Seasonality of sudden infant death syndrome in mainland Britain and Ireland 1985–95

A S Douglas, P J Helms, I T Jolliffe

Abstract
By the end of 1995 four years had passed since the dramatic fall in the incidence of sudden infant death syndrome (SIDS), following the “back to sleep” campaign. This time lag permitted a more definitive epidemiological reassessment than had been possible before. The extent of seasonal variation from 1992–5 fell by about half, occurring mainly as a single step down in 1992. The fall was relatively greater in winter than in summer. Before 1992 the extent of seasonal variation (amplitude) was greater in those age ≥ 5 months compared with those aged ≤ 4 months. Since 1992 the falls in incidence and amplitude have been greater in the younger group, suggesting that SIDS deaths in younger and older babies may have different causes.

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Keywords: sudden infant death syndrome; seasonality; epidemiological reassessment

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Table 1  Cosinor analysis SIDS rates

<table>
<thead>
<tr>
<th>All ages</th>
<th>%&lt; 4 months</th>
<th>≥ 5 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>p</td>
</tr>
<tr>
<td>1985</td>
<td>0.91</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1986</td>
<td>0.96</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1987</td>
<td>0.95</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1988</td>
<td>0.98</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1989</td>
<td>0.98</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1990</td>
<td>0.95</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1991</td>
<td>0.94</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1992</td>
<td>0.86</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>1993</td>
<td>0.89</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1994</td>
<td>0.47</td>
<td>NS</td>
</tr>
<tr>
<td>1995</td>
<td>0.78</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Table 1 shows that the mean annual rate of SIDS remained stable from 1986–8, started to fall in 1989–91, and then fell precipitously in 1992, with the subsequent low level being mainly sustained but with some minor further decline.
seasonality, but this returned in 1995 with an overall 20% amplitude. When the sine curve model was fitted to 1985–95, to 1985–91, and to 1992–5 separately, there was an extremely significant improvement (p < 0.0001) in the fit for the separate models, confirming that the seasonality curves had indeed changed from 1992 onwards. Although seasonal amplitude fell by about half from 1992 onwards, there was still strong evidence (p < 0.0001) for the persistence of seasonality in the later years.

A further question was whether the seasonal variation had stabilised from 1992. Fitting separate cosine curves to the two pairs of years 1992–3 and 1994–5 showed no significant improvement compared with the single curve for 1992–5 (p = 0.16). Hence on the basis of data available so far, there is no evidence of further change in seasonality after 1992, the year of the large fall in incidence.

In a comparison of the monthly rates between 1986–9 (4 years) and 1992–5 (4 years) the percentage falls by month were as follows: January 71%, February 72%, March 74%, April 66%, May 63%, June 55%, July 40%, August 59%, September 59%, October 66%, November 74%, December 75%. The fall in winter was relatively greater than in summer. The average rates per 1000 live births were 2.21 (1986–9) and 0.71 (1992–5), a fall of about two thirds (68%). Over the same years the amplitude fell by half (51%).

DEATH AT ≤4 AND >5 MONTHS
The results of separate analyses for ≤4 months and >5 months of age are also given in table 1. With two exceptions (1990 and 1991), the amplitude was greater in the older age group. The 4 years 1986–9 (well before the precipitous rate fall) were compared with 1992–5. The rate reduction for both age groups was again about two thirds, (≤4 months 69% and >5 months 63%); amplitude reductions were greater in the younger age group than in the older (≤4 months 55%; >5 months 36%).

The acrophase peak dates for those aged ≤4 months are earlier than >5 months; except in 1994, the one year with non-significant sinusoidal seasonality (table 1).

Discussion
While the persistence of seasonality in SIDS has been questioned, 6, 7 this study uses a rigorous statistical analysis to demonstrate that despite the dramatic fall in rate, seasonal variation still occurs. Seasonality remains an aetiological clue and the differing seasonality features by age of death may provide clues as to causation. The findings by age at death are less certain but provide support for the suggestion by others 2–4 that there may be more than one at risk population of SIDS babies with differing aetiological factors.

The following agencies supplied data: Office for National Statistics, Population and Health Group, St Catherine’s House, 10 Kingsway, London, WC2B 6JP (Jeremy Schuman). Northern Ireland Statistics and Research Agency, General Register Office, Oxford House, 49–55 Chichester Street, Belfast BT1 1HL (John Gordon). National Sudden Infant Death Syndrome Register, Sudden Infant Death Association, George’s Hall, The Children’s Hospital, Temple Street, Dublin (Bernadette Kiberd, Tom Matthew). General Register Office for Scotland, Ladywell House, Ladywell Road, Edinburgh EN2 7TF (Jack Arrundale). ASD was supported by funding arising from the Maryland Medical Research Institute. Dr Margaret Moffat did some of the computing and Mrs Muriel Burnett and Mrs Nicki Duncan the typing. Dr John Rawles constructed the cosinor programme.

The following references are cited: