

# The United Kingdom National Bariatric Surgery Registry

## POLICY FOR IDENTIFICATION OF POTENTIAL OUTLIERS

### Introduction

Assessment of outcomes after bariatric surgery is fraught with difficulty, not least because quality surgery involves a whole team of specialists involved in the care of each patient. Thus from the initial outpatient assessment through to the in-hospital episode, operation and subsequent follow up, care is provided by a whole multidisciplinary team that includes dietitians, specialist nurses, theatre teams and anaesthetists, as well as the actual surgeons, of which there may be several involved in any one patient's care pathway.

Operative outcomes for each individual surgeon need to be interpreted with great care, as some surgeons may only take on patients needing more difficult, revision surgery, and others may operate predominantly on higher risk patients having primary surgery. There are also more inherent risks with more complex primary operations. To avoid the obvious problems of comparing 'apples with oranges', all operations recorded into the NBSR can be risk stratified by referencing other co-morbidity data collected for each patient before the operation and the surgical data that detail the kind of procedure carried out. In addition, operating volumes for individual surgeons may depend on many factors, including the numbers of referrals agreed by the commissioners, which kind of bariatric operation is done and the proportion of more complex operations, which may take longer to do.

If any one individual surgeon's results are deemed to be outlying it is important to recognise that there may be many possible reasons. These range from incorrect data being entered, different definitions of complications being applied in different hospitals, or variations in the local policy for admission to intensive care, local reasons for prolonged length of stay. Of course, the reasons for less than perfect care may also include all the individual aspects of care delivered by the bariatric surgery team as outlined above that make up the whole treatment process.

### Methodology

The standard way for individual surgeons' survival and complication rates to be compared in surgical registries with a benchmark is with funnel plots. These can be defined as a graphical representation of results that show observed values against target or expected values to determine whether they fall into an expected range. The target range is largely determined by the

target mean of the population group under analysis, the sample size and the expected variability. The confidence interval is shown by boundary lines either side of the population/target mean. Confidence intervals indicate the likelihood that an observed value is consistent with the 'target or expected' value, for instance a 95% confidence interval defines the range that 95% of observations consistent with the target value would be expected to lie within.

An unusually high value compared to the target value will fall outside of the confidence limits, and therefore will be considered an outlier. By definition, the smaller the number of data points (operations) being analysed the less precise the estimate and the wider is the confidence interval, and the greater the number is, the tighter the confidence interval. Lines are drawn on the graphs to show the confidence intervals for given level of statistical significance. The wider the confidence intervals and more extreme the level of statistical significance is set the more unusual it is to identify an outlier. Sometimes data are presented as 'box and whiskers' graphs, where the box represents the Interquartile Range or 'middle 50%' of the data.

**Outlier:** A value derived from an analysis that falls outside of the defined control limits. Identification as an outlier is the first step in the process, and serves to indicate that a set of values require further investigation.

In the NBSR surgeon-level data report (June 2013) the Committee chose to use the confidence limits of 99% and 99.9%, applied to the raw data. In due course as further reports are produced it is our intention to risk adjust the confidence limits so that they are appropriate for higher risk patients. A 99% (99.9%) confidence interval implies that there is 1% (0.1%) probability that a surgeon with outcomes consistent with the target will have a value above the confidence limit. Data points outlying these limits trigger alarms. Setting the confidence limits lower, eg 95%, increases the likelihood that a surgeon will be inaccurately identified as a potential outlier by chance.

#### Possible actions after identification of a potential outlier

1 As and when requested by the NBSR Committee, Dendrite Clinical Systems Ltd, the NBSR software provider, produces analyses for specified outcomes in a specific time period. Dendrite also internally checks the data for obvious discrepancies such as duplicate data entries or an age in excess of human limits. These data are sent back to each unit for validation. After this process the NBSR Committee assesses the overall data for the possibility of outlying data.

2 If a potential outlier is suspected the NBSR Committee makes the individual surgeon aware so that he/she can then check again whether or not the data are correct, and a time limit is given within which to respond. After this process of validation the data may be corrected, and there may be no case to answer, and the individual surgeon will be written a letter confirming this. For

instance, cases could have been wrongly classified as low risk when they should be high risk.

3 If, after any data errors have been corrected, the results still appear to indicate a potential outlier, the NBSR Committee will write letters according to the potential outlier level. For data outside the 99% confidence interval a letter will be written to the surgeon and the Clinical Director, requesting that there is appropriate local investigation. For data outside the 99.9% confidence interval the letter will also go to the surgeon's Medical Director and Chief Executive. The correspondence thus far, the actual data, and the methodology used for the analysis will be made available to them. A request will be made to acknowledge receipt of the information within a defined timescale. The local Trust will be responsible for further local audit to investigate the potentially outlying status and to determine what action might need to be taken.

NBSR Committee  
30th June 2013

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