National Joint Registry data inaccuracy: a threat to proper reporting

Introduction: The authors set out to investigate the accuracy of the information their unit was inputting onto the National Joint Registry. This is important both in relation to implant surveillance and also to the use of these data to monitor the performance of surgeons.
Method: A single consultant's arthroplasty patients were audited over 12 months. Data taken from the National Joint Registry were compared to the operation notes and the hospital's computer system.
Results: Of 78 cases inputted, 27 (35%) were incorrect. Sixteen cases (21%) had the incorrect 'consultant in charge' recorded, eight cases (10%) had the incorrect 'operating surgeon' recorded and three cases (4%) had both errors. The most frequent inaccuracies resulted from listing by another consultant and incorrectly recorded trainee supervision. These errors were highlighted to the unit and a corrected process was designed. The intervention was to implement this process by presenting to the involved groups and displaying posters to prevent the error-producing process. The audit was repeated (after 6 months) showing eradication of the problem.
Discussion: It is the surgeon's duty to ensure data recorded under his/her name are accurate and justify any discrepancies when compared to other surgeons. Pooling of patients and supervision of trainees are sources of potential error.

The Department of Health and Welsh Government set up the National Joint Registry in 2002 and Northern Ireland joined in 2013. The Registry is now managed by the Healthcare Quality Improvement Partnership. The primary aim of the National Joint Registry is to collect information relating to arthroplasty surgery and monitor the performance of implants used and the surgical techniques. This information is collected across both the NHS and independent health-care sector.

Initially, the National Joint Registry collected information on just hip and knee arthroplasty but information on ankle replacements was added in 2010 and elbow and shoulder arthroplasties have been added since April 2012.

The stated goals of the National Joint Registry are to monitor real-time outcomes by brand of prosthesis, hospital and surgeon. Where performance falls below expectations, these data can be used to prompt investigation and follow-up (National Joint Registry, 2013). In this way, the collected data can be used to inform clinicians, patients and commissioners of outcomes achieved and support evidence-based use of implants. The National Joint Registry Steering Committee reports directly to government as well as to hospitals and implant manufacturers.

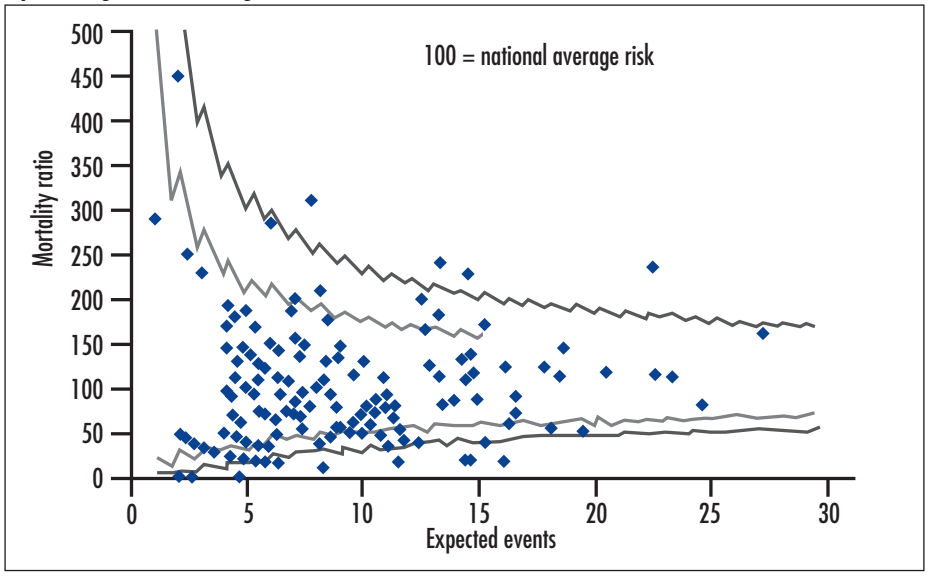
One benefit of the data collected is that revision arthroplasties are indexed back to the primary surgery. This can be used to highlight implants with a high revision rate but can also be linked to the operating surgeon.

The process of 'outlier monitoring' allows individual surgeons to be compared. Funnel plots are created for each procedure to identify surgeons with revision rates significantly higher than their peers (*Figure 1*).

This is the first step of a process that has been agreed by the British Orthopaedic Association. Following anonymous review of the data by the National Joint Registry Steering Committee, if it is thought that there is a case to answer, the individual surgeon (and the Chief Executive Officer of the employing trust) are contacted. It then becomes the responsibility of the individual surgeon to justify the discrepancy and provide internal audit data to support this.

Although the process of outlier monitoring has justifiable patient safety goals, it is essential that the data inputted into the National Joint Registry are accurate. Inaccuracies could skew the data and result in a lengthy and troublesome process for the surgeon to clear his/her name.

Figure 1. Example of funnel plot used to identify 'outliers'. Expected events (x-axis) takes into account complexity of cases including patient comorbidities. The y-axis displays a mortality ratio with 100 representing national average risk.



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The National Joint Registry forms ask specifically about the 'consultant in charge' and the 'operating surgeon' for each procedure. It has become commonplace, in many hospitals, for subspecialty patients to be pooled. This creates a situation where a number of different consultants may be involved in the assessment and management of an arthroplasty patient. The surgeon the patient is referred to, listed by, and operated on may all be different. This allows for some confusion about the consultant in charge. The training of specialty registrars also means that the operating surgeon is not always the most senior surgeon present.

The National Joint Registry form provides a single tick box to allow the consultant in charge's 'default technique' to be recorded. If the consultant in charge is incorrect, this potentially means inaccurate information is also recorded about surgical approach, use of a tourniquet and the provision of thromboprophylaxis – all of which could be argued to have a bearing on the longevity of the implants.

The potential for data inaccuracies was noted in the authors' department and an audit undertaken to evaluate this.

Methods

The authors contacted the National Joint Registry and asked for the data collected against the lead surgeon's name operating at their institution. This gave details of the cases in which he was listed as consultant in charge, operating surgeon, or both. A total of 78 cases were identified including primary knee, primary hip and revision knee procedures (*Table 1*).

The recorded information was then compared with what was written on the operation note. In this instance, the consultant in charge was either the consultant who was operating or supervising in theatre. When no consultant was present (the operation was performed or supervised by an associate specialist), the listing consultant was recorded, as the patient is admitted under this consultant. The operating surgeon was taken as the primary surgeon recorded on the operation note.

Following the completion of this comparison, the operation record on the hospital computer system (Galaxy, CSC, Banbury, UK) was examined to see whether this could be relied upon as an accurate record of the consultant's work.

Results

Following the initial comparison between the information recorded on the National Joint Registry and the operation note, it was found that 27 (35%) of these entries were incorrect. Sixteen cases (21%) had the incorrect consultant in charge recorded, eight cases (10%) had the incorrect operating surgeon recorded and three cases (4%) had both errors (*Figure 2*).

Where the incorrect consultant in charge was recorded, all 19 cases had the listing consultant recorded as in charge. This consultant had not been present at the time of surgery. Where the incorrect operating surgeon was recorded, the error in all was that either the consultant was assisting a trainee (and the consultant was recorded as operating surgeon) or vice versa.

Comparison with the hospital theatre computer records showed significant discrepancies. Only 84% of the cases tallied up.

Intervention and re-audit

In response to this audit, the results were presented to the department and the sources of the errors were detected. Some of the information (including consultant in charge and demographics) was recorded before surgery when consenting for inclusion in the register took place. The remainder of the form was completed in theatre, by theatre assistants. An improved process was designed, highlighting the importance that the National Joint Registry forms be completed by the operating surgeon only at the end of the procedure. This was widely communicated within the department and displayed in poster format in the areas where these forms were being completed.

A re-audit using the same methodology was performed over a 6-month period, 6 months after the introduction of the form. The results of this re-audit showed 100% accuracy of both the consultant in charge and operating surgeon. The progress was again presented back to the department. The findings of the original audit remain key to the department and will continue to be audited on an annual basis.

Discussion

The authors set out to audit the accuracy of National Joint Registry data inputted for a single consultant surgeon. Their hospital pools primary hip and knee replacements between eight lower limb arthroplasty surgeons. Revision knee replacements are similarly pooled between two of the surgeons with this subspecialty interest.

The consultant in charge was incorrect in 25% of the National Joint Registry entries. This was found to be the result of confusion in the pooled system between the listing consultant and the operating consultant. With pooled patients, the individuals were incorrectly inputting the listing consultant as consultant in charge. This was seemingly not being properly checked by the surgeon at the end of the procedure. The impact of this is the potential for incorrect recording of the surgical technique used as well as tourniquet and thromboprophylaxis use. The use of the default technique box compounded this if the incorrect consultant in charge was recorded.

Figure 2. Pie chart showing inaccuracies of National Joint Registry data.

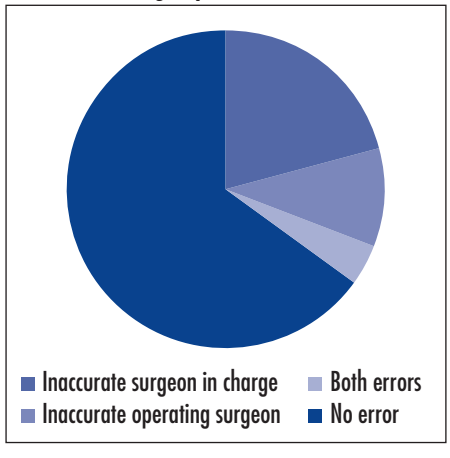

Table 1. Data from the National Joint Registry for the lead surgeon over the preceding 12 months

Arthroplasty	Consultant in charge	Operating surgeon	Surgeon in charge and operating surgeon
Primary knee	19	7	33
Primary hip	0	4	4
Revision knee	1	2	8

Of the National Joint Registry entries that were audited 14% had the incorrect operating surgeon recorded. This error seemed to result from the consultant and trainee being incorrectly recorded as assistant or primary surgeon. This appeared to stem from the theatre team recording this wrongly while the surgery was being performed (and this not being checked by the surgeon at the end of the procedure). Although it has been shown that the outcome of arthroplasty surgery is the same whether the consultant is operating or assisting a trainee (Palan et al, 2009), this does have some implications. First, this available information may be interpreted by those scrutinizing the data as poor numbers of procedures where training is taking place. This could potentially have consequences for the number of trainees a trust is given. Second, the trainee may not always use the consultant's default technique. In the current system, trainees learning to perform joint replacements may wish to maintain their own standard technique, while operating with supervision from differing consultants to develop a reproducible method.

LEARNING POINTS

- This audit demonstrates inaccuracies in 35% of entries relating to the surgical team.
- Pooling of patients within a unit and training of junior surgeons represent potential sources of error.
- It is the surgeon's responsibility to ensure all data entered under his/her name are accurate.
- In outlier monitoring, the surgeon must be able to verify the accuracy of the data.

Inaccurate data recorded on the National Joint Registry has obvious implications for the quality of information that is recorded on the national system to perform real-time surveillance of joint replacement surgery. Furthermore, the use of these data for outlier monitoring means that it is in the individual surgeon's interest to ensure that the data recorded are as accurate as possible. If a consultant found him- or herself in the position of having to justify his/her revision rate being an outlier on the created funnel plot, having to rely on this data may be troublesome. Faced with scrutiny from both the National Joint Registry Steering Group and the Trust Board, it becomes the surgeon's responsibility to prove (or disprove) the validity of the results. The authors found that the hospital's computer system was an inaccurate method of doing this. The lead consultant in this case was not keeping a personal logbook of procedures performed. However, the results of this audit prompted a change in his practice to ensure he did this.

The inclusion of only a single consultant surgeon's work in this audit can be viewed as a potential limitation. However, the authors have no reason to believe that this is not representative of the whole department. The issues identified, in terms of the timing of form completion and staff involved, are likely also to be seen in other institutions who have adopted a similar pooled listing process.

The use of doctor-reported outcome data is one of the areas highlighted within the recent review of treatment and care quality by Professor Sir Bruce Keogh (2013). The report emphasizes the need for health-care providers, commissioners and patients to have access to 'accurate, insightful and easy to use data about quality at service line level'. However, it also describes the complexity of the data recorded and the poor consistency of information used to monitor quality on an ongoing basis. The appropriateness of the National Joint Registry data being used to 'rank' surgeons can be debated. However, while it is being used as such, it must be the surgeon's responsibility to ensure the data that he/she is inputting are accurate. Challenging the validity of data that one has been responsible for collecting becomes difficult and surgeons should be mindful of how this may be presented to the public and commissioners.

The National Joint Registry plays an important role in the surveillance of joint replacements. It is the surgeon's responsibility to ensure that the data inputted are accurate. Particular challenges are the pooling of patients and training juniors. To ensure the process of outlier monitoring and the scrutiny involved is simple for the surgeon to engage in, it is vital that an accurate personal logbook is maintained.

Surgeons should be aware of the inaccuracies that have been identified and the causes which the authors have had to address to prevent similar issues in their practise. **BJHM**

Conflict of interest: none.

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