Detection and management of outliers

Purpose

An outlier is a result that is statistically significantly further from the expected comparator value than would usually occur by chance alone.

This policy has been developed to ensure that potential outliers are identified through the processes of national clinical audit. The policy sets out the actions that ICNARC takes when data indicate that results for a site significantly deviate from the expected value.

This policy is based on Department of Health guidance on the 'Detection and management of outliers' and supersedes ICNARC’s previous policy.

Assessment of outlier status

The following criteria are considered when assessing potential outlier status:

1. **Coverage**
   Data are collected according to the scope of the national clinical audit.

2. **Sample size**
   Presentation of quality indicators takes account of the available sample size from each participating site.

3. **Data completeness**
   Comprehensive processes are in place to maximise completeness of all fields.

4. **Data validity**
   Data are collected to a set of standard definitions and are rigorously validated to identify potential unusual, inconsistent and/or invalid values (or combinations of values).

5. **Model accuracy**
   Risk models are evaluated for their discrimination (ability to separate those that experience an event from those that do not) and calibration (agreement between observed and expected values) and are regularly recalibrated to ensure ongoing fit to up-to-date data.
Quality indicators are presented in a funnel plot format, plotting the quality indicator against the number of eligible patients.

Potential outliers are defined as results that fall:

- two standard deviations on or above the expected comparator value across two consecutive reporting periods; or
- three standard deviations on or above the expected comparator value in one or more reporting period.

Results that lie outside this threshold are said to exhibit *special cause variation*: the observed results in these units being different to that predicted by the model, and more so than would be expected to occur by chance (expected in 2.5% of results). This difference may be due to a number of different factors, including the data and the model, and should not, on its own, be taken as a marker of quality.

The reason for any differences should be investigated.

This policy is based on Department of Health guidance on the detection and management of outliers. Should you wish to review this policy, please follow the link below:


**Guidance**

- **Key individuals**

The table below lists those key individuals that will or may be involved or hold some responsibility in the process of detecting and managing outliers:

<table>
<thead>
<tr>
<th>ICNARC</th>
<th>NHS Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Clinical Audit Manager</td>
<td>Lead Clinician of the Critical Care Unit</td>
</tr>
<tr>
<td>Head of Statistics</td>
<td>Clinical Director of Critical Care</td>
</tr>
<tr>
<td>Head of Data and Business Technology</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Director</td>
<td>Chair of Clinical Governance</td>
</tr>
<tr>
<td>Chair of the Board of Management</td>
<td>Chief Executive</td>
</tr>
</tbody>
</table>

The flow diagram on the following page outlines the actions and timeframes that are required in the process of detecting and managing a potential outlier.
ICNARC detect one or more Potential Quality Indicator(s) that fall on or above the expected comparator value and examine processing and analysis of data

START

Yes

Potential outlier status confirmed?

No

• Data and results revised in CMP Database
• Details formally recorded

END

STAGE ONE

• ICNARC send Director of Critical Care copy of result with email informing them of potential outlier status, requesting identification of data errors and comprehensive response

Director of Critical Care provides written response

ICNARC review response from Director of Critical Care to determine if data resubmission required

Yes

No

STAGE TWO

• Revalidation* and re-analysis of data still indicates outlier status
• Confirmation that original data submission is accurate, therefore confirming outlier status
• Original data submission contained incorrect values
• Revalidation* and reanalysis of data no longer indicates outlier status.
• Data and results revised in CMP Database
• Details formally recorded

Director of Critical Care resubmits data file to ICNARC

ICNARC reviews data/response

Yes

Outlier status confirmed

No

STAGE THREE

• ICNARC confirm potential outlier status in writing (via email) and details of publication

STAGE FOUR (at ICNARC’s discretion)

• ICNARC write to Chief Executive confirming potential outlier status
• Both letters copied to Chair of Clinical Governance and Medical Director
• All relevant data, analyses and correspondence made available

Acknowledgement of receipt of the letter

Public disclosure of comparative data that identifies participating site

*Unit must respond to revalidation queries, via email, within two working days of receipt
Timeframes

Should a site fail to meet the timeframes set in this policy (see: flow diagram), resulting in the process not being completed by the date of publication, ICNARC will consider publication of results in the absence of a response. Publication of results will carry a notice denoting that the data are subject to an ongoing investigation under the terms of this policy.

Contact us

If you have any feedback or questions about this policy, please contact:

ICNARC
Napier House
24 High Holborn
London
WC1V 6AZ

Web: www.icnarc.org
Email: publicreporting@icnarc.org
Tel: 020 7269 9288
Fax: 020 7831 6879