Infant and perinatal mortality in Somerset, 1995 to 2012
About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. It does this through advocacy, partnerships, world-class science, knowledge and intelligence, and the delivery of specialist public health services. PHE is an operationally autonomous executive agency of the Department of Health.

Public Health England
133-155 Waterloo Road
Wellington House
London SE1 8UG
Tel: 020 7654 8000
http://www.gov.uk/phe
@PHE_uk

Prepared by: Mark Dancox, Senior Public Health Intelligence Analyst, Knowledge and Intelligence Team (South West)

For queries relating to this document, please contact: +44 (0) 117 970 6474
© Crown Copyright 2014
Published August 2014
PHE gateway number: 2014-272
Contents

Introduction 3
Summary of results 3
The number of infant and perinatal deaths in Somerset, 1995 to 2012 4
Explaining the annual variation in perinatal deaths 5
Conclusion 6
Appendix 7
References 8
Introduction

This document provides an update to earlier briefings produced by the South West Public Health Observatory (now part of Public Health England) in response to concerns raised about infant and perinatal mortality around Hinkley Point power station in Somerset (1,2).

It looks at infant and perinatal mortality in Somerset from 1995 to 2012 using Office for National Statistics (ONS) births and deaths registration data where it is possible to link postcode information to geographical location.

Key definitions

- The perinatal mortality rate is the number of stillbirths plus the number of deaths at ages under one week per 1,000 live births and stillbirths

- The infant mortality rate is the number of deaths at ages under one year, per 1,000 live births

Summary of results

- The perinatal mortality rate in Somerset (6.8 per 1,000 live births and stillbirths in 2010 to 2012) is not significantly different to that of either the South West (6.3) or England (7.3)

- The perinatal mortality rate in the two districts closest to Hinkley Point – Sedgemoor and West Somerset – were 4.7 and 5.8, respectively, per 1,000 live births and stillbirths in 2010 to 2012; both rates are not significantly different to those for Somerset, the South West or England

- The infant mortality rate in Somerset (3.4 per 1,000 live births in 2010 to 2012) is not significantly different to that in either the South West (3.4) or England (4.1)

- The infant mortality rate in Sedgemoor in 2010 to 2012 (1.3 per 1,000 live births) was significantly lower than that in Somerset, the South West and England as a whole; the infant mortality rate in West Somerset for the same period was 6.9 per 1,000 live births, not significantly different to that in Somerset, the South West or England as a whole
The number of infant and perinatal deaths in Somerset, 1995 to 2012

Figure 1 and Table 1 show the annual number of perinatal and infant deaths occurring in Somerset from 1995 to 2012.

Since 1995, Somerset has averaged 36 perinatal deaths each year, ranging from 25 (in 2004) to 53 (in 2009).

Since 1995, Somerset has averaged 22 infant deaths each year, ranging from 15 (in 2010) to 26 (in 2001 and 2005, respectively).

As the number of perinatal and infant deaths is small, a chance event can give the impression of a meaningful increase.

Figure 1: Trends in the number of infant and perinatal deaths in Somerset, 1995 to 2012

Source: ONS births and deaths registrations data

Table 1: The number of infant and perinatal deaths in Somerset, 1995 to 2012

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Perinatal deaths</td>
<td>34</td>
<td>31</td>
<td>45</td>
<td>42</td>
<td>42</td>
<td>32</td>
<td>28</td>
<td>27</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>Infant deaths (less than 1 year)</td>
<td>18</td>
<td>22</td>
<td>25</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>26</td>
<td>21</td>
<td>20</td>
<td>22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of deaths (Cont.)</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perinatal deaths</td>
<td>37</td>
<td>39</td>
<td>30</td>
<td>33</td>
<td>53</td>
<td>33</td>
<td>43</td>
<td>41</td>
</tr>
<tr>
<td>Infant deaths (less than 1 year)</td>
<td>26</td>
<td>21</td>
<td>24</td>
<td>23</td>
<td>20</td>
<td>15</td>
<td>25</td>
<td>18</td>
</tr>
</tbody>
</table>

Source: ONS births and deaths registrations data
Explaining the annual variation in perinatal deaths

Single years’ data for events that are small in number can show variation year on year that can be difficult to interpret. Because of the fluctuation of perinatal deaths described in Figure 1, we conducted an exploratory analysis (see Appendix) of the annual perinatal mortality count. Figure 2 shows the perinatal deaths for Somerset in the period 1995 to 2012 with the median, lower quartile and upper quartile values. Also shown are upper and lower ‘extreme’ values.

The chart shows two individual years where the number of perinatal deaths has exceeded the variation we might expect. There were 45 perinatal deaths in Somerset in 1997 and 53 in 2009, both higher than the upper quartile value of 42. However, the number of perinatal deaths did not fall outside the range defined by the upper and lower extreme values for any year.

The chart shows the number of perinatal deaths decreasing in the years immediately following the peaks in 1997 and 2009.

Figure 2: Trends in the number of perinatal deaths in Somerset, 1995 to 2012

Source: ONS births and deaths registrations data
Conclusion

The number of perinatal deaths in Somerset between 1995 and 2012 were within the range given by the lower and upper extreme values and we conclude that the variation seen over the period is consistent with random fluctuation.

We are confident that there is no evidence to suggest an increased risk of infant or perinatal mortality anywhere in Somerset.
Appendix

Exploratory data analysis

Exploratory data analysis (Tukey, 1977) is a standard approach for investigating patterns in data without making any prior assumptions about how the data is distributed. It is the collective name for a range of graphical summaries of the data, rather than a specific method.

Box and whisker plots

The Box and Whisker plot is one such summary. This describes a data set by using the statistics directly based on the data: the median, lower quartile (Q1), upper quartile (Q3) and interquartile range (Q3 minus Q1).

The median is simply the mid-value of dataset when the values are arranged from lowest to highest values. The quartiles of a sample are the values which split this sorted list into even fourths.

Medians, quartiles and interquartile range are generally considered to be ‘robust’ in the sense that they are less affected by extremely large or small values in dataset and are thus more representative.

Identifying ‘outliers’

Upper and lower extreme values can also be used to provide reference points for outlying values. These are based on the upper and lower quartile values and on the observed interquartile range:

upper extreme = upper quartile + 1.5*(interquartile range)

lower extreme = lower quartile – 1.5*(interquartile range)

Upper and lower extreme values can be calculated to show values outside of which you might expect an outlier to fall.
References

   Available at: http://www.swpho.nhs.uk/resource/item.aspx?RID=35764
