



## Supplementary Material

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**Table i.** National Joint Registry data quality strategy stages of data quality validation: explanatory notes.

Level	Purpose	Responsible	Key elements
<b>Validation stage 1</b>			
Local primary audit of NJR data input	To establish the status and quality of primary data entry at unit level	Local staff, NJR Regional Coordinators, and Regional Clinical Coordinators, Northgate.	<ul style="list-style-type: none"><li>• To provide 'audit information' packs to units setting out the requirements of undertaking primary local audit and timescales;</li><li>• To identify data issues i.e. data errors, missing data;</li><li>• To identify and address any system problems;</li><li>• Collate results centrally (NJR Centre) to establish national intelligence on both unit specific and wider generic (common) issues;</li><li>• Identify a unit action plan to address the issues;</li></ul>

			<ul style="list-style-type: none"> <li>• Conduct unit level training tailored to addressing specific local problems;</li> <li>• Provide RCs and RCCs with the names of Trust Data Quality leads for the purpose of this validation stage.</li> </ul>
<b>Validation stage 1 a</b>			
Local management of Edit Stacks (pending records)	To ensure that unit Edit Stacks are kept to a minimum size	Northgate	<ul style="list-style-type: none"> <li>• Close monitoring of unit Edit Stacks by NJR Regional Coordinators and liaison with local units if Edit Stack is not well managed;</li> <li>• Establishment of an Edit Stack protocol, incorporating triggers that escalate problems and outlining steps and timescales to be followed with regard to arrangements for monitoring, reporting, and taking necessary action.</li> </ul>
<b>Validation stage 2</b>			
NJR Central Data base-Pre data entry system validation	To ensure quality of the in-built database system validation rules to prevent input of inaccurate data	Northgate	<ul style="list-style-type: none"> <li>• To review the current system 'Logical Business Rules', i.e. what data input the system allows- Northgate to circulate a list of the LBR;</li> <li>• Using outcomes intelligence from validation stage 1, establish whether additional system validation rules are required;</li> <li>• Ensure that mandatory data fields are in place prompting system warning messages if a record is entered incorrectly.</li> </ul>
<b>Validation stage 3</b>			
NJR Central Database –Post data entry system validation	To ensure that data, once entered onto the NJR database, are further validated through linkage with alternative data sources (HES, PEDW, PHES) to provide additional assurance that data quality is fit for NJR reporting purposes	Northgate / Bristol	<ul style="list-style-type: none"> <li>• Bristol to advise on data quality issues to be resolved through LBRs as per Stage 2;</li> <li>• Make appropriate applications for approval to access and link with secondary data sources; <u>Approval obtained</u></li> <li>• Identify any missing records and anomalies flagged through other data sources;</li> </ul>

			<ul style="list-style-type: none"> <li>• Produce unit level DQ reports identifying anomalies i.e. patients in HES but not NJR or vice-versa, to enable further local level validation to be undertaken;</li> <li>• Immediately undertake pilot validation checks at 6 units;</li> <li>• Production of dashboards. <u>Approval not obtained</u></li> <li>• Identify problems and risk for the NJR of not obtaining the necessary approvals, i.e. a) inability to gain access to HES and PROMs through NHS Digital for 2013/14 affecting Annual Report production, b) delay obtaining governance approvals for changes to minimum data set v6;</li> <li>• Agree an escalation process if unable to resolve access and linkage problems, i.e. NHS England</li> </ul>
<b>Validation stage 4</b>			
Routine NJR Reporting	Personal and organizational validation through publication of routine NJR reports i.e. surgeon and implant outliers, consultant level, Supplier feedback, Management feedback, COP, etc.	Individuals and Trusts	<p>Ongoing promotion, communications, and use of:</p> <ul style="list-style-type: none"> <li>• Clinician Feedback</li> <li>• Consultant Level Report</li> <li>• Management Feedback</li> <li>• Supplier Feedback</li> <li>• NJR Surgeon and Hospital Profile website.</li> </ul> <p>Actively request feedback from users of these services on any data quality issues identified, and put in place processes for resolution of any such issues.</p>
<b>Validation stage 5</b>			
National NJR data Audit via British Orthopaedic Network Environment (BONE)	To develop a national annual NJR data validation audit through the BONE infrastructure to drive quality assurance	BONE/BOA; Jeya Palan (lead)	<ul style="list-style-type: none"> <li>• To identify requirements of BONE to undertake annual audit;</li> <li>• To finalize a process, action plan, and reporting arrangements;</li> </ul>

	and make it a requirement for units to comply		<ul style="list-style-type: none"> <li>• Undertake 4/5 BONE pilot audits to inform the above;</li> <li>• To pursue making this audit a national requirement for units to comply.</li> </ul>
<b>Validation stage 6</b>			
External Review	To undertake a programme of external hospital reviews to assess unit compliance with audit requirements	NJR Team led by Professor Paul Gregg	<ul style="list-style-type: none"> <li>• To establish a programme of visits based on a follow-up of the outcome of BONE national audits;</li> <li>• To convene an NJR team;</li> <li>• To communicate with units about expectation of the external review;</li> <li>• To agree a protocol for reporting outcomes and agreeing action.</li> </ul>

BOA, British Orthopaedic Association; BONE, British Orthopaedic Network Environment; COP, Consultant Outcomes Publication; DQ, data quality; HES,

Hospital Episode Statistics; LBR, Logical Business Rules; NJR, National Joint Registry; PEDW, Patient Episode Database Wales; PHES, Private Hospital Episode

Statistics; PROMs, patient-reported outcome measures; RC, Regional Coordinator; RCC, Regional Clinical Coordinator.



5	BONE	Undertake BONE audits												
6	External Reviews	NJR external unit audits/inspections												
	Colour code													
		proposed timescales												
		provisional timescales due to external dependency												

BONE, British Orthopaedic Network Environment; COP, Consultant Outcome Publication; LBR, Logical Business Rules.

## LOCAL DATA VALIDATION/COMPLIANCE AUDIT

FIELD	ACTION
<b>HOSPITAL DETAILS SHEET</b>	<p>Complete all the details required:-</p> <p><b>The Auditor will need to confirm with individual Consultants whether they validated the data contained in their Consultant Level Report in 2014.</b></p> <p>Check whether there is a named NJR Ortho lead. Enter yes or no If there is a nominated lead, enter the Surgeon's name</p>
1) <b>LOCAL PATIENT IDENTIFIER</b>	Record the local patient identifier if not present
2) <b>NJR INDEX</b>	If the record has already been submitted to the NJR insert the NJR index no. will be present. If no record has previously been submitted, complete this when the new MDS form has been generated & submitted
3) <b>STATUS</b>	Select the appropriate choice.
4) <b>ACTION</b>	Select the appropriate choice.
5) <b>RECORDED CONSULTANT IN CHARGE</b>	This is the name of the Consultant in charge recorded on the NJR
6) <b>CORRECT CONSULTANT IN CHARGE</b>	If a procedure has been recorded with an incorrect CIC, enter the surname of the correct CIC in the spreadsheet (after verifying with Consultants involved). A new form DOES NOT need to be completed. The existing submitted record will be put back into the edit stack by the NJR when the audit tool is returned, ready for amending by the HDM.
7) <b>CORRECT PROCEDURE</b>	If a record has been submitted with an incorrect procedure, enter the correct procedure on the spreadsheet. A new form DOES NOT need to be completed. The existing submitted record will be put back into the edit stack by the NJR for amending by the HDM.

- 8) **MDS FORM COMPLETE?** If a new form was required complete this field when it has been fully completed
- 9) **MISSING/ INCORRECT DATA COMPLETED?** If a record is in the edit stack tick "yes" once it has been confirmed any missing data items have been completed. If the "validate override" facility has to be used select "no".
- 10) **RECORD SUBMITTED?** Only complete this field when the record has been FULLY submitted to the NJR
- 11) **DATE OF SUBMISSION** To be completed by the HDM or member of staff submitting any **NEW** fully completed NJR form **or** record from the edit stack (date format = dd/mm/yy)
- 12) **COMMENTS** Use this field to record any other issues related to the record (*i.e. had to use Data Validate function to submit*)