Detection and management of mortality outliers for the National Hip Fracture Database (NHFD)

Outlier policy for NHFD annual report 2020

Title	Detection and management of mortality outliers for National Hip Fracture Database (NHFD)
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Description	This document details the identification and management of significantly outlying organisations in the NHFD 30-day casemix-adjusted mortality funnel, which will be published in the NHFD annual report 2020.
Contact Details	NHFD@rcplondon.ac.uk +44 (0)20 3075 2395

Definitions

BGS	British Geriatrics Society
BOA	British Orthopedic Association
CCG	Clinical Commissioning Group
CQID	Care Quality Improvement Department, RCP
CEO	Chief Executive Officer
CQC	Care Quality Commission
DARS	Data Access Review Service, NHS Digital
FFFAP	Falls and Fragility Fracture Audit Programme, RCP
HIW	Health Inspectorate Wales
HQIP	Healthcare Quality Improvement Partnership
MD	Medical Director
NDORMS	Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences
NHFD	National Hip Fracture Database
WDT	Workstream Delivery Team
WG	Welsh Government

DETECTION AND MANAGEMENT OF OUTLIERS

These recommendations apply to:

- comparisons of providers (hospitals) using batches of data collected over the defined period of monitoring (calendar year of report)
- the chosen key indicator, case-mix adjusted 30 day patient mortality

The webtool and database provider is Crown Informatics.
The statistical analysis is carried out by the subcontractor, Oxford University, NDORMS unit.

1. Performance indicator

Case-mix adjusted 30 day mortality is the chosen key performance indicator (KPI) – a valid measure of a provider's quality of care in that there is a clear relationship between the indicator and quality of care. The cohort is all patients over 60 admitted with a fragility hip or femoral fracture in the calendar year preceding the year of the report release.

2. Identification of outliers

Outlier analysis will be performed for all patients over 60 who present with a hip fracture to any hospital in England and Wales.

Each hospital's crude mortality figures will be case-mix adjusted by our statistics providers (NDORMS at the University of Oxford) using our validated model.

Comparison of hospitals must take account of differences in the type of patients presenting to each in respect of key factors that have been shown to affect 30 day mortality: these are *age, sex, ASA grade, pre-fracture residence, pre-fracture mobility and fracture type.* This model has been rigorously tested with regard to its power of discrimination and its calibration [Tsang *et al.* 2017]. Details of the model are available on our website.

The results of this model will be displayed by Crown Informatics as case-mix adjusted run-charts on the NHFD website. These run-charts will display each hospital's crude and case-mix adjusted mortality against the national average and 95% (2SD) and 99.8% (3SD) control limits above and below this average.

- Each calendar quarter the NHFD will identify all hospitals in which mortality over the preceding 12 months is above the upper 99.8% (3SD) control limit.

- Hospitals will be 'flagged' the first time their mortality rises above this control limit. The clinical leads, CEO and MD of such hospitals will be made aware of this position so that they can consider appropriate action, including examination of the quality of their data (see section 3, below).

- Hospitals which remain above this control limit for two or more successive quarters will be considered 'alarm' outliers. They will be formally identified in the NHFD annual report as 'outliers for case-mix adjusted mortality'.

The run-charts will also identify hospitals with mortality above the upper 95% control limit, but these will not be formally managed as outliers since in any analysis of 175 units some hospitals will fall outside such control limits by chance, simply as a result of expected statistical variation.

However, clinical leads in such units will be made aware of their position, as will those in units where good performance is indicated by significantly low casemix adjusted 30 day mortality.

3. Data quality

Clinical leads in each hospital are responsible to the quality of the data they submit to the NHFD, and in reviewing this they will need to consider three aspects:

- Case ascertainment. The NHFD typically receives data on more cases than are captured by data sources such as HES and PEDW, so these cannot be used as a 'gold standard' as they are not as accurate as the NHFD in picking up such cases. Instead NHFD comment on the number of patients submitted in previous years, so that units can consider whether these might indicate any short-fall in data entry in the current year. So for the 2020 annual report, this will be the number of patients submitted in the 2019 calendar year compared to the number of patients submitted in the 2018 calendar year.

- Data completeness. Missing data can compromise a hospital's benchmarking data and their income from best practice tariff. Missing casemix data may also affect the adjustment model used during our mortality analysis and potentially lead to a hospital unnecessarily triggering an 'alarm' in respect of their mortality outlier status.

- Data accuracy. Inaccurate coding of data can have similar effects to those mentioned above; resulting in miscoding that falsely portrays a unit as having a population that is healthier than normal can again unnecessarily trigger an 'alarm' in respect of their mortality outlier status.

The run charts may help units to identify problems with the completeness and accuracy of their data. The presence of such factors will be highlighted if units see a large discrepancy between their crude and casemix adjusted mortality run charts. Such findings should encourage teams to review their data quality.

4. Case-mix (risk) adjustment

Comparison of hospitals must take account of differences in the mix of patients between providers by adjusting for known factors associated with the performance indicator.
These are: *age, sex, ASA grade, pre-fracture residence, pre-fracture mobility and fracture type.*
Our casemix-adjusted analysis of 30-day mortality uses externally validated Civil Registration Data from NHS Digital, and Business Services Organisation (BSO) in Northern Ireland, as described by Tsang et al 2017. Each year the casemix adjustment process is refined and the model coefficients are updated to reflect changes in the data reported by hospitals.

5. Detection of a potential outlier

Statistically derived limits around a national reference of 30 day mortality line in the whole of the NHFD are used to define if a hospital is a potential outlier: Hospitals will be 'flagged' if their mortality moves to lie more than 3SDs from this line, and be notified as an 'alarm' if they remains in this position for more than one successive quarter

4. Management of a potential outlier

Management of potential outliers involves several teams:

- NHFD audit team: responsible for managing and running the audit nationally and informing participants of the outlier process, timeline and methodology
- NHFD clinical leads: responsible for assessment of data quality and direct communication with hospitals for outlier status notification
- Outlying hospital's NHFD lead clinician: clinician contact for NHFD in provider organisation
- Outlier hospital's medical director and chief executive.

The following table indicates the stages needed in managing a potential outlier, the actions that need to be taken, the people involved and the time scale. It aims to be both feasible for those involved, fair to hospitals identified as outliers and sufficiently rapid so as not to unduly delay the disclosure of comparative information to the public.

Hospital CEOs, MDs and lead clinicians will be first notified when their unit moves to above 3SD in any quarter and if a site 'alarms' by remaining above 3SDs for two consecutive quarters, they will be notified of their formal 'outlier' status and this policy will be activated.

5. Involvement of the Care Quality Commission (CQC) and Welsh Government (WG)

The WG are responsible for assurance and determine their approach with the Health Inspectorate Wales (HIW). Along with CQC they are included in this policy as they will need to ensure that hospitals are engaging appropriately in the process. They will be notified if units become 'alarm' level outliers, by being copied into email correspondence from NHFD clinical leads to hospital lead clinicians and management, and the replies from hospitals detailing steps taken to rectify/improve performance. The run-chart on our website means that they will be able to see which units are outside both 2SD and 3SD control limits at any time.

The CQC and WG will not usually take regulatory action if organisations are responding appropriately to each stage of the outlier management process.

Stage	What action?	Who?	Schedule			
1	Report datacut (most recent four quarters) extracted from database and sent to NHS-Digital	Crown	Febru ary 2020	June 2020	Septe mber 2020	Febru ary 2021
2	Data transferred to NDORMS via secure transfer mechanism	NHS Digital	March 2020	July 2020	Octob er	March 2021

					2020	
3	Linked data transferred to NDORMS via secure transfer mechanism	Crown	March 2020	July 2020	October 2020	March 2021
4	Provisional run-chart specifications provided to Crown	NDORMS	April 2020	August 2020	November 2020	April 2021
5	Outlying hospitals (high and low outliers) contact details updated – CEO, NHFD lead, medical director, clinical governance lead	NHFD team	March 2020	July 2020	October 2020	March 2021
6	List of outliers (both high and low) provided to NHFD WDT Table of case-mix factors for outliers provided, with national descriptor figures (mean/range) - as data quality check	NDORMS	April 2020	August 2020	November 2020	April 2021
7	Scrutiny of data handling, matching and analyses performed to determine in which hospitals there is a case to answer If outlier status can be clearly associated with poor case-mix data the hospital will not be excluded from analysis or reporting but annual report will describe context of finding in poor data quality	NHFD clinical leads	May 2020	September 2020	December 2020	May 2021
8	Organisations informed – local lead clinicians contacted by email and phone call from NHFD clinical leads Advised on data quality/checking in advance of next report period	NHFD clinical leads	June 2020	October 2020	January 2021	June 2021
9	Organisations informed – CEO, MD and local lead clinicians contacted by email and letter signed by NHFD clinical leads Advice including the potential role of BOA review, Correspondence copied to CQC and WG	NHFD team	July 2020	November 2020	February 2021	July 2021
10	Acknowledgement of receipt received by NHFD Follow-up letters if no acknowledgement within five working days	Provider CEO/MD	August 2020	December 2020	March 2020	August 2021
11	Once all site acknowledgements received, CQC and WG updated with list of outliers	NHFD team	September 2020	January 2021	April 2021	September 2021
12	Provider appeals outlier status, with evidence to support this: **Provider failure** Provider accepts/claims that there has been a failing in local coding and data checking If this appears true we indicate in annual report that finding is on the basis of data quality If no evidence to support a claim of coding failure then reported as clinical finding **NHFD error** Site highlights an error in NHFD analysis Corrections applied, and reconsideration of outlier status is made	NHFD site lead clinicians and CEOs/MDs	August 2020	December 2020	March 2020	August 2021
13	Provider fails to respond to initial letter within 14 working days Letter resent NHFD clinical lead phones hospital CEO for acknowledgement and action plan	NHFD clinical leads	August 2020	December 2020	March 2021	August 2021
14	Provider fails to respond to NHFD phone call within 7 working days Final letter to CEO Copied to CQC, WG and CQID clinical director	NHFD clinical leads	August 2020	December 2020	March 2021	August 2021

15	Review of the progress/results of investigations undertaken by Outlier Provider **Follow-up protocol** Until adequate update on findings/remedial measures received from Provider CEO: Further reminder letter sent at 2 weeks Telephone call to provider lead clinician at 4 weeks Notification of FFFAP and CEEU leads if no response before end of January Notification to HQIP if no response	NHFD clinical leads	October 2020	February 2021	May 2021	October 2021
16	Once all action plans received, final detailed letters sent to CQC and WG regarding site action plan summary and run charts All outlier issues finally closed – either closed as adequate responses or escalated to HQIP as inadequate responses	NHFD team	November 2020	March 2020	June 2021	November 2021

NHFD Annual report

17	Final draft of NHFD annual report including summary of that year's findings and list of outlier sites written and submitted to HQIP	NHFD team	October 2020
19	Report published as per HQIP SRP timeline	NHFD team	November 2020

Scope

This policy will be applied to the specific patient safety concern of 30 day mortality.

Other unusual findings identified by the NHFD annual report will be managed out with the scope of this policy by communication between the NHFD clinical leadership and the local lead clinician. The HQIP cause for Concern policy can be found here.

Process

Prepared on behalf of the NHFD team, NHFD Advisory Group and FFFAP Board by:

Elizabeth Fagan, NHFD Project Manager
Dominic Inman, NHFD Clinical Lead
Antony Johansen, FFFAP Senior Clinical Lead