

Monitoring perinatal deaths in Trusts and Health Boards

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BACKGROUND

Stillbirths and neonatal deaths in the UK are monitored by MBRRACE-UK. The perinatal mortality rates are reported annually for different organisations. The rate of perinatal death varied between 3.19 and 9.59 deaths per 1,000 births in 2015 by NHS Trust and Health Board.¹

MBRRACE-UK are developing methodology that detects a significant rise or fall in perinatal deaths in a timely manner, using the individuals and moving ranges (XmR) chart.

The XmR chart is a surveillance tool for continuously monitoring perinatal deaths in real time. The method compares the occurrence of deaths at present to a previous time period.

AIM

To recommend a statistic to be implemented within the XmR chart that measures the incidence of perinatal deaths in Trusts and Health Boards of different volumes, across the UK.

METHOD

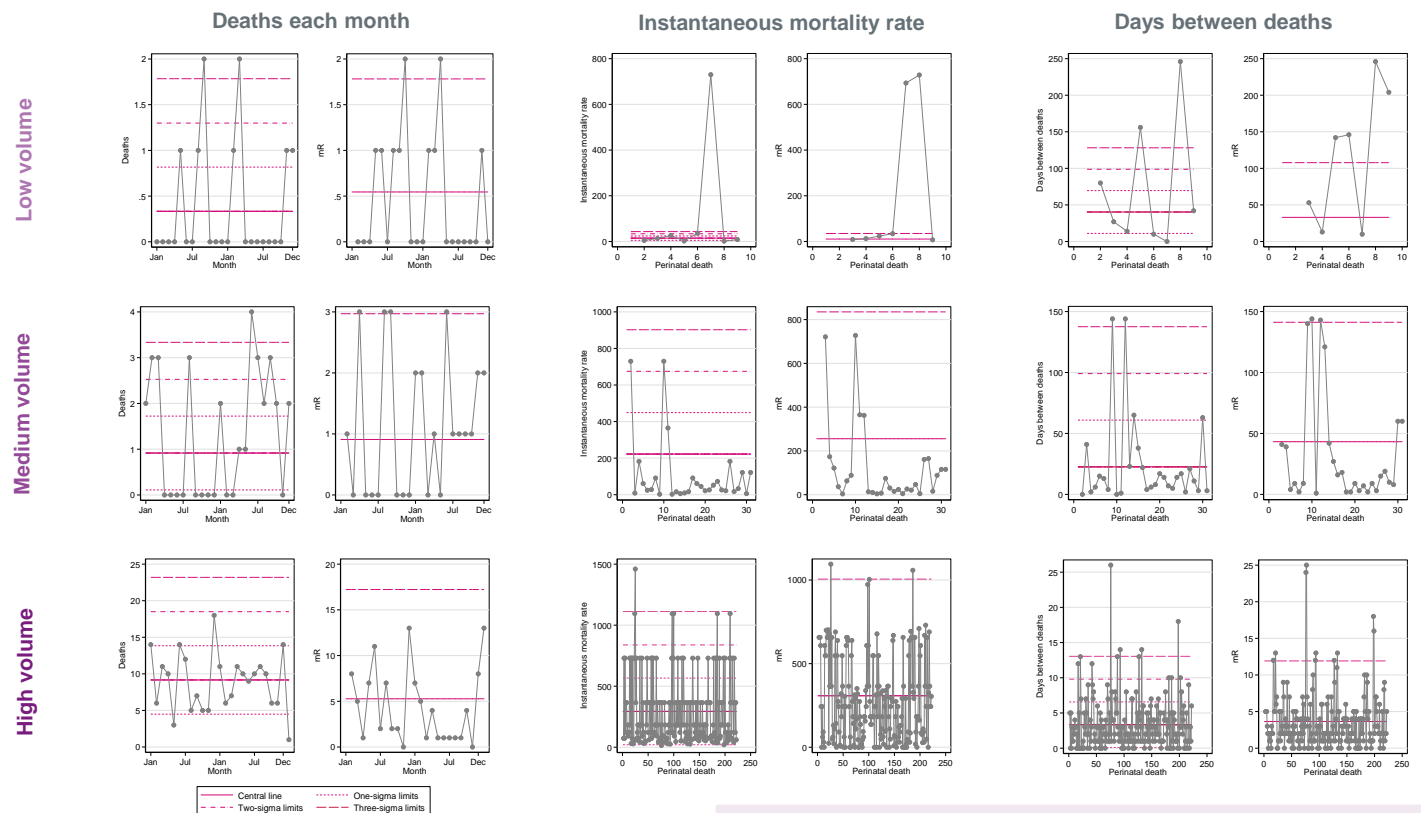
The incidence of perinatal deaths was measured in three ways: the number of deaths each month, the instantaneous mortality rate and the days between consecutive deaths.

The XmR chart consists of two charts:

- **Individuals (X) chart:** monitors the consistency in the incidence of perinatal deaths.
- **Moving ranges (mR) chart:** monitors the short term change in the occurrence of perinatal deaths.

Data: Perinatal deaths in the UK between 1st January 2014 and 31st December 2015. The limits are calculated with information regarding the perinatal deaths that occurred in 2014.

The Trusts chosen are low, medium and high volume organisations in order to assess the efficiency of the statistics implemented within the XmR chart. The number of births and level of care delivered varies between them.



REFERENCES

1. Manktelow BN et al. MBRRACE-UK Perinatal Mortality Surveillance Report: UK Perinatal Deaths for Births from January to December 2014. Department of Health Sciences, University of Leicester, 2016.
2. Western Electric Company. Statistical quality control handbook: The Company; 1958.
3. Wheeler DJ. Working with rare events. Quality Digest 2011;28.

DISCUSSION

- The XmR chart for the number of deaths each month is effective when the average number of deaths per month is at least one.³ This is unlikely in low volume organisations, increasing the risk of a false alarm.
- The XmR chart for instantaneous mortality rates is less effective when multiple deaths occur in a day. The sensitivity of the chart to detect a true change is reduced.
- The XmR chart for days between consecutive deaths detects significant improvements, useful for quality improvement initiatives. The chart is effective in Trusts and Health Boards of different volumes and will be implemented across the UK.

RESULTS

Majority of the X charts satisfied at least one of the following rules to suggest a change in the incidence of perinatal deaths:

1. A value outside a three-sigma limit.
2. Two out of three values outside a two-sigma limit.
3. Four out of five values outside a one-sigma limit.
4. Eight values on one side of the central line.²