	0	2	2	6	1	5	2	6	3	3	1	8	0	9	1	4	0	4
Meningitis (ICD:320-322)	0	0	0	1	0	3	0	0	1	2	0	1	0	0	1	0	0	1	1	0	2	0	1	1
Other inflammatory disease of the CNS (ICD: 323-326)																	0	1	0	0	0	0	0	0
Diseases of the respiratory system (ICD: 460-519)	3	6	0	4	2	5	3	4	2	3	1	7	2	2	0	4	3	3	3	4	1	5	3	2
Diseases of the digestive system (ICD: 520-579)	0	2	2	1	0	1	1	1	1	2	0	0	0	1	0	0	0	0	2	2	2	1	0	2
Congenital anomalies (ICD:740-759)	104	29	95	35	86	31	78	30	88	17	85	37	97	32	85	29	103	28	87	27	94	26	105	26
Birth injury & difficult Labour (ICD:763,767)	0	0	2	0	1	0	3	0	4	1	3	0	4	0	3	0	6	2	5	0	5	0	2	0
Slow fetal growth & malnutrition & disorders relating to short gestation & unspecified LBW (ICD:764,765)	30	1	42	2	51	3	82	1	55	5	55	9	53	5	30	0	35	1	46	4	48	0	46	1
Anoxic, hypoxic & other respiratory conditions of fetus and newborn (ICD:768-770)	44	4	23	3	21	4	19	0	15	3	15	4	28	6	39	5	26	4	27	2	17	1	16	1
All other conditions originating in the perinatal period (ICD:760-762, 766, 771-779)	26	5	23	0	13	3	18	3	23	3	13	1	31	3	40	4	29	10	40	6	31	9	38	0
Sudden Death, cause unknown (ICD:798)	2	54	2	35	4	35	3	29	3	32	9	44	3	37	2	30	8	40	7	39	3	30	8	34
All other causes	9	15	8	11	12	7	18	12	4	6	14	20	9	9	6	13	8	10	17	9	13	19	12	9
Total	220	123	199	96	190	94	225	82	198	80	196	128	229	101	209	88	219	108	235	102	217	95	231	80

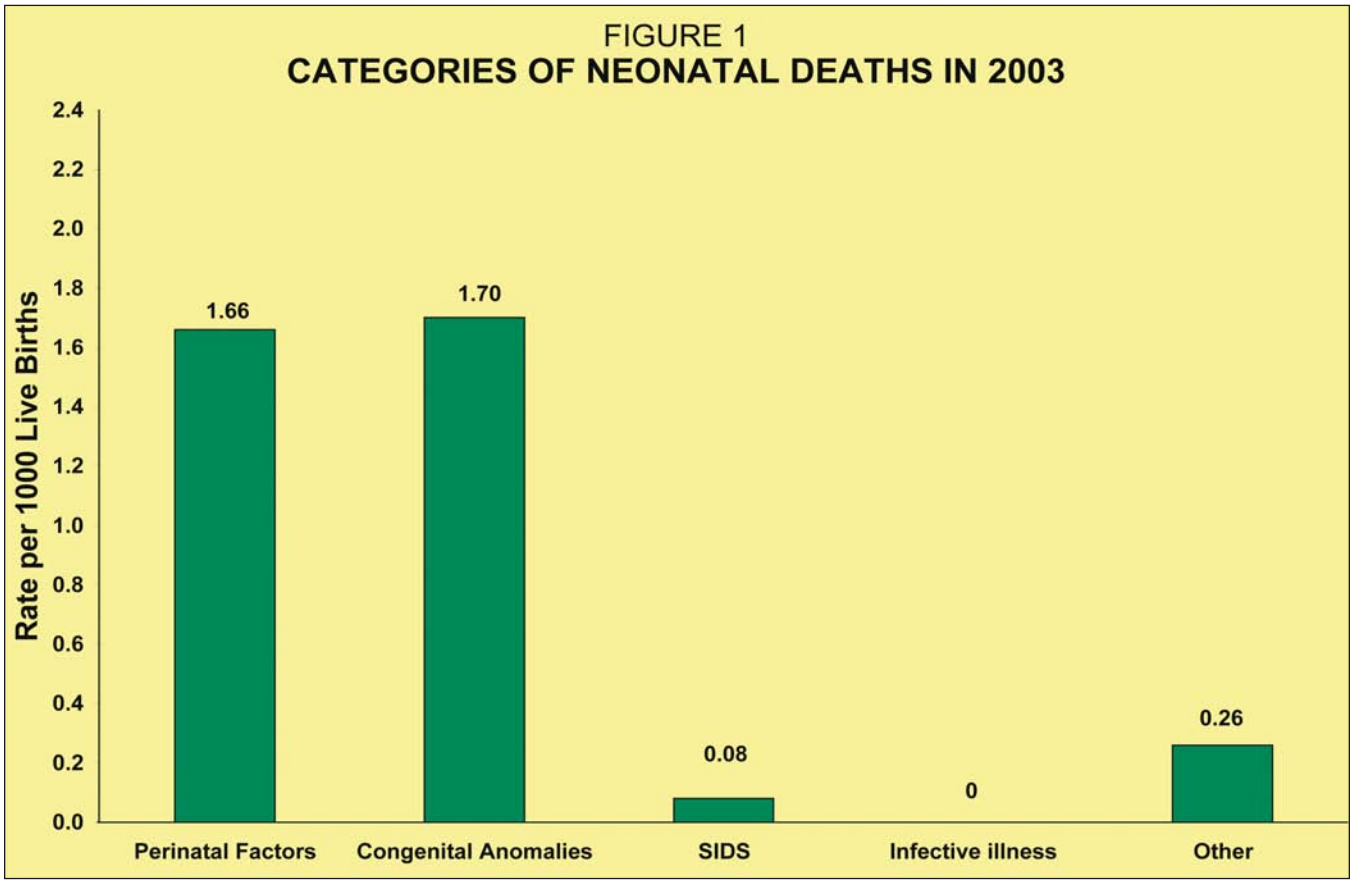


FIGURE 1. Total number of Neonatal Deaths = 231(Period 1st Jan – 31st Dec 2003) Source: CSO Vital Statistics 2003
Neonatal Mortality Rate = 3.8/1000 live births

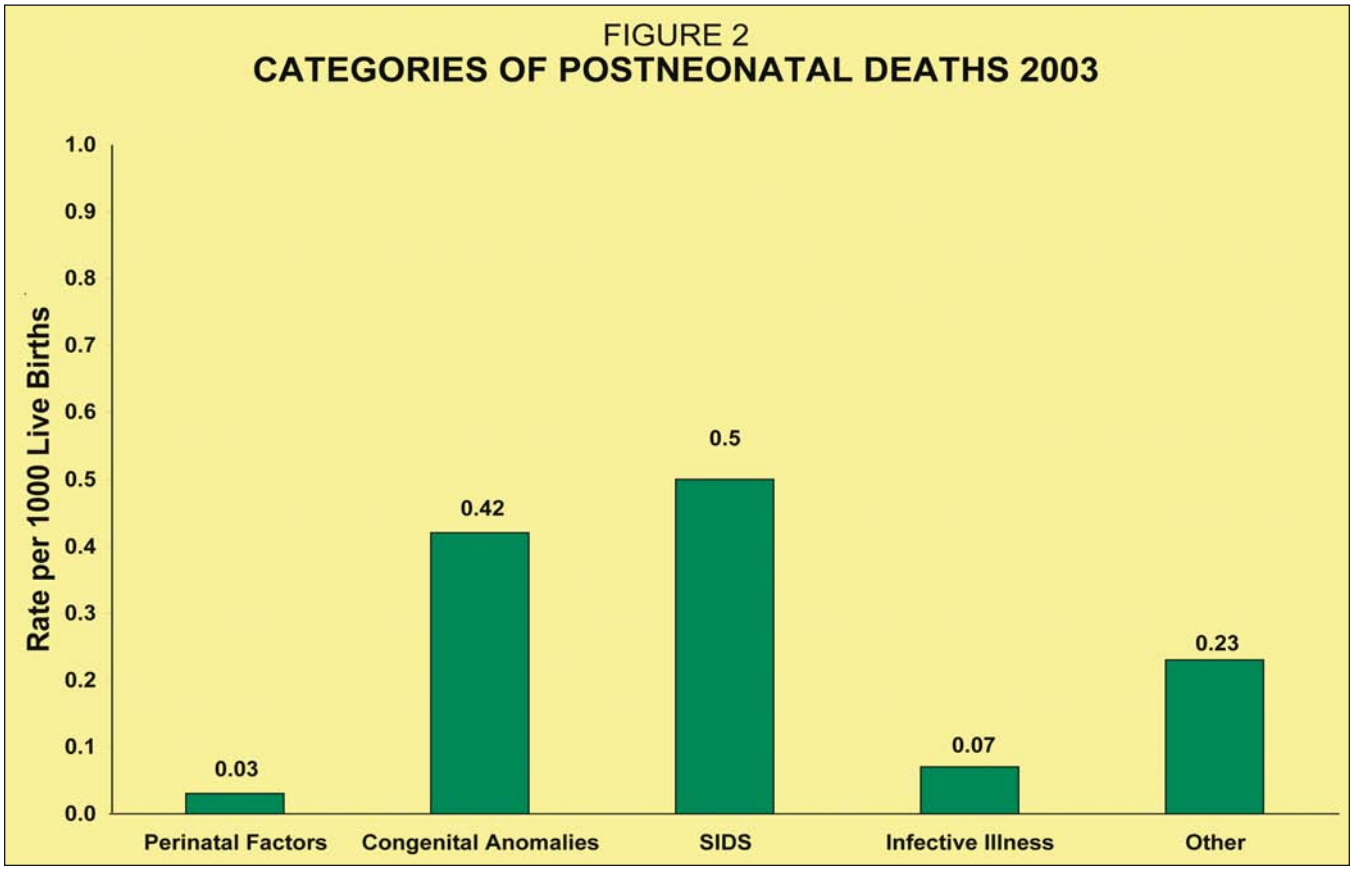


FIGURE 2. Total number of Postneonatal Deaths = 80 (Period 1st Jan – 31st Dec 2003) Source: CSO Vital Statistics 2003
Postneonatal Mortality Rate = 1.3/1000 live births
*Does not include six infants over 52 weeks of age

5.3 Sudden Infant Death Figures

In 2003 the National Sudden Infant Death Register was notified of 55 SUDS, of which 42 (76%) following a thorough post mortem examination, were classified as SIDS (ie certified cause of death). This yields a SIDS rate of 0.68 per 1,000 live births based on CSO registered birth figures for 2003 (61,517). Comparison of rates in previous years is illustrated in figure 3. Six SUDS were certified with an explained cause of death and one case went to inquest (13%). An additional six cases (11%) were certified as 'unascertained' or 'undetermined'. In recent years there has been an increase in the use of the term 'undetermined' or 'unascertained' to certify deaths which would previously have been classified as SIDS (figure 4).

Table 2 outlines the proportion of SIDS cases dying in both the neonatal and post neonatal period. Infant mortality figures from the CSO reported that there were 42 SIDS deaths registered in 2003. A comparison of register data with CSO figures is also presented in table 2. The total number of SIDS cases in infants under one year of age that occurred (reported to the Register) in 2003 represents 12% (n=36) of all infant deaths registered by the CSO during this period. SIDS cases, in the post-neonatal period (reported to the Register, excluding infants over 12 months of age) in 2003 accounted for 39% (n=31) of all registered deaths in that age group. An additional six cases of SIDS reported to the register occurred in infants over twelve months. Five SIDS infants were <=28 days old. While SIDS continues to be a leading cause of death in infants during the post-neonatal period, accounting for four in every ten post-neonatal deaths, the declining SIDS rate is positively contributing to the overall decline in post-neonatal mortality.
Every year since 1992 some of the SIDS deaths have been among traveller families. In 2003 two SIDS cases (5%) were from traveller families.

FIGURE 3
SIDS RATE 1980 - 2003

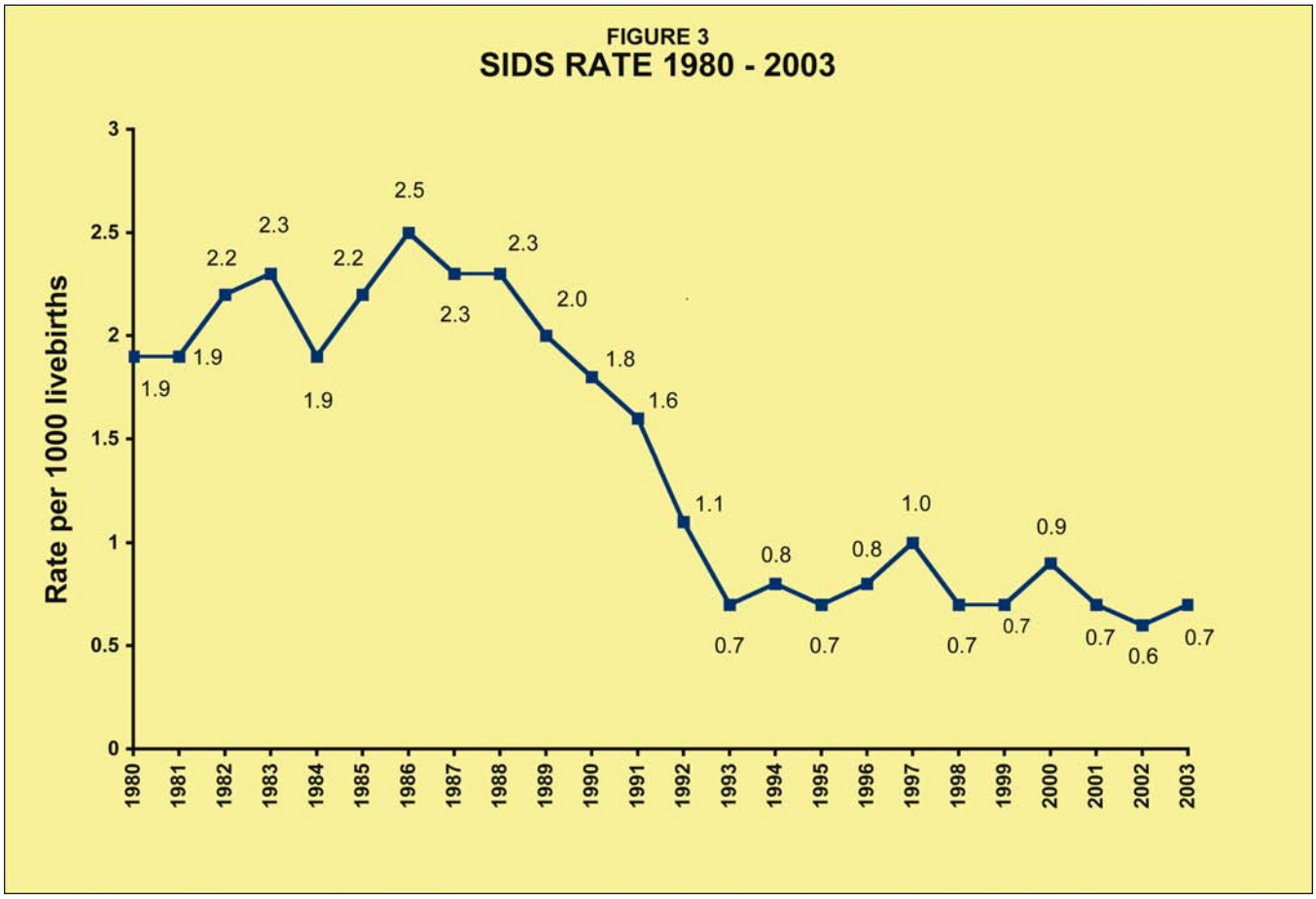


Figure 4

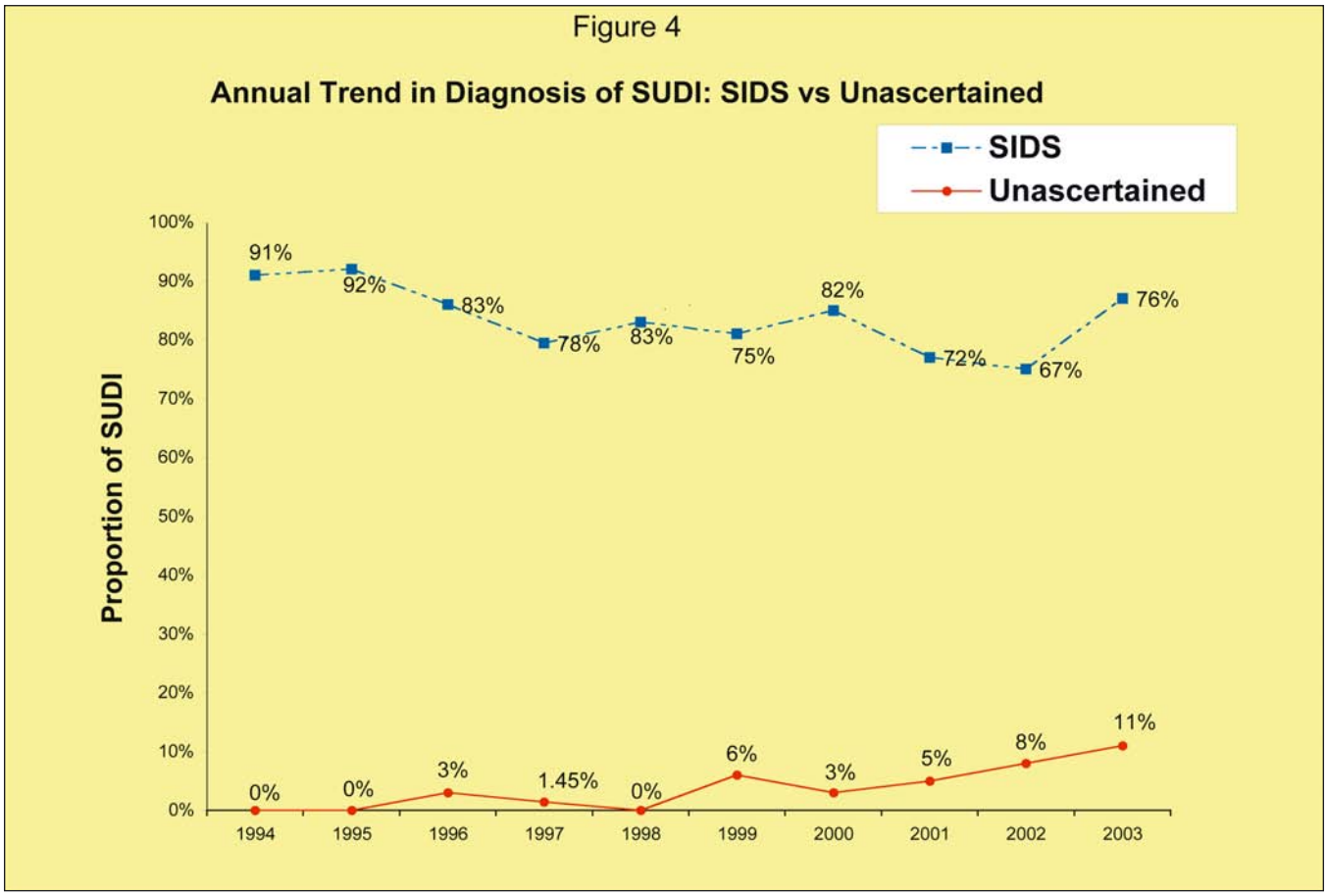


TABLE 2. SIDS CASES AS A PROPORTION OF INFANT DEATHS UNDER ONE YEAR, 2003

	Total Deaths	SIDS	SIDS/Total infant deaths
CSO figures			
Neonatal Deaths	231	8	4%
Post-neonatal Deaths	80	34	43%
Total	311	42	14%
(NSIDR figures)			
Neonatal Deaths	231	5	2%
Post-neonatal Deaths	80	31*	39%
Total	311	36	12%

***Six infants not included were over 1 year of age**

5.4 SIDS Age Distribution

Figure 5 demonstrates the ages at which children died. In 2003, fewer deaths occurred in the 4-8week age group than observed in previous years. Most cases occurred in babies aged between nine and sixteen weeks of age (33%, n = 14). Seventy four percent (n=31) of all cases occurred after the first four weeks of life and less than 52 weeks. The proportion of SIDS deaths in infants older than 52 weeks was greater than in previous years- 14% (n=6) in comparison with 4% for the years 1992 – 2002 combined (n = 19). These infants ranged in age from 59 weeks to 116 weeks.

FIGURE 5

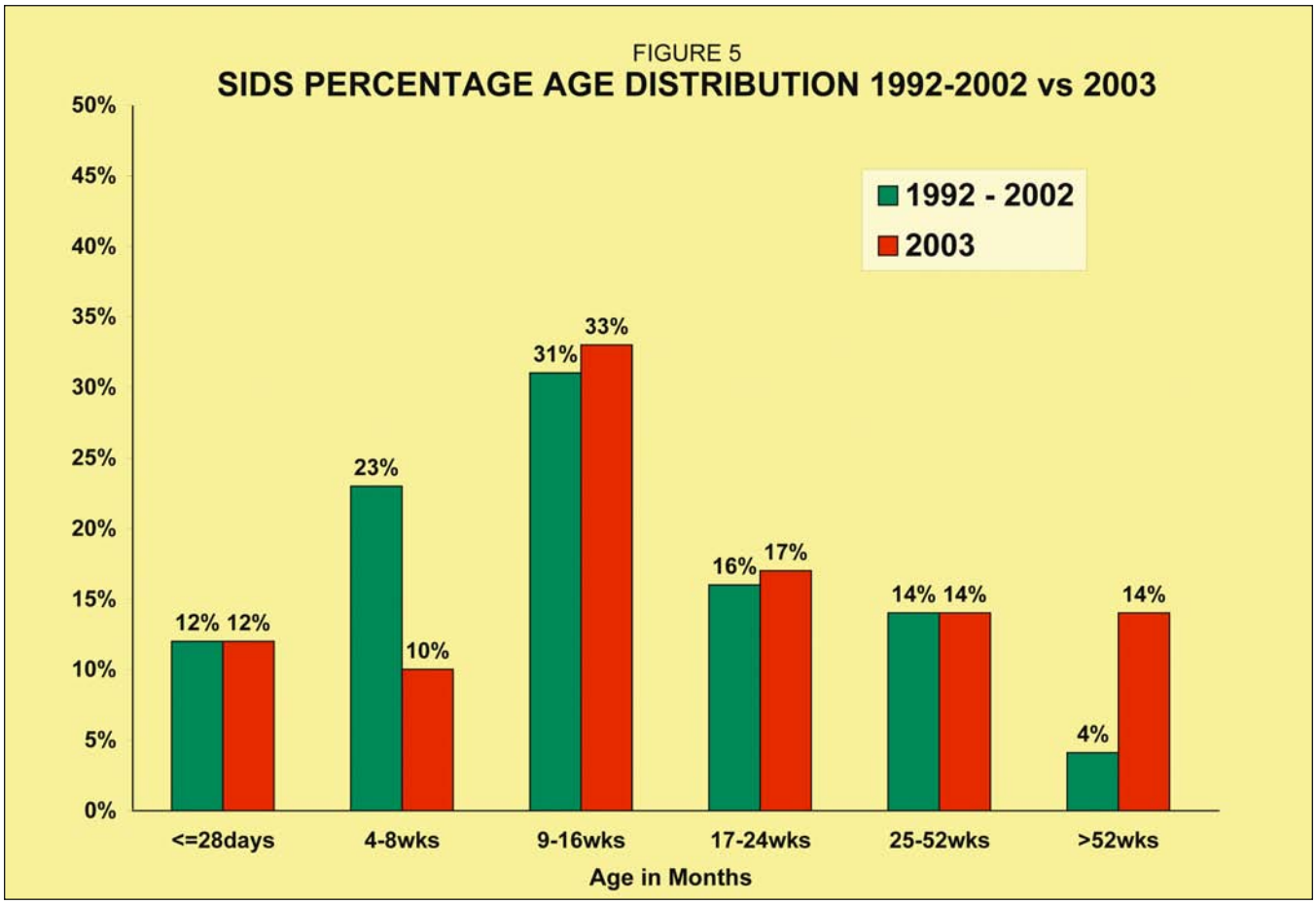
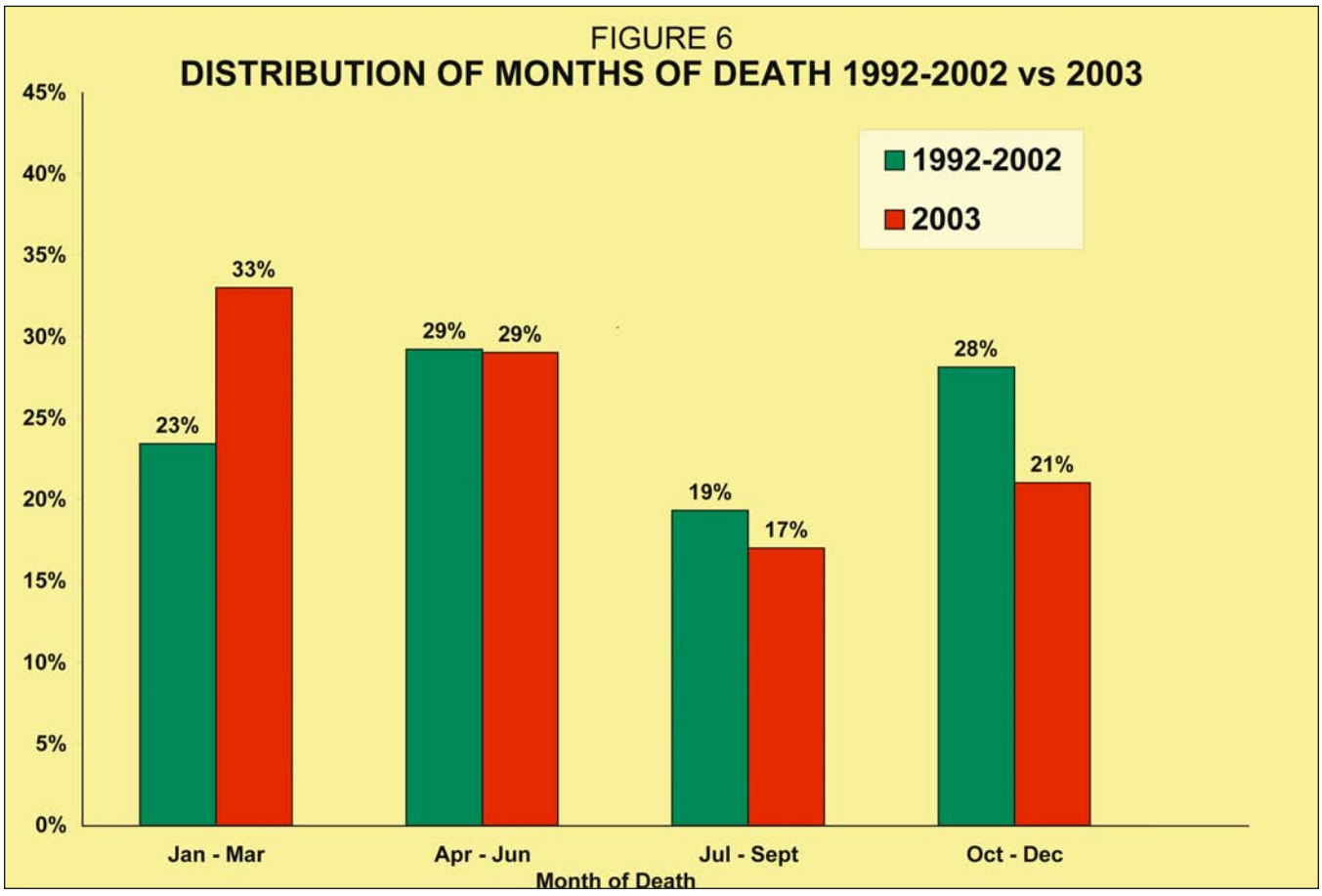


FIGURE 6



5.5 SIDS Seasonal Distribution

Figure 6 illustrates the seasonal pattern of SIDS deaths by calendar month for 1992 to 2002 in comparison to 2003. Throughout the 1980's, the international epidemiology of SIDS showed a predominance of cases occurring in the coldest months of the year. In Ireland, a change in this pattern was first noted in 1993 with a similar number of SIDS cases occurring during summer and winter months. Since 1995 slightly fewer cases have occurred between July and September than any other quarter. The seasonal distribution of SIDS cases in 2003 did not differ from that observed in previous years other than more cases were observed in the first three months of the year than previously, and less in the last three months.

5.6 SIDS Sex Distribution

In 2003 more males than females died of SIDS (67% vs 33%). This is equivalent to a ratio of 2:1 and is consistent with the SIDS pattern of recent years. For the previous years combined (1992-2002) the ratio of males to females was 1.5:1.

5.7 SIDS Geographic Distribution

Table 3 outlines the SIDS rate in each of the separate Health Board areas. These rates are based on the number of live births assigned to each Health Board area by the CSO in 2003. In this year the highest rate of SIDS occurred in the Midland Health Board Area (2.18 vs 0.68 national rate). The Southern, South-Eastern and MidWestern health board areas also had a SIDS rate higher than the national rate. For only the second time in twelve years in the period 1992 – 2003, the SIDS rate in the Eastern Regional Health Authority area has not been higher than the national rate.

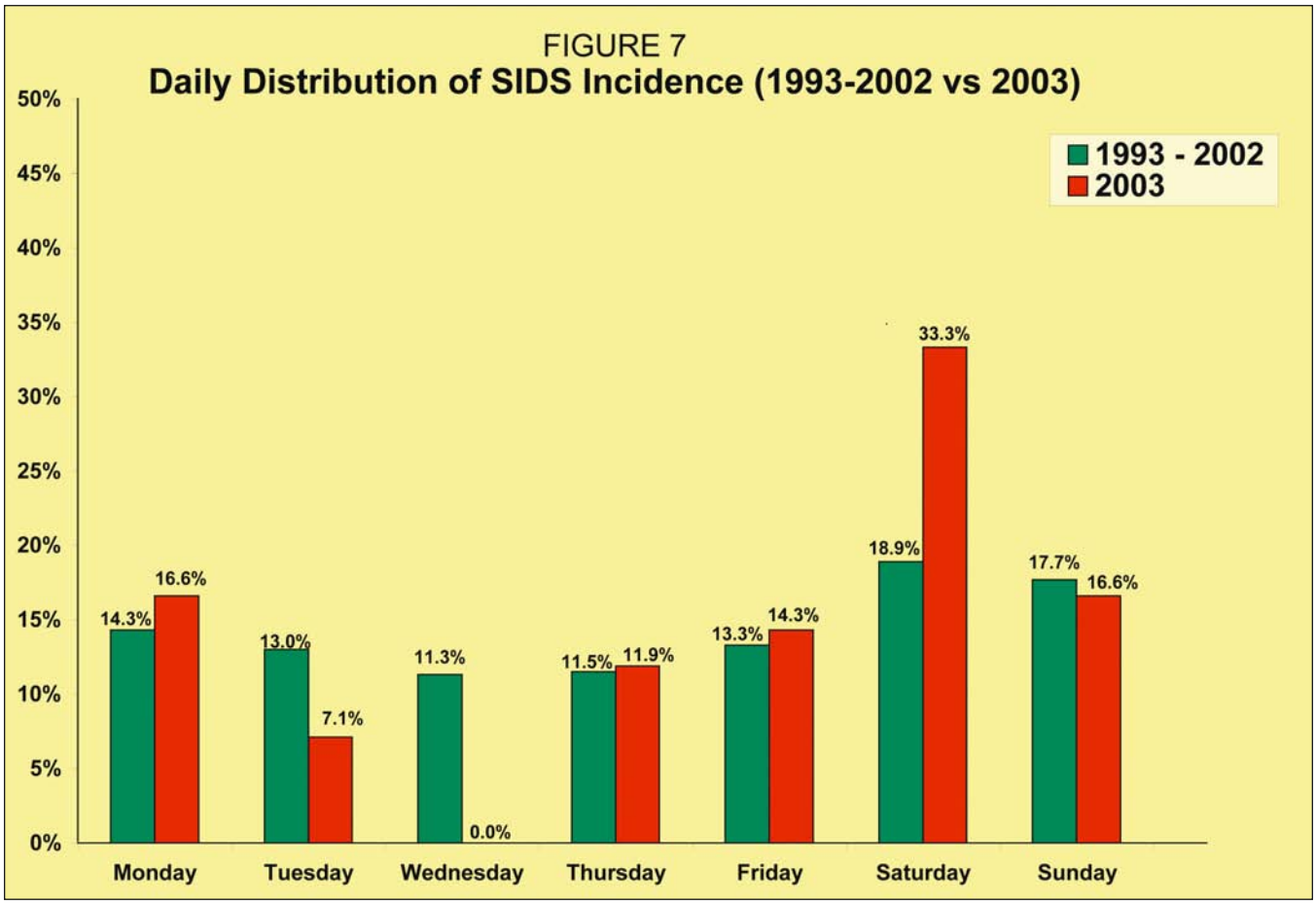
TABLE 3. SIDS RATES PER HEALTH BOARD AREA: 2003 vs 1992-2002

Health Board Area	Births 2003	SIDS cases 2003	*Rate per 1,000 live births 2003	Rate per 1,000 live births 1992 - 2002
Eastern Regional Health Authority	24,521	16	0.65	0.95
North-Eastern	4,774	0	0.00	0.75
Southern	8,586	7	0.81	0.69
Western	6,417	3	0.47	0.86
South-Eastern	6,427	5	0.78	0.70
Mid-Western	4,531	4	0.88	0.79
Midland	3,209	7	2.18	0.63
North-Western	3,052	0	0.00	0.42

*Based on births assigned to each Health Board area in 2003.
Source:National Sudden Infant Death Register, 2003.
CSO, Vital Statistics, Yearly Summary 2003.

5.8 SIDS Day of Death

In 2003 SIDS cases occurred throughout the week with the exception of Wednesday (App B). A weekend trend was observed in 1992, 1995-2001 and again in 2003. Fewer deaths occurred midweek and the largest number (n = 14) occurred on a Saturday (figure 7).



5.9 Location of SIDS Cases at Time of Death

The majority (83%, 30/36) of all SIDS cases in 2003 occurred in the infants' own home environment (App C). This trend is the same as that observed previously in the years 1997 -2002. Other cases occurred in a friend or relative's home (n =5) and at an asylum site (n = 1). SIDS has also been known to occur in cars, creches, hospitals or even in the infants' mother's arms (see previous reports from register).

Eighty three percent (n = 35) of deaths occurred between 10 pm and 8am (App D), a trend consistent with the patterns of all previous years.

5.10 SIDS Socio-demographic Details

5.10.1 Social Class

Father's social class, classified according to the Classification of Occupations, 1991 Population Census, was recorded in 28 cases (App E). Asylum seekers who were not assigned a code for social class were put in a separate category and accounted for 18% (n =5) of case families. The larger proportion of case fathers (54%; n = 15) in 2003 were from social classes 4, 5 and 6 or had never worked. This trend has been apparent since 1992 and each year the figure has been greater than the national figure for social classes 4-6 (the national figure of social classes 4,5,6 for males according to the 2001 census was 40% and 34% for all persons).

5.10.2 Employment Status

Father's employment status was recorded in 29 cases and reveals an unemployment figure of 21% (n=6) (App F) which is similar to the figure for 2002 (20%) but higher than that observed in 2001 (14%). However, the national unemployment figure is also increased from 2001. A similar trend has been evident every year since 1992. Asylum seekers (n = 5) were not included as part of the labour force and

accounted for 17% of cases on which information was available and 12% of all SIDS families. The national unemployment figure reported by the CSO Labour Force Survey during 2003 averages at 4.4% of the total registered work force for all persons and 4.7% for males. At the time of interview, 43% of SIDS mothers were engaged in home duties.

5.10.3 Health Eligibility Status

Health eligibility status was ascertained for 22 cases (App G). Medical card holders accounted for 46% of these 22 cases. Nationally, the proportion of medical card holders at the end of 2003 was 30%. Each year since 1992, the percentage of medical card holders amongst SIDS families has been greater than the national average.

5.10.4 Social Disadvantage Index

A social disadvantage index was devised (using a method based on the Townsend deprivation scoring sytem), scoring 1-5 (where 5 = most disadvantaged) by adding a score of one for each of the following: having a medical card (a low income-based free health service entitlement), living in non-private rented accommodation, non car ownership, both parents being unemployed, and mother in receipt of social welfare. From 27 cases for which this information was available, 48% were socially disadvantaged (ie scoring 3-5).

5.10.5 Parents' Marital Status

Parent (s) marital status was recorded in 26 cases (App H). Fifty percent (n=13) of case mothers were not married. As with previous years this figure is higher than the national average for 2003 (31%). However, of the 26 mothers for whom data is available, 88.5% (n = 23) were cohabiting with the baby's father (App I). Eight percent (n = 2) lived with their parents/guardian.

5.11 SIDS Perinatal Factors

5.11.1 Maternal Age

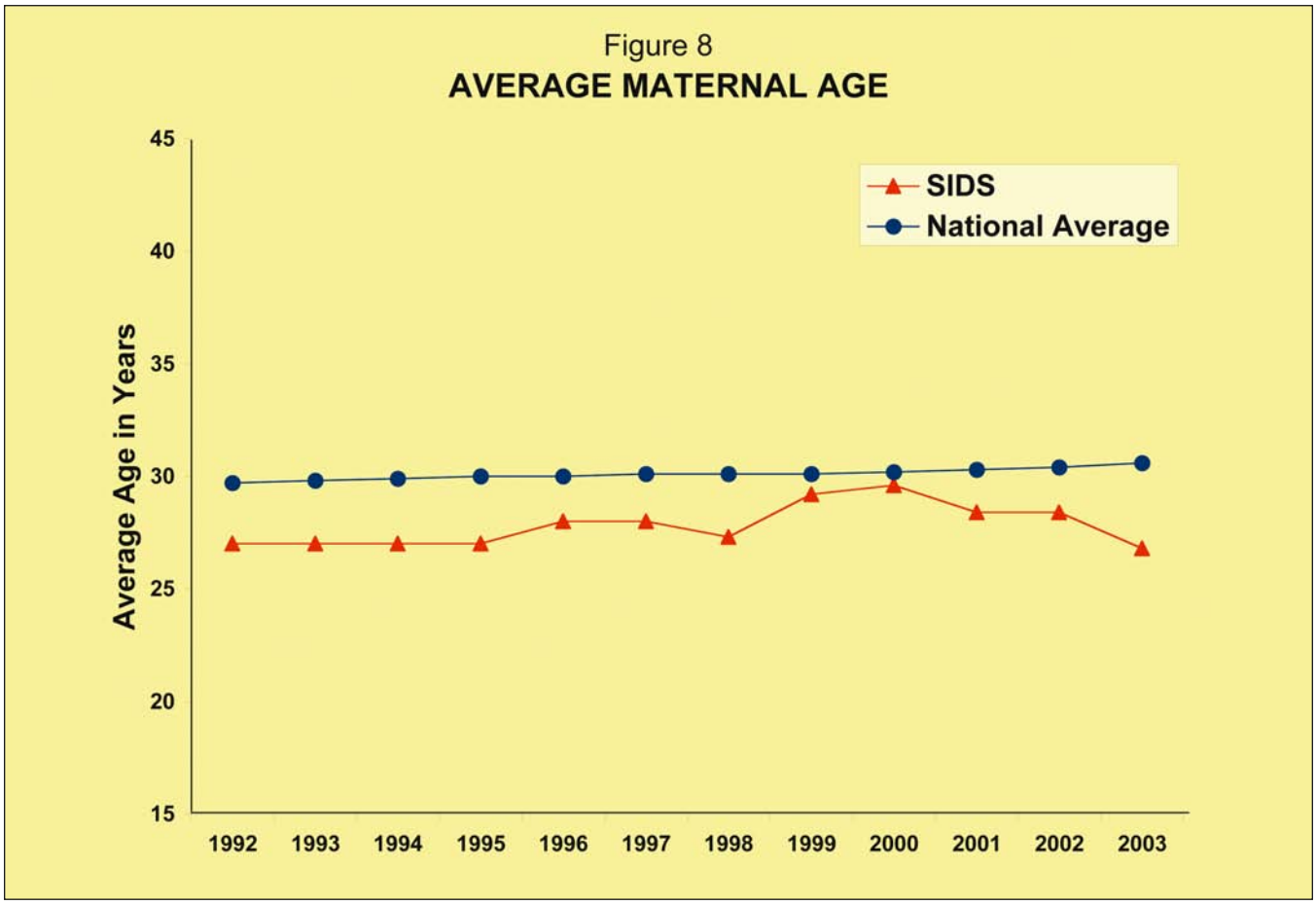
Maternal age was recorded for 25 cases (Table 4). The average maternal age of SIDS cases in 2003 was 26.8 years (range 18 - 39). This is younger than the average maternal age of SIDS cases observed in previous years as well as the national average maternal age for 2003 (30.6yrs). The largest proportion of SIDS cases in 2003 was born to mothers aged between 20 and 24 years. In previous years most case mothers were 25 years of age or older. Every year since 1992 the average maternal age of SIDS cases has been less than the national average (see figure 8).

TABLE 4. MATERNAL AGE OF SIDS CASES.

	SIDS Population, 2003		National Average, 2003		SIDS population, 1993-2002	
Age Group	n	%	n*	%	n	%
<=19 yrs	2	8.0	2,803	4.6	19	5.5
20-24 yrs	10	40.0	8,469	13.8	89	25.6
25-29 yrs	5	20.0	14,806	24.1	103	29.7
30-34 yrs	5	20.0	20,899	34.0	84	24.2
35-39 yrs	3	12.0	11,978	19.5	44	12.7
40 + yrs	0	0.0	2,237	3.6	8	2.3

*Age not stated for 0.5%

Figure 8
AVERAGE MATERNAL AGE



5.11.2 Gestation

Gestation was recorded for 29 cases (App J). The average gestational age for cases of SIDS in 2003 was 39.2 weeks. Preterm babies (less than 37 completed weeks) accounted for 10% (n=3) of SIDS cases. The highest and lowest preterm figures recorded by the register to date were 21% in 1999 and 6% in 1998. During the twelve-year period from 1992 to 2003, the proportion of preterm SIDS cases has always been higher than the national preterm figure (figure 9).

5.11.3 Birthweight

Birthweight was recorded for 29 cases (App K). The mean birthweight for SIDS cases this year was 3414.9 grammes. A total of 14% (n = 4) of cases were considered to be of low birthweight (less than 2,500 grammes) in 2003; a figure which is lower than the previous three years. However, as in previous years, this figure is higher than the 2003 national average low birthweight figure of 5%. The low birthweight figure has been higher in the SIDS population than the national average every year since 1992 (figure 10).

5.11.4 Parity

The number of maternal pregnancies was recorded for 25 cases (App L). Forty percent (n=10) of births were to mothers with no previous liveborn children, while 20% (n=5) had 3 or more previous children. The corresponding national figures for 2003 were 40% and 10% respectively. International data show that SIDS infants are more likely to be of a higher birth order, independent of their mother's age. A short interpregnancy interval is also considered to confer a higher risk. Information on miscarriage history was available for 24 mothers and it emerged that 17% (n =4) of these mothers reported a previous miscarriage. The combined figure for 1992 – 2002 is 19% (n = 85).

Figure 9

Proportion of Preterm Infants: Annual Trend (1992-2003)

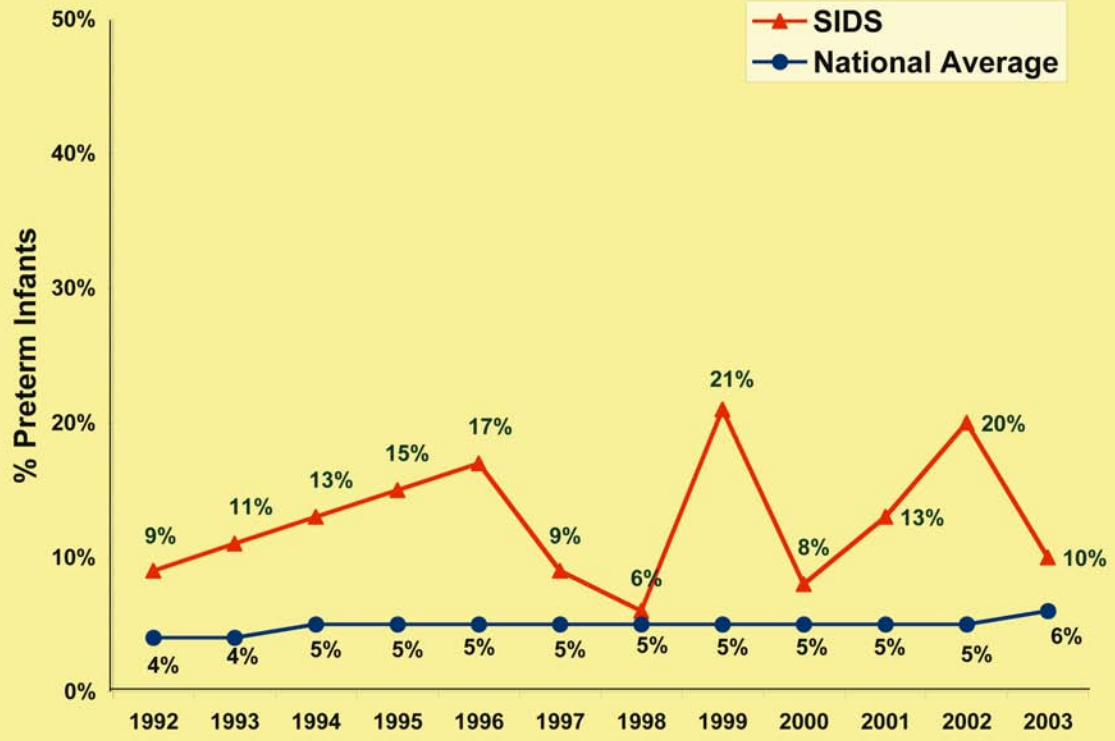
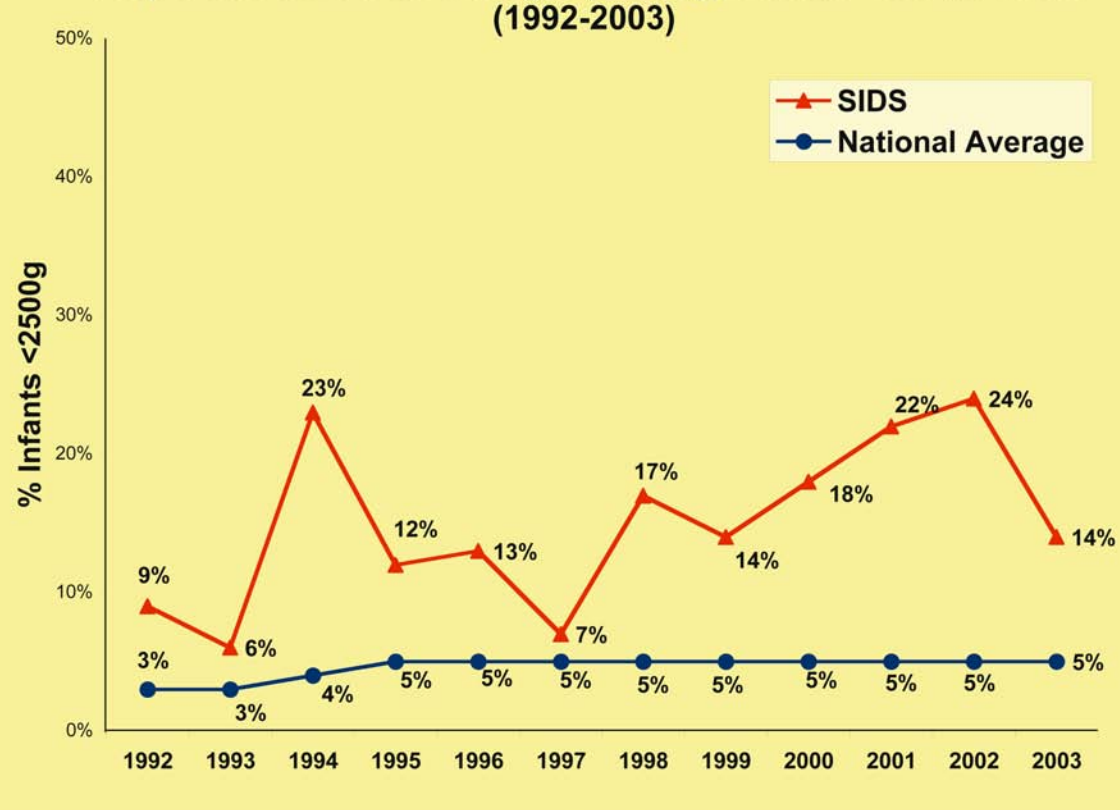


Figure 10

Proportion of Low Birthweight (<2500g) Infants: Annual Trend (1992-2003)



5.12 SIDS-The Impact of 'Reduce the Risks of Cot Death' Guidelines

5.12.1 The parents who participated in home interviews provided information on their parenting practices and smoking habits. Information regarding smoking during pregnancy and feeding practices at the time of birth were ascertained and clarified with medical records.

5.12.2 **Smoking**

Information on parental smoking habits during pregnancy was available for 30 mothers (71%) and 22 fathers (52%). Table 5 outlines the number and percentage of SIDS parents who smoked in 2003 and the average number of cigarettes smoked per day. Figure 11 compares the smoking pattern of parents in 2003 with that from previous years.

Fifty percent of case mothers smoked in 2003 (see table 5). This figure is lower than that observed any year previously. The average proportion of case mothers that smoked in the years 1992-2001 was 74%, with a reduction to 52% in 2002. However the figures for 2002 and 2003 are still higher than the most recently available national figures. A report from the National Health and Lifestyle Survey, published by the Department of Health's Health Promotion Unit in 2003 revealed that the proportion of regular daily smokers in the population was 31% in 1998 and 26% in 2002 for females and 32% in 1998 and 26% in 2002 for males. These data indicate that nationally, there has also been a decline in the smoking rates. Analysis of the register's control data revealed that 15% of expectant mothers smoked in 2003.
Postnatally, the proportion of mothers smoking was 48% (vs 50% during pregnancy). Every year (except for 2002) we have observed that slightly less mothers smoked after the baby's birth than during pregnancy. This may be a reflection of increased emphasis on implementation of health messages regarding smoking around small infants and children but suggests that there may be slightly less awareness of the importance of smoking during pregnancy.

The proportion of fathers who smoked has also dropped from an average of 66% in 1992-2001 to 54% in 2002 which was the lowest figure recorded to date. However this trend did not continue in 2003 as 64% of case fathers stated that they were smokers. The average quantity of cigarettes smoked was 12 per day for both mothers and fathers. The quantity of cigarettes smoked by mothers during pregnancy was only slightly lower than the amount smoked postnatally (table 5). The average quantity of cigarettes smoked per day during pregnancy has reduced very slightly over the years (Figure 12).
A total of 30% (n=7) of parents stated that their child was regularly in a room where people smoked (App M). This figure has been declining steadily from 70% in 1992 to 30% in 1998. Thirty five percent stated that their child was never in a room with smoke.

Sources: National Health and Lifestyle Survey (SLáN) & The Irish Health Behaviour in School-Aged Children Survey (HBSC), Health Promotion Unit, Department of Health and Children, 2003.
ISIDA's National Sudden Infant Death Register, 2003.

Table 5. Parental smoking figures 2003.

During Pregnancy	No.	%	Average No. of cigarettes
Mothers smoking	15/30	50	11 (range: <1-20 cig/day)
Fathers smoking	14/22	64	14.2 (range: 10-20 cig/day)
After Baby's Birth			
Mothers smoking	13/27	48	12.4 (range: 4.5-20 cig/day)
Fathers smoking	13/22	59	12 (range: 10-20 cig/day)

Source: ISIDA's National Sudden Infant Death Register 2003

FIGURE 11

SIDS - RATE OF PARENTAL SMOKING 1992-2003

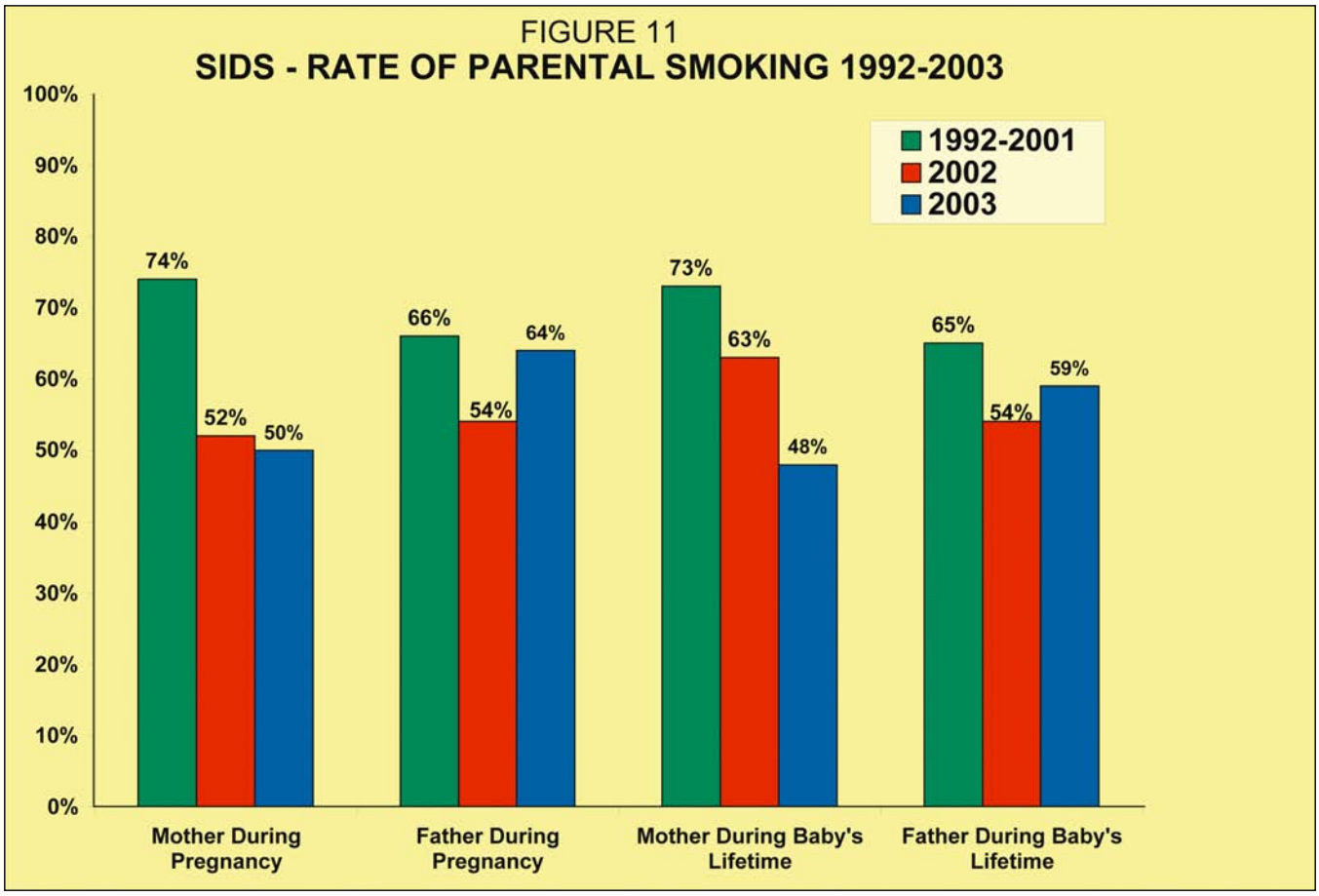
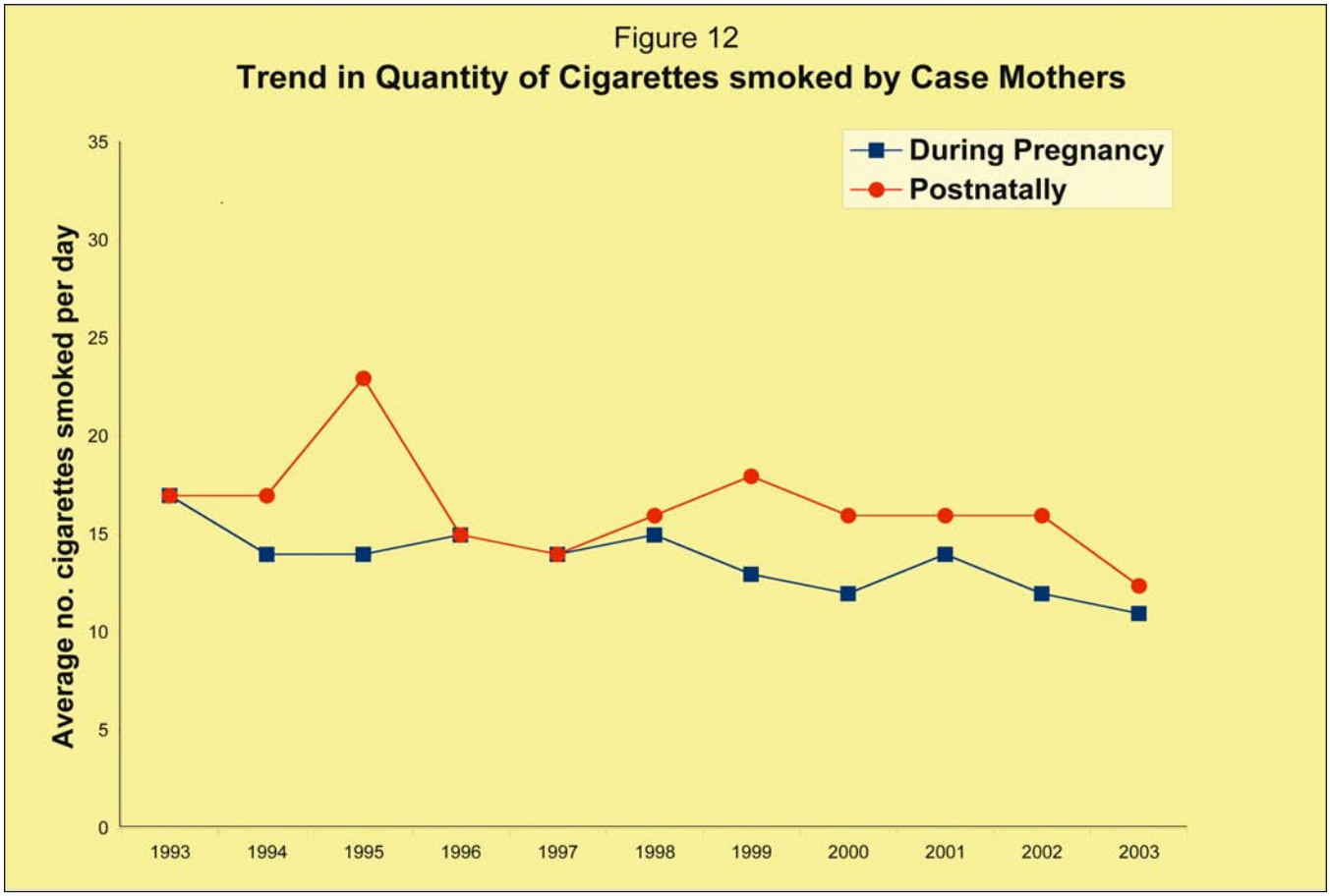


Figure 12

Trend in Quantity of Cigarettes smoked by Case Mothers



5.12.3 Sleep position

Examination of the usual sleeping position of 25 SIDS infants revealed that 75% (n = 18) were regularly placed to sleep on their backs, the highest figure recorded so far and the same as that reported in 2002 (APP N). An additional 8% were regularly placed on their sides and for the remaining 17% (n = 4) of cases the prone position (lying on their stomach) was the usual sleep position employed. Previously, the use of the prone position as the usual method of placing infants to sleep had decreased from 19% in 1992 to only 3% in 1998 and 0% in 2000.

It should be noted that the following data relating to sleep position during the last sleep period represents only 55% of the total SIDS population in 2003 and should therefore be interpreted cautiously.

Table 6 illustrates the pattern of sleep position during the last sleep period. Information was available on 'position placed' for 23 infants (55%) and on 'position found' for 25 infants (60%). Of the 23 infants for whom information was provided, eleven (48%) were placed to sleep in the prone position on the night they died. Twelve were found dead in the prone position, accounting for 48% of cases included in the analysis. These are the highest figures recorded to date and, they demonstrate that use of the prone position has increased in comparison with previous years (table 6). Figure 13 demonstrates the annual trend in use of prone sleeping among SIDS cases for the years 1994-2003. There was a gradual reduction in the proportion of infants placed to sleep in the prone position before it started to increase again in 2002. Less annual variation was observed in the proportion cases found prone.
The proportion of babies who were found dead in a different position from which they were placed to sleep was 19% (4/21). Two were found on their sides after being placed on their backs and two found on their backs after being placed prone.

Figure 13

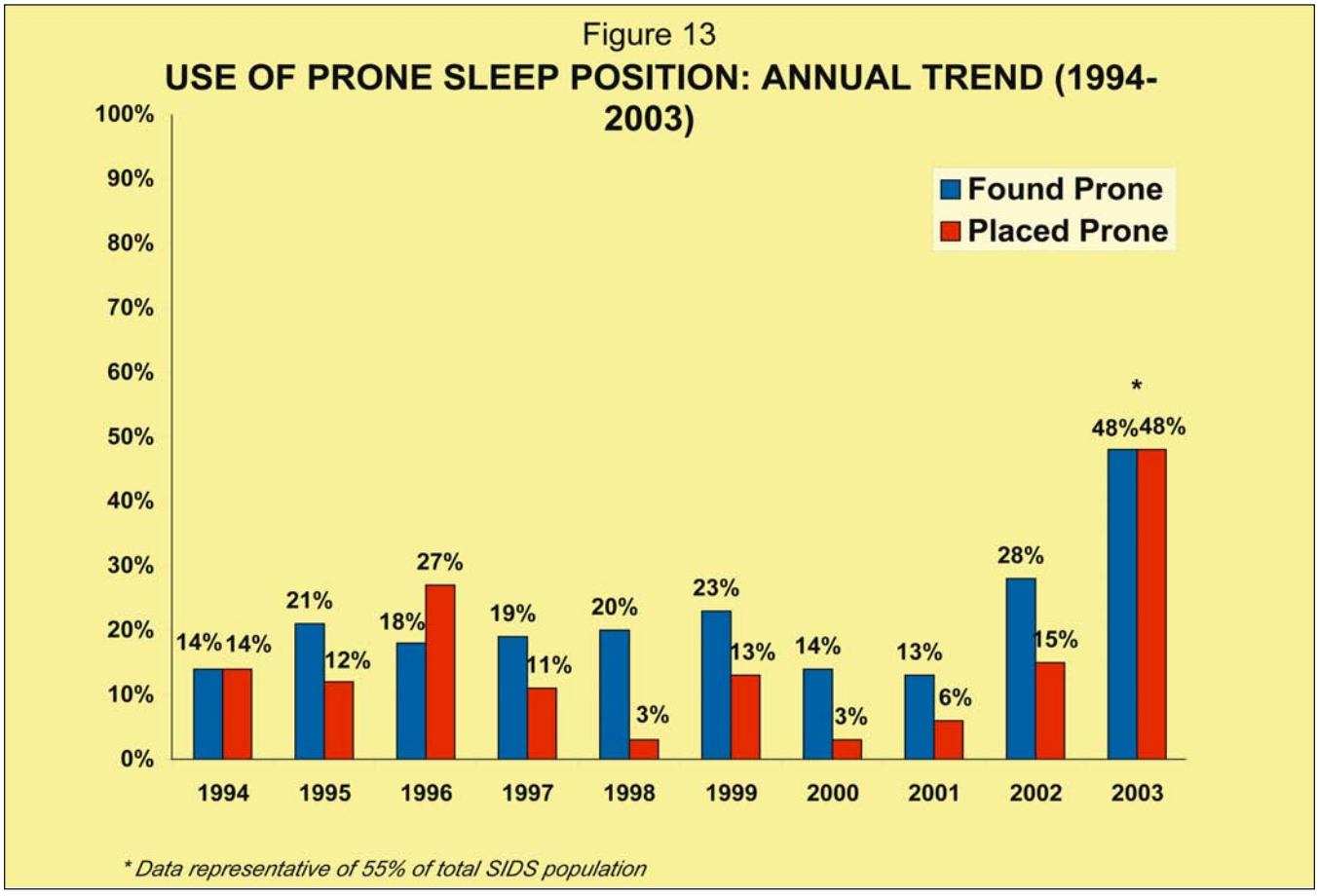


TABLE 6. MOVEMENT OF SIDS CASES DURING THE LAST SLEEP PERIOD.

	Position put to sleep		Position found dead	
	1992 - 2002	2003	1992 - 2002	2003
Back	170 (48.3%)	10 (43.4%)	160 (45.7%)	10 (40%)
Side	137 (38.9%)	2 (8.7%)	96 (27.4%)	3 (12%)
Prone	42 (11.9%)	11(47.8%)	90 (25.7%)	12 (48%)
Other	3 (0.9%)	0	4 (1.1%)	
Total	352	23	350	25

Note:- Information on sleeping position "placed" not available for two infants.

5.12.4 Infant-Parent Co-sleeping

Examination of the infant's sleeping environment is an important element of SIDS research. A number of epidemiological studies identifying infant-parent co-sleeping as a risk factor for SIDS[1-6] have initiated much debate as to whether or not it is safe for babies to co-sleep with adults in adult beds and the international data on this issue lacks agreement. In our study co-sleeping is defined as any shared sleeping arrangement of an infant with a parent(s)/sibling/other adult on or in a bed/sofa/armchair. Co-sleeping with an infant on a couch/sofa is considered particularly dangerous and should be excluded from analysis aiming to determine the risk associated specifically with infant-parent bed-sharing. In general it is agreed that bed-sharing should be avoided if parents are smokers, have consumed alcohol or other drugs, or are ill or excessively tired. So while there are some situations where bed-sharing is clearly dangerous, whether bed-sharing per se poses a risk remains to be determined. Although there is no evidence that bed-sharing reduces the risk of SIDS, it is encouraged by some in order to promote successful breastfeeding and increase infant arousability [7,8] and it is the common method of sleeping arrangement for many cultures, including those with very low SIDS rates [9-12]. Proposed mechanisms whereby bed-sharing could increase an infant's risk include head covering with bedding, use of soft bedding such as pillows and duvets and overheating. There is also the added risk of accidental suffocation.

Information on co-sleeping status during the last sleep period was available for 37 infants (table 7). In 2003 the proportion of cases found dead whilst co-sleeping with an adult was 57% (21/37); 49% (n = 18) in beds and 8% (n = 3) on sofas or armchairs. These figures demonstrate a continuation of the trend of high levels of bed-sharing among SIDS cases (Figure 14). Only 21% of babies (n =5) co-slept as a usual practice (table 7). However information was not available for 45% of cases. Most cases that were found while co-sleeping were unaccustomed to this type of sleeping arrangement (8 out of 11 on which there was information available on both usual and last sleep). Every year a larger proportion of infants are found bed-sharing during the last sleep than do so as a usual practice (figure 14).

Analysis of case control data examining the infant's sleep environment concluded that co-sleeping should be avoided in infants whose mothers smoked during pregnancy and were less than twenty weeks of age. The risk associated with co-sleeping was not significant for those babies who were subsequently placed back in their own cot to sleep and only infants who were co-sleeping for the entire sleep period were at increased risk of SIDS. Thus bed-sharing for the purpose of breastfeeding would not increase the SIDS risk provided the baby is placed back in their own cot afterwards. This data has been published in the Archives of Disease in Childhood (2003, Vol88 pp1058-1064)[1]. Further analysis of this data using additional data collected in the years 1999-2001 revealed that for babies whose mothers smoked, bed-sharing increased the risk of SIDS by a factor of 14. For infants whose mothers did not smoke, the associated risk was close to but not quite significant (table 8). The small number of cases bed-sharing among non-smoking families makes it difficult to accurately estimate the bed-sharing risk for this group.

The associated risk was also dependent on infant birth weight (adjusted for gestation, parity and gender) and the combined tog value of infant clothing and bedding. This data is outlined in table 8. The risk associated with bed-sharing was three times greater for infants with low birth weight (UOR 16.28 vs. 4.90), and increased fivefold if the combined tog value of clothing and bedding was ≥ 10 (UOR 9.68 vs. 2.34).

Figure 14

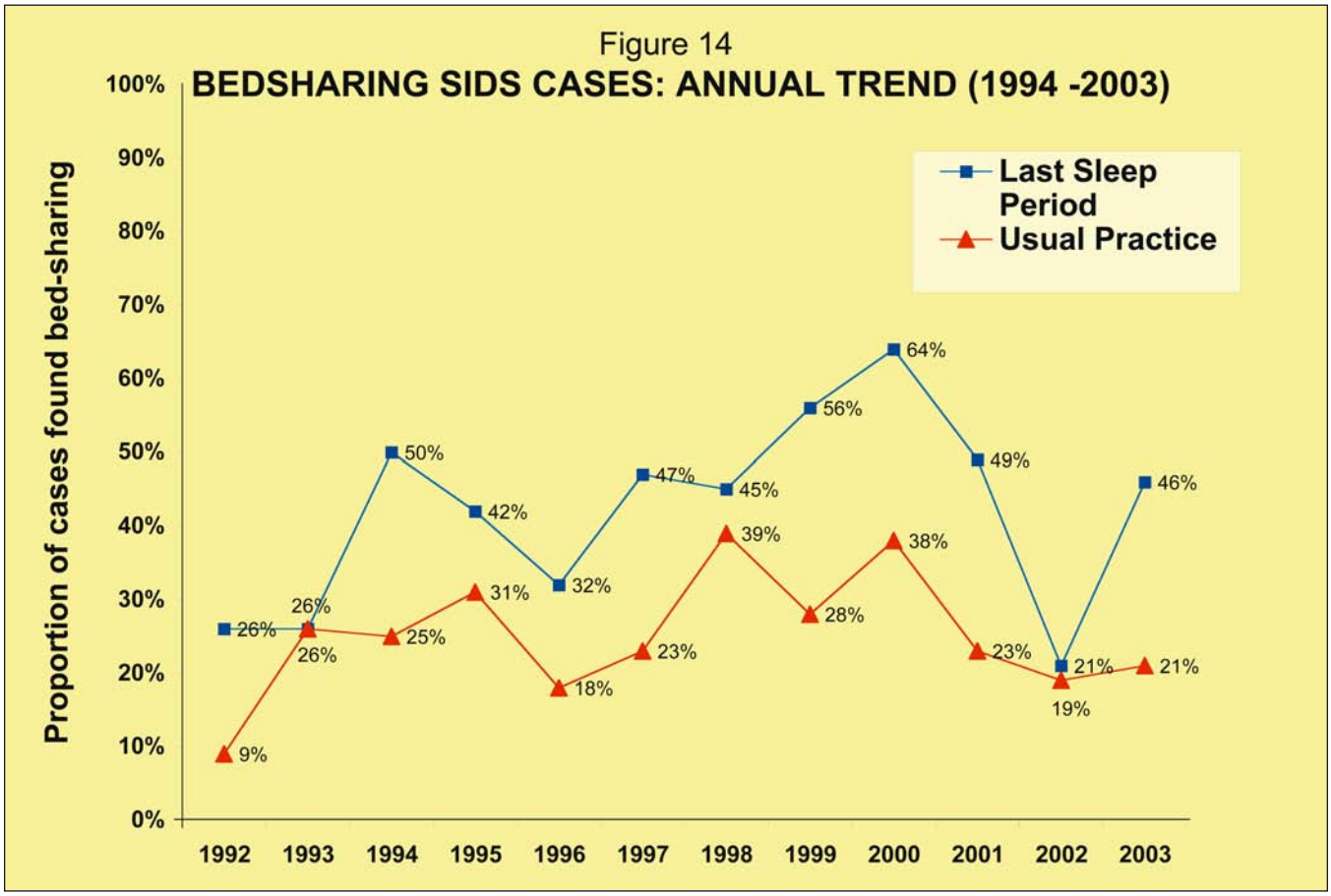


TABLE 7. INFANT-PARENT CO-SLEEPING 2003: USUAL VS LAST SLEEP.

	Usual Sleep Day		Usual Sleep Night		Last Sleep Period	
	N	%	N	%	N	%
Own cot/pram/basket	13	56.5	19	79.2	15	40.5
In own bed					1	2.7
In bed with parent(s)	1	4.3	5	20.8	18	48.6
On sofa with parent(s)	-	-			3	8.1
On sofa/chair by self	6	26.1				
In bed with sibling	-	-	-	-	-	-
Car seat/baby chair	3	13.0	-	-	-	-
Total	23	100.0	24	100.0	37	100.0

Table 8: Odds Ratios for Bed-sharing;
Effect of stratification by maternal smoking status, tog value and z scores at birth.

Group	Cases		Controls		Odds Ratio for	95% CI
(a) Maternal smoking status	n	%	n	%	Bed-sharing	
Bed-sharing and Mother smoker	109	42	17	2	13.87	9.58 – 20.09
Bed-sharing and Mother non smoker	17	7	783	10	2.09	0.98 – 4.39
(b) Tog value of clothing and bedding						
Bed-sharing and tog _10	102	40	57	7	9.68	8.41 – 11.14
Bed-sharing and tog <10	24	9	44	5	2.34	1.12 – 4.95
(c) Z scores of weight for gestation at birth						
Bed-sharing and Z scores -0.81	57	25	17	2	16.28	14.15 – 19.10
Bed-sharing and Z scores > -0.81)	56	24	72	10	4.9	2.88 – 8.41

Proportions refer to number of subjects that were bedsharing, subcategorized according to variables listed.

5.12.5 Thermal Environment

Data on personal clothing and bedding, which the baby used, both normally during sleep and at the time of the baby's death, was available for 23 cases (App O). While there were individual variations in the amount of clothing and bedding used, generally parents tended to increase the tog values during the night time sleep compared to the day time sleep. The data for 2003 showed that during the daytime sleep, only 4% (n = 1) of children routinely had a tog value more than or equal to 10, while at night 30% (n = 7) of babies routinely had a tog value ≥10. The corresponding figure for the last sleep period was 35% (n = 8). The proportion of cases with a high tog value for the last sleep has been decreasing gradually over the years. The average tog value for the last sleep period in 2003 was 7.6, the lowest figure recorded to date. Examination of this variable over time has indicated a decreasing trend (figure 15).

Analysis of the case control study data (1994 to 1998) revealed that significantly less control babies than SIDS cases had a tog value of 10 or more (50% controls vs 67% cases) at the time of the last/reference sleep. In a univariate analysis, the risk of SIDS was more than doubled when a tog of 10 or more was used at the time of the last sleep (table 9).

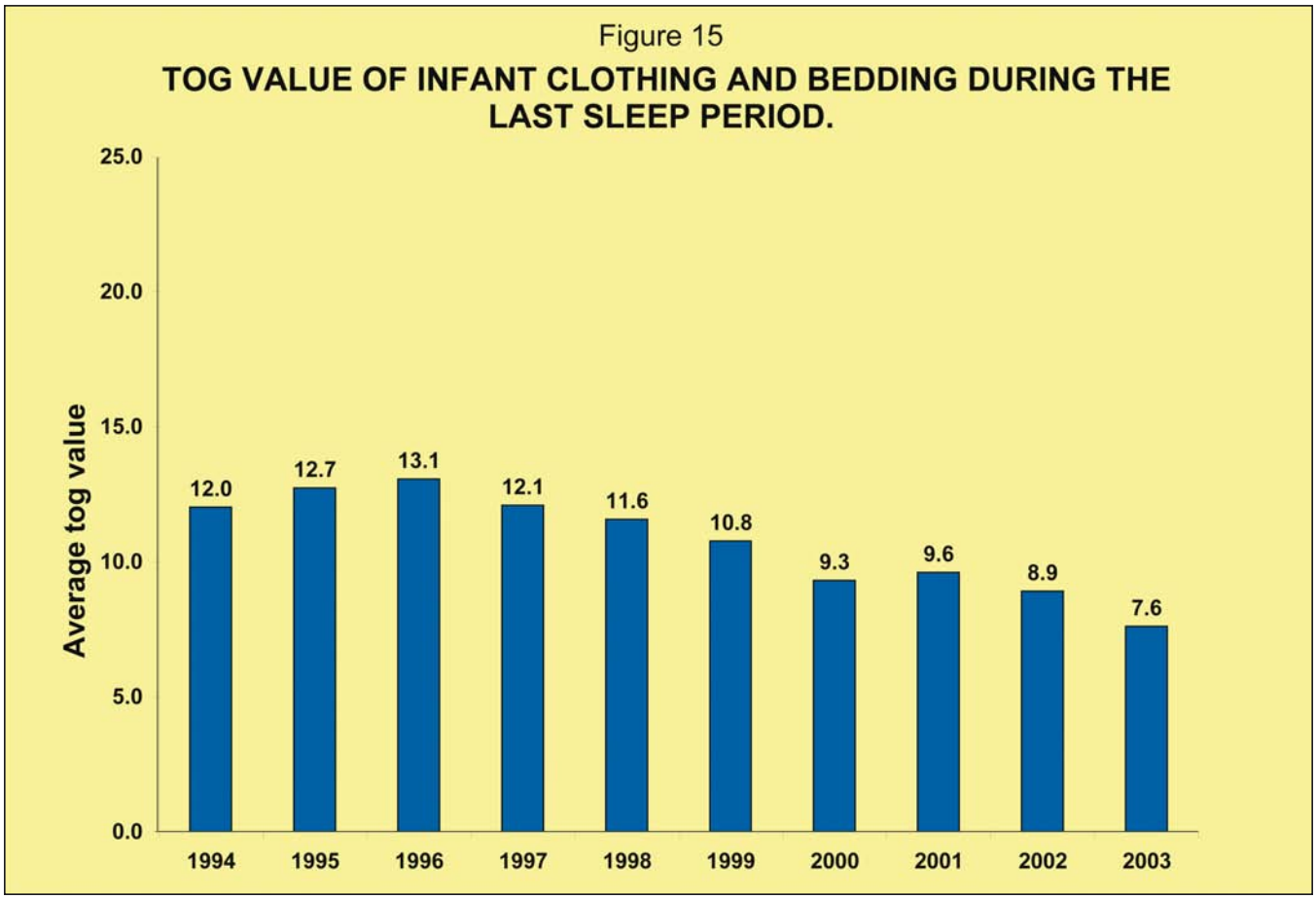
Table 9: Effect of thermal environment during the last sleep on risk of SIDS (1994 - 2001)

	Cases		Controls				
Tog	n	%	n	%	Odds Ratio	95%CI	P value
<10	106	40	479	56			
>= 10	156	60	369	44	2.52	1.82 - 3.48	<0.001

5.12.6 Feeding

Information on babies' feeding patterns was recorded for 24 cases (App P). At the time of birth, 37.5% (n=9) of babies were initiated breastfeeding, a return to the average figure for previous years (30%) which was not observed in 2002 (12%). This figure is only slightly less than the 40% national figure estimated in 2000 by the ESRI (Report on Perinatal Statistics, 2004). Each of these mothers continued to breastfeed for at least the first two weeks of the infant's life.

Figure 15



5.12.7 **Reported Medical Problems**

Seventy six percent (23/30) of SIDS cases in 2003 had a history of illness during their lifetime, a figure greater than that observed in previous years. The illnesses reported included mostly respiratory and other infections (App Q). Case control data (1994-2001) revealed that 61% of SIDS cases had reported medical problems during their lifetime compared with only 27% of controls. In a univariate analysis children who suffered from medical problems during their lifetime were five times more likely to die from SIDS (table 10). The associated risk remained statistically significant even when adjusted for as many confounding variables as possible in the multivariate analysis. A summary of information on general health and wellbeing of case and control infants at various stages of their lifetimes, collected for the years 1994-2001 is outlined in table 10.

5.12.8 **Recent Illness in Baby**

Analysis of data regarding the infants' wellbeing in the last 48 hours prior to death revealed that 25% of cases (6/24) had symptoms or problems, varying from colds and/or coughs to altered sleeping patterns (App R). The total proportion of infants who experienced any problems was similar to the previous three years and less than 1994 – 1999 combined (65%). Almost half of the cases in 2003 for whom data was available (46%; 11/24) had visited their GP in the week prior to death although most of these (8/11) were attending because they were due a routine checkup or for vaccinations. Examination of case control data revealed that a significantly higher proportion of SIDS cases than control babies had experienced minor illness in the 48 hours prior to death. This caused a twofold increase in the risk of SIDS following univariate analysis of data which became non significant after controlling for other confounding variables in the multivariate analysis (table 10).

Table 10: Univariate Analysis of Risk Factors for SIDS: Infant's Health and General Wellbeing (1994 - 2001)

	Cases		Controls					*		
A: 48hrs prior to Death	**n**	**%**	**n**	**%**	**OR**	**95%CI**	**Pvalue**	**OR**	**95%CI**	**Pvalue**
Physical Symptoms										
General wellbeing ie any symptoms/problems	101	39	207	25	2.08	1.47 - 2.96	<0.001	1.67	0.85 - 3.29	ns
Snuffles	59	22	229	28	0.99	0.69 - 1.41	ns			
Chest complaints (any)	250	25	187	23	1.06	0.73 - 1.55	ns			
Any gastrointestinal, stomach, bowel problems	22	9	45	5	1.68	0.94 - 3.00	ns			
Diarrhoea	14	6	32	4	1.59	0.80 - 3.16	ns			
Vomiting	9	4	16	2	1.86	0.74 - 4.66	ns			
Skin rash	33	13	122	15	0.91	0.57 - 1.42	ns			
Pale appearance (compared to usual)	9	4	23	3	0.95	0.37 - 2.43	ns			
Flushed appearance	11	4	40	5	1.05	0.51 - 2.14	ns			
Temperature	4	2	19	3	0.79	0.62 - 1.01	ns			
Sweating more than usual	4	2	18	2	0.86	0.23 - 3.21	ns			
Colder than usual to touch	2	1	5	1	1.03	0.10 - 10.02	ns			
Behavioural Changes										
Baby sleeping more than usual	46	18	64	8	2.19	1.39 - 3.44	<0.01	1.48	0.57 - 3.84	ns
Baby drowsy when awake	24	9	17	2	3.80	1.94 - 7.46	<0.001	1.51	0.36 - 6.36	ns
Baby less responsive than usual	18	7	23	3	2.13	0.94 - 4.74	0.07			
Baby taking less fluids than usual	48	18	53	6	2.65	1.64 - 4.29	<0.001	2.40	0.86 - 6.77	0.09
Passing less urine than usual	11	4	21	3	1.15	0.46 - 2.90	ns	0.49	0.03 - 7.17	ns
Unusual cry/ change in crying pattern	37	14	33	4	3.42	1.92 - 6.11	<0.001	0.67	0.11 - 3.94	ns
B: Last Week										
Baby visited GP in last week	111	41	241	27	1.69	1.21 - 2.35	<0.01	1.61	0.76 - 3.44	ns
Medication in Last week	88	32	256	28	1.12	0.79 - 1.58	ns			
C: Baby's lifetime										
Feeding problems	115	42	300	34	1.37	0.95 - 1.98	ns			
Crying/colic problems	89	33	187	22	1.81	1.28 - 2.55	<0.01	1.75	0.84 - 3.61	ns
Sleeping problems	30	13	79	11	1.16	0.68 - 1.96	ns			
Illness (any)	161	61	227	27	4.86	3.38 - 6.98	<0.001	4.15	1.97 - 8.74	<0.001
Baby prone to sweating	80	31	132	16	2.64	1.79 - 3.88	<0.001	1.86	0.83 - 4.15	ns

General wellbeing includes being 'off form', 'teething' and 'vaccinations received'
Baby's lifetime refers to the time period following discharge from hospital and excluding the last two weeks of life
*Adjusted for infant age at death/interview

6.0 Discussion

6.1 The availability of accurate information regarding the incidence of SIDS in the Republic of Ireland, coupled with the excellent participation of families and professionals provides an essential database with which to monitor emerging trends. As with other years it is vital that interpretation of data based on small numbers is viewed with caution. The potential influence of random variation must be also considered and some data may require monitoring over time before being accepted as accurate.

6.2 There has been a steady decline in the SIDS rate in Ireland since the early nineties and the rate of 0.6 recorded in 2002 is the lowest on record. In 2003 the rate was 0.68. The overall infant mortality rate (5.1 per 1,000 live births) is also lower than in previous years. The 2002 figure of 0.6 per 1,000 livebirths represents a 74% drop from that observed in 1988 (2.3 per 1,000 live births). Despite this reduction in the number of cases, SIDS remains the leading cause of death in infants aged four weeks to one year, accounting for 43% of all deaths in this age group in 2003.

6.3 While the rate of SIDS has decreased slightly, we have observed an increase in the rate of infant deaths certified as 'unascertained' or 'undetermined', (0.10 per 1000) raising the possibility that this slight reduction may be attributed partly to a change in diagnosis. In 2003 six cases were certified as 'unascertained' and a further two cases as SIDS/unascertained. If these deaths were included in the SIDS figures we would have observed an increase in the SIDS rate. This increase in the use of unascertained as a diagnosis has also been observed in the UK and there is currently much debate regarding its use, which generally occurs in cases where the pathologist is undecided about whether the case falls into the category of SIDS or not. However the criteria for the use of this terminology in cause of death statements are not standardized and far from clear. In addition many deaths are being classified as SIDS without the recommended death scene investigation or complete post mortems, increasing the likelihood of misdiagnosis. In Ireland even when a case is diagnosed as unascertained on a PM report it may still be certified as SIDS by the coroner. This can lead to misleading SIDS statistics and there is now an urgent need internationally for a standardized protocol for conducting autopsies on suspected SIDS cases. Death rates from SIDS are variable among developed countries and comparisons between countries should be carefully interpreted. The variance in rates from country to country may be due partly to differences in the reporting and coding of sudden unexpected infant death and may also be related to the fact that pathologists are working to different standards, definitions and protocols. Such diversity makes meaningful comparisons of international statistics impossible. In an article, currently in press we have outlined how the SIDS rate in Ireland varies significantly when the defining criteria are altered and suggest that rather than using 'unascertained' as an alternative diagnosis to SIDS, it may be more beneficial to have a separate classification for cases that lack complete investigation and remain unresolved[14].

6.4 In keeping with data from previous years and with international SIDS data, most SIDS cases (33%) this year occurred within the 2-4 month age group. The proportion of deaths occurring in the 4-8 week age group has decreased slightly and there was an increase in the proportion of deaths in young children greater than 52 weeks of age. The seasonal fluctuation of deaths in previous years has been small. In 2003 the distribution of deaths ranged from 17% occurring between July and September, the warmest months of the year to 33% occurring between January and March, the coldest months. Since 1993, there has been little or no seasonal variation and no change in the seasonal distribution in 2003. The greatest number of cases in 2003 occurred on a Saturday, in keeping with a weekend trend observed in previous years. Every year fewer cases occurred midweek than at the weekend. This weekend trend is observed internationally and a recent review has demonstrated its continued existence despite the overall fall in prevalence of SIDS associated with the 'back to sleep' campaign[15]. It has been speculated that the increased incidence at weekends may be a consequence of changed environment or parental routines[16]. The majority of cases occurred during the nighttime sleep period in the infants' home environment.

6.5 The highest rate of deaths in 2003 occurred in the Midland Health Board area while the Southern, South-

Eastern and Mid-Western health board areas also had rates higher than the national rate. Annual monitoring has not shown any geographical trends other than the observation that for ten of the twelve years from 1992-2003 the Eastern Regional Health Authority has had a SIDS rate higher than the national rate – 0.95 per 1,000 (combined 1992-2002).

6.6 Every year since 1992 the proportion of SIDS parents in social classes 4-6 has been higher than the national average. The consistency of this observation along with a greater paternal unemployment (25% v. 4.7% national for males and 4.4% for all persons) and medical card status among SIDS families (46% vs 30% national average) than the national average figures for 2003 highlights the influence of the socio-economic environment on SIDS rates. While SIDS strikes infants from all socioeconomic backgrounds, research has consistently shown that lower socioeconomic status is associated with a higher risk of SIDS[17]. Using a scoring system devised from information on household employment, social welfare payments and home and car ownership, it was concluded that 48% of case families in Ireland in 2003 were socially disadvantaged, a figure similar to the average figure for the years 1994-2002 combined.

6.7 There is evidence in the literature of variation in SIDS among different ethnic groups, an observation which may be due to variations in parenting practices, socioeconomic and cultural factors18. In recent years there has been an increase in the proportion of SIDS deaths in Ireland attributable to families of non Irish origin. This coincides with an increase in the number of asylum seekers arriving in Ireland in recent years. In 2003, 12% (n = 5) of SIDS families were foreign nationals or asylum seekers.

6.8 The proportion of preterm and low birthweight babies among SIDS cases has been higher than in the general population every year since 1992, a trend which is consistent with international data. These factors may be directly or indirectly related to SIDS through other factors such as smoking or social deprivation. It has also been shown that the risk associated with bed-sharing is greater for infants with low birthweight.

6.9 While the proportion of case mothers that were unmarried remained high this year (50%), most mothers (90%) however, were in fact cohabiting with the baby's father. This figure, also observed in 2002 is 30% greater than observed in previous years. The average maternal age in 2003 was slightly less than previously observed and was also less than the national average. This has been the case every year to date. Numerous research studies have demonstrated a strong correlation of SIDS with young maternal age and higher parity and an increased risk for infants of single mothers, an observation which may be attributable to an increased prevalence of other confounding factors.

6.10 For the first eight years of this study an average of 74% of case mothers smoked during their pregnancies in comparison with 26% of controls. The first change in this trend was apparent in 2002 when the proportion of case mothers who smoked dropped to 58%. This was reduced further in 2003 to 50%. A slight drop was also observed in the control population with only 15% of mothers smoking during their pregnancies in 2002. We have also observed a gradual reduction in the quantity of cigarettes consumed by both parents. This suggests an increase or improvement in the implementation of advice relating to the negative effects of parental smoking. The proportion of parents smoking postnatally has also dropped. While the figures are still higher than national average figures the observed reductions are a welcome and promising result.
Results of case control studies have demonstrated consistently that smoking is strongly associated with SIDS. The risk of SIDS is significantly increased by exposure to tobacco smoke whether during pregnancy or after the baby's birth. While it is difficult to accurately estimate the effect of postnatal smoke exposure it is believed that the risk associated with smoking is not restricted to an in utero effect from maternal smoking. The associated risk increases as the level of infant's exposure increases, whether it occurs via an increase in the number of cigarettes smoked daily or via an increase in the number of smokers in the household[19]. This evidence of a dose response effect, along with the repeated nature of results from many independent studies is supportive of a causal role of smoking in SIDS. The risk associated with maternal smoking is increased substantially if the infant bed-shares with parents.

6.11 The data for 2003 demonstrates an even further increase in the use of the supine position with 75% of parents now choosing to routinely place their babies to sleep in this position. This was accompanied by a corresponding decrease in the use of side positioning. However, the data again highlights the continued risk associated with the use of the prone position. Four parents from a total of 25 who provided information routinely placed their babies to sleep on their stomachs. For the last sleep period, only 43% were placed on their sides while an alarming 11 out of 23 (48%) were placed prone. This is a large increase form the 12% observed in previous years. Prone sleeping has consistently been shown to increase the risk of SIDS and the reduction in its use has contributed greatly to the large decline in SIDS deaths globally. Proposed mechanisms whereby prone sleeping could increase the SIDS risk include airway obstruction and impairment of arousal and swallowing reflexes and overheating. The risk is potentiated by soft bedding, and for infants who are swaddled or have had a minor illness in the previous 24 hrs[20].

6.12 From 1992 to 2001 the number of parents who co-slept with their infants had increased steadily. A change in this trend occurred in 2002 when there was a reduction from 54% (1992-2001) to 32%. In 2003 the proportion of infants found co-sleeping with adults increased to 57%, most of which were unaccustomed to this type of sleeping arrangement. Three of the cases found co-sleeping were doing so on sofa or couches, a particularly dangerous practice. Results of the analysis of the case control data collected between 1994 and 2001 demonstrated a significantly increased risk of SIDS for infants bed-sharing with parents who smoke. Subsequently, results of a study by the European Concerted Action on SIDS demonstrated an increased risk associated with bed-sharing among non-smokers for infants who were less than eight weeks of age (Carpenter et al., The Lancet Vol 363, 2004). Babies brought into the bed for a short period of time e.g. for the purpose of breastfeeding were not at increased risk if they were placed back in their own cot to sleep[1]. The proportion of cases who were initiated breastfeeding in 2003 was 38% (n = 9), a figure similar to the national average of 40% estimated by the ESRI in 2004.

6.13 More than half of SIDS infants had a history of medical problems during their lifetime, the most prevalent of these being respiratory difficulties, a trend which had not changed since 1992. The proportion of infants displaying symptoms of illness in the 48hrs before death decreased slightly. These types of problems along with other factors such as prematurity and low birthweight add to the vulnerability of an infant. The data highlights the importance of seeking medical advice early particularly since it is often difficult to assess the severity of illness in small babies.
Investigations of the role of infectious illness in SIDS have not provided sufficient evidence that recent infectious illness increase the risk for SIDS significantly. Rather it is thought that illness may interact with other factors to potentiate the risk eg. one study has shown that infection was only a risk factor for infants who slept prone[20]. A study conducted in the UK in which mothers recorded symptoms and signs of illness prospectively, on a daily basis revealed that SIDS infants have a range of symptoms which appear to be of a general nature and not related to any one system. The authors concluded that symptoms are seen throughout life and not related to the time of death[21].

6.14 The observed reduction in the overall SIDS rate in 2002 was possibly due to reductions in parental smoking and infant-parent co-sleeping, the combination of which has been shown to significantly increase the SIDS risk, along with a possible reduction in the diagnosis of some sudden unexpected infant deaths as SIDS. In 2003, the proportion of SUDI deaths certified as unascertained increased further and parental smoking rates remained low. Despite this the SIDS rate did not remain at 0.6 but was increased to 0.68. This may be a consequence of the observed increases in the proportion of infants placed and found in the prone sleep position along with an increase in the proportion of infants found co-sleeping.

7. Future Direction

7.1 National control data, which is being collected by the National Sudden Infant Death Register, will continue to enhance evaluation of the findings outlined. At the same time, the on-going collection of data by the Register will ensure that emerging trends are monitored over time and that health professionals will have access to information which will enhance the implementation of appropriate public policies.

7.2 Collaboration with European Research

The National Sudden Infant Death Register continued to participate in the European 'Concerted Action' SIDS research project. Funded by the European Union, the study encompasses fifteen centres in twelve countries throughout Eastern and Western Europe, which are gathering SIDS case control data. Results of this study are now published in The Lancet (Carpener et al., The Lancet Vol 363 January 2004).
In addition, the Register continues to be a member of the SIDS Global Strategy Task Force and ISPID (International Society for the Prevention for Infant Death). Collaboration with other countries enhances SIDS research and education and provides a better understanding of risk factors within a cultural context of high-risk groups, all of which may help to solve the mystery surrounding Sudden Infant Death Syndrome.

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Appendices

App A. Live births, Number of SIDS and SIDS Rate, 1981 - 2003

Year	Live Births	Total SIDS	SIDS Rate	IMR
1981 - 1990	615792	1339	2.2	9.0
1991	52690	84	1.6	7.6
1992	51584	59	1.1	6.5
1993	49456	37	0.7	6.1
1994	47929	40	0.8	5.7
1995	48530	33	0.7	6.4
1996	50390	38	0.8	6.0
1997	52311	54	1.0	6.1
1998	53551	40	0.7	5.9
1999	53354	35	0.7	5.9
2000	54239	49	0.9	6.2
2001	57882	43	0.7	5.7
2002	60521	38	0.6	5.2
2003	61517	42	0.7	5.1
2004	61517	36	0.6*	**

* Provisional figures based on 2003 birth figures and suspected 2004 SIDS cases

IMR for 1981 - 1990 = decennial average

** not available at time of going to press.

Appendix B. Daily Distribution of SIDS Cases

Day of Week	Number	Percentage
Monday	7	16.7
Tuesday	3	7.1
Wednesday	0	0.0
Thursday	5	11.9
Friday	6	14.3
Saturday	14	33.3
Sunday	7	16.7
Totals	42	100.0

Appendix C. Location of SIDS cases at time of death

Location	Number	Percentage
Home	30	83.3
Friend or relative's house	5	13.8
Asylum site	1	2.9
Total	36	100.0

Appendix D. Time of death

Location	Number	Percentage
08:00 - 11:59	2	4.8
12:00 - 17:59	3	7.1
18:00 - 21:59	2	4.8
22:00 - 07:59	35	83.3
Total	42	100.0

Appendix E. SIDS Paternal Social Class

Social Class	Number	Percentage
1	3	10.7
2	1	3.6
3	3	10.7
4	10	35.7
5	0	0.0
6	2	7.1
Unknown	1	3.6
Never Worked	3	10.7
Asylum Seeker	5	17.9
Total	28	100.0

Appendix F. SIDS Parental Employment Status

	Paternal		Maternal	
	Number	Percentage	Number	Percentage
Full Time	17	58.6	5	17.9
Part-time	0	0.0	4	14.3
Unemployed	6	20.7		
Engaged in home duties	1	3.4	12	42.9
Paid Training course				
Student			2	7.1
Asylum seekers	5	17.2	5	17.9
Total	29	100.0	28	100

Appendix G. Health Eligibility Status

	Number	Percentage
Medical card	10	45.5
Private	7	31.8
None	5	22.7
Total	22	100.0

Appendix H. SIDS Families Marital Status

Marital Status	Number	Percentage
Single	4	15.4
Married	13	50.0
Cohabiting	9	34.5
Total	26	100.0

Appendix I. Mother's Living Arrangements

Living	Number	Percentage
Alone	1	3.8
With Baby's Father	23	88.5
With Parents/Guardian	2	7.6
Total	26	100.0

Appendix J. Gestation of SIDS Cases

Gestation	Number	Percentage
25 - 36 weeks	3	10.3
37 - 40 weeks	15	51.7
> 40 weeks	11	38.0
Total	29	100.0

Appendix K. Birthweight of SIDS Cases

Grammes	Number	Percentage
< 2500	4	13.8
2500-2999.9	3	10.3
3000-3499.9	9	31.0
3500-3999.9	8	27.6
4000-4499.9	2	6.9
>=4500	3	10.3
Total	29	99.9

Appendix L. Maternal Parity

No. of previous live births	Number	Percentage
None	10	40.0
1-2	10	40.0
> =3	5	20.0
Total	25	100

Appendix M. Smoke Environment

Day	Number	Percentage
Never	8	35.0
Day only	1	4.0
Night only	1	4.0
Both day and night	5	22.0
On occasion	8	35.0
Totals	23	100.0

Appendix N. Usual Position Placed to Sleep

Position	Number	Percentage
Back	18	75.0
Side	2	8.3
Prone	4	16.7
Totals	24	100.0

Appendix O. Tog Values- usual vs last sleep period

Tog	Usual Sleep Period (Day)		Usual Sleep Period (Night)		Last Sleep Period	
	N	%	N	%	N	%
<5	2	8.7	2	8.7	7	30.4
5 - 9.99	20	87.0	14	60.9	8	34.8
10 - 14.9	0	0.0	6	26.1	8	34.8
15 - 19.9	1	0.0	0	0.0	0	0.0
>=20	0	4.3	1	4.3	0	0.0
Total	23	100.0	23	100.0	23	100.0

Appendix P. SIDS Cases Initial Feeding Pattern

Type	Number	Percentage
Breast only	8	33.3
Bottle Only	14	58.3
Both	1	4.2
i.v/TPN	1	4.2
Total	24	100.0

Appendix Q. Infants' Medical History

Problem	Number	Percentage
None	7	24
Respiratory	12	41
Apnoea/blueness	1	3
Cardiovascular	0	0
GIT/feeding	5	17
Other Infections	7	24
Skin Problems	4	14
Febrile convulsions	4	14
Other	9	31

Note: Some infants may have experienced more than one of the above listed illnesses
"Other infections" included eye infections, chicken pox, tonsillitis, laryngitis and thrush.
"Other" included colic (n =3), neonatal abstinence syndrome (n =2), allergic reaction (n =1), fall(n=1), hydrocephalus (n=1) and blocked tear duct (n =1).

Appendix R. Problems/Symptoms in the 48 hrs Prior to Death

Problem	Number	Percentage
None	18	75
Respiratory	3	13
Altered sleep pattern	2	8
vaccinations received	2	8
Other	1	4

"Other" referred to one infant who was making unusual breathing noises when asleep
Note: Some infants may have experienced more than one of the above listed illnesses