

# Hospital episode statistics: time for clinicians to get involved?

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**ABSTRACT** – Hospital episode statistics contain clinical data. They are used for many purposes, including monitoring activity in the NHS and the allocation of funds. More recently they have been applied to monitoring performance, and it is intended that they will inform consultant appraisal and revalidation.

The validity of hospital episode statistics was questioned by Körner in 1982. Recent publications have shown that problems persist in England and Wales, and that the quality of the data is inadequate for the task. The lack of involvement of clinicians in the process of data collection and validation is no longer acceptable. To rectify the situation there should be a change of process and culture, supported by education and investment. NHS data definitions of terms such as 'spells', 'episodes' and 'diagnoses' need to be reviewed. The development of separate data processes to monitor national service frameworks is regrettable.

**KEY WORDS:** clinicians, hospital episode statistics, data validity

Statistics on activity in all NHS hospitals are used for many purposes including: negotiation of funds for the NHS, allocation of resources, monitoring of variations in activity and identification of trends in healthcare<sup>1</sup>. Recently, they have been used to produce performance and clinical indicators<sup>2,3</sup>. They could also be used for clinical audit<sup>4</sup> and health-technology assessment via randomised trials<sup>5,6</sup>. In the future, they may also be used to inform consultant appraisal and underpin the new consultant contract<sup>7</sup>.

Hospital episode statistics (HES)<sup>8</sup> are just one of many central returns from NHS hospitals (most are financial)<sup>1</sup>. Clinical information on diagnosis and procedures is captured for inpatients and day cases, but not for outpatient attendances. The clinical data are identified and coded from medical records, following the discharge of a patient from an inpatient or day-case episode. The process is distinct from the separate data collection required for confidential enquiries and specialty-based audits<sup>9</sup> and for monitoring national service frameworks<sup>10,11</sup>.

The quality of data routinely collected for central returns for management purposes was questioned in 1982 by Körner, who noted that 'the inaccuracy, lack of timeliness and certain inherent defects form the core of criticism levelled against NHS information'<sup>12</sup>. Problems with validity have been acknowledged by the Department of Health<sup>8</sup> and the Welsh Office (now the National Assembly for Wales), who found inexplicable variations in clinical indicators between Wales, England and Scotland, which, it was presumed, 'were due to coding or technical errors'<sup>13</sup>.

## Validity of HES

We have reviewed papers assessing the validity of data held in HES for England and Wales since 1990. They show that the ability of HES to capture all inpatient and day-case episodes is doubtful (Table 1). A recent study<sup>6</sup> found that hospital episode statistics in Wales (held on the patient episode database for Wales (PEDW)<sup>17</sup>) failed to identify 17%, 29% and 53% of patients admitted to hospital in the course of three randomised controlled trials.

Even if patient episodes are captured, the clinical data recorded may be inaccurate. A retrospective audit in two hospitals, comparing diagnosis codes assigned by local staff with those assigned by members of an external coding team who did not know the locally assigned codes, found exact agreement for the main diagnosis in 43% and 60% of cases, and approximate agreement in 55% and 72% of cases, respectively, in the two hospitals<sup>18</sup>.

Operations and procedure data are equally suspect (Table 2). Examination of procedure data for 1999–2000 on the HES website reveals that for approximately 6 million operations, the number of general anaesthetics that were included was 61,833<sup>23</sup>.

It is clear, therefore, that HES remain unable to support the purposes for which they were originally designed<sup>1</sup>, let alone new purposes related to quality<sup>2,3</sup>, appraisal and revalidation<sup>7</sup>. The unjustified criticism of the Chesterfield and North Derbyshire Royal Hospital NHS Trust by the Commission for Health Improvement is an example of the damage that can be done<sup>24</sup>.

**Table 1. Completeness of hospital episode statistics (HES) for patient episodes.**

| Comparator   | Year      | Completeness of HES | Comments  |
|--|-----------|---------------------|---|
| Cancer registrations <sup>14</sup>   | 1991–4    | 66%                 | Thames Cancer Registry. Some patients may not have been admitted to hospital.                 |
| Public Health Common Dataset <sup>15</sup>                                       | 1993–5    | 83%                 | Patients admitted with hip fracture in Wessex region (range 44%–99% in individual districts). |
| NHS private patient unit data <sup>16</sup>                                      | 1995/6    | 84%                 | Data from 53 hospitals in England. More day cases than inpatients were missing.               |
| Randomised controlled trial database: investigation of sleep apnoea <sup>7</sup> | 1995–7    | 83%                 | All patients were admitted as day cases to one hospital in South Wales.                       |
| Randomised controlled trial database: surgery for incontinence <sup>7</sup>      | 1996–2000 | 71%                 | Three hospitals in South Wales participated.  |
| Randomised controlled trial database: total knee replacement <sup>7</sup>        | 1995–8    | 47%                 | One hospital in South Wales participated.   |

### What can be done?

The process of collecting clinical data for central returns is summarised in Table 3. Accurate coding depends on clear medical documentation of diagnoses and procedures, as highlighted by the Audit Commission<sup>25</sup>. Clinicians must also validate the coded data. Discussion of data validity in *HES – the book* makes no mention of the need for clinicians to be involved<sup>8</sup>. There is no routine process of feedback to clinicians of either individual patient or aggregate data at a local level. In 1982, Körner made 98 recommendations for improving the quality of HES, but not one of these suggested that clinicians should be given ownership of or responsibility for the process, or be involved in validation<sup>12</sup>. The involvement of clinicians in data collection will improve accuracy<sup>26–28</sup>, but they need to work closely with coders<sup>29</sup>. The accuracy of coding by trained coders, when presented clearly with the term to code, is high<sup>25,29,30</sup>, suggesting that most problems lie with the identification of the correct

diagnoses and procedures in the notes<sup>31</sup>. To rectify this, the quality of documentation in medical notes must be given a high priority in undergraduate and postgraduate curricula<sup>32</sup>. Transfer of the responsibility for, and ownership of, collection and validation of routine clinical data from management to clinicians in hospitals<sup>33</sup> would mean a change in culture<sup>34</sup> as well as education. It would also need resources – but there is already a considerable investment in the coding infrastructure in hospitals, which might be more effectively deployed by providing support to a clinically managed process. The likelihood that HES data will underpin the new consultant contract and appraisal<sup>7</sup> may create interest from clinicians in this change.

In the meantime, NHS data definitions need revision and clarification. For example, the definition used to describe an episode<sup>35</sup> is open to misinterpretation. A hospital provider spell is 'the total continuous stay of a patient, using a bed on premises controlled by a health care provider, during which medical care is the responsibility of one or more consultants, or the patient is

**Table 2. Completeness of procedure data in hospital episode statistics.**

| Comparator  | Year    | Patients with procedure correctly identified (%) | Comments   |
|---|---------|--|--|
| Histopathology department records <sup>19</sup>       | 1990    | 10%  | Pleural biopsies in Wales.   |
|   |         | 23%  | Liver biopsies in Wales.   |
|   |         | 54%  | Renal biopsies in Wales.   |
| Haematology department records <sup>19</sup>          | 1990    | 12%  | Marrow aspirations in Wales.   |
| External coding team <sup>18</sup>                    | 1991–3  | 58%; 76%   | Exact agreement required (two hospitals in NW Thames).<br>Approximate agreement required (two hospitals in NW Thames). |
|   |         | 70%; 83%   |  |
| Gastrointestinal endoscopy unit records <sup>19</sup> | 1992    | 67%  | All Wales.   |
|   | 1996    | 79%  | All Wales.   |
| Local audit data <sup>20</sup>                        | 1989/90 | 45%  | Varicose vein operations in the Oxford region.   |
|   | 1995/6  | 98%  | Varicose vein operations in the Oxford region.   |
| Prospectively collected data <sup>21</sup>            | 1994/5  | 69% (range: 36%–87%)                             | Vascular procedures in five regions in England and Wales.  |
| Prospective data collection <sup>22</sup>             | 1990–5  | 80%  | Vascular surgery in the Oxford region.   |

**Table 3. Summary of steps in the process of clinical data collection for central returns from hospitals.**

| Step | Action  | Responsibility  |
|------|---|---|
| 1    | Clear documentation in the medical record of all diagnoses made and procedures undertaken. Primary diagnosis identified. Symptoms or signs to be used where diagnosis is unproven | Doctor  |
| 2    | Transfer of the medical record to the coding office after discharge of the patient  | Hospital management                                     |
| 3    | Dates of inpatient or day-case spell and finished consultant episodes (FCE) identified using NHS data definitions   | Coder   |
| 4    | Identification of relevant diagnoses and procedures from the medical record   | Coder   |
| 5    | Coding of primary diagnosis, one subsidiary and up to five secondary diagnoses in ICD10, and up to four procedures in OPCS4, using NHS data definitions                           | Coder   |
| 6    | Returns sent monthly to regional offices  | Hospital management                                     |
| 7    | Data aggregated and analysed  | Department of Health/<br>National Assembly for<br>Wales |

receiving care under one or more nursing episodes, or midwife episodes in a ward. The hospital provider spell starts when a consultant, nurse or midwife assumes responsibility for care following the decision to admit the patient'. Furthermore, 'A bed includes any device that may be used to permit a patient to lie down when the need to do so is a consequence of the patient's condition, rather than the need for active intervention such as examination, diagnostic investigation, manipulation/treatment or transport'. This definition causes immediate confusion when applied to a procedure such as an endoscopy, which could be classified as a day-case, and thus collected in HES data, or as an outpatient procedure, in which case it would be omitted. It is no wonder that endoscopic data held on PEDW indicate recurring under-reporting of nearly 10,000 procedures per annum in Wales<sup>19</sup>, translating to 170,000 procedures per annum for the whole of England and Wales.

While the total continuous stay in hospital is a 'spell', the period of care when a patient is under a consultant is termed a 'consultant episode'<sup>35</sup>. The use of the 'finished consultant episode' as the primary episode currency has been questioned<sup>36,37</sup>, and has dubious relevance in a health service where roles are rapidly changing and team working is becoming the norm. The concept of the episode of care now needs to cross conventional organisational and time boundaries<sup>38</sup>. This would provide a more complete picture of both individual care and outcomes, leading to better views on quality, as well as better-informed case management, service development and policy decisions.

The definition of 'primary diagnosis' is also likely to contribute to poor validity. *HES – the book* describes 'primary diagnosis' as 'the main condition treated or investigated during the episode of health care'<sup>38</sup>. 'Main condition' is not defined, and there are six further diagnosis fields for a 'subsidiary', and up to five 'secondary' diagnoses, again not defined, to be used to record 'other diseases, conditions or complications'. The rate of recording of secondary diagnoses in England is about 10% of that in the USA, with serious implications for any comparison of outcomes between hospitals or professionals<sup>39</sup>.

It is also of concern that, while there is considerable investment in the process of collecting central returns, additional and parallel data-collection processes exist or are being created in support of confidential enquiries<sup>9</sup> and national service frameworks<sup>10,11</sup>. A fundamental review of all data-collection processes is required in order to integrate them into a single process linked to the implementation of electronic patient records<sup>40</sup>. A current consultation on NHS performance indicators<sup>41</sup> fails to seize this opportunity or to acknowledge the crucial role of clinicians in ensuring data quality. Improvements in the validity of HES might help to gain the trust of clinicians, and might also enable the wider use of the data for purposes such as audit<sup>4</sup> and health-technology assessment by randomised controlled trial, with potential cost savings to the research budget<sup>6</sup>. Many of these issues were identified in the Bristol inquiry report, *Learning from Bristol*<sup>42</sup>. Action now needs to be taken.

## References

- 1 Central data collections from the NHS. NHS Executive Health Service Circular 1998/054.
- 2 *The new NHS: modern and dependable. A national framework for assessing performance*. Leeds: NHS Executive, 1998.
- 3 *Quality and performance in the NHS: clinical indicators*. Leeds: NHS Executive, 1999.
- 4 McKee M. Routine data: a resource for clinical audit? *Qual Health Care* 1993;2:104–11.
- 5 Lewsey JD, Leyland AH, Murray GD, Boddy FA. Using routine data to complement and enhance the results of randomised controlled trials. *Health Technol Assess* 2000;4:22.
- 6 Williams JG, Cheung WY, Cohen D, Hutchings H, *et al*. The value of routine data in health technology assessment: can randomised trials rely on existing electronic data? *Health Technol Assess* 2002 (in press).
- 7 Maynard A, Bloor K. Reforming the contract of UK consultants. *BMJ* 2001;322:541–3.
- 8 Department of Health. *HES – the book*. London: Department of Health, 2000.
- 9 Pareto Consulting. *Review of clinical audit systems*. London: Department of Health, 1998.
- 10 Cancer Dataset Project. *Consultation document for cancer dataset version 1.0*. Birmingham: NHS Information Authority, 2000.
- 11 Department of Health. Coronary heart disease information strategy,

- September 2001. [www.doh.gov.uk/ipu/strategy/nsf/chdstrat/chdisdoc.htm](http://www.doh.gov.uk/ipu/strategy/nsf/chdstrat/chdisdoc.htm)
- 12 Körner E. *First report to the Secretary of State of the steering group on health services information*. London: HMSO, 1987.
  - 13 Welsh Health Circular (98) 441. Cardiff: Welsh Office, 1998.
  - 14 Pollock AM, Vickers N. Reducing DCO registrations through electronic matching of cancer registry data and routine hospital data. *Br J Cancer* 2000;**82**:712–17.
  - 15 McColl AM, Roderick P, Cooper C. Hip fracture incidence and mortality in an English region: a study using routine National Health Service data. *J Public Health Med* 1998;**20**:196–205.
  - 16 Williams BT, Pearson J. Private patients in NHS hospitals: comparison of two sources of information. *J Public Health Med* 1999;**21**:70–3.
  - 17 PEDW data items. [www.wales.nhs.uk/whcsa/hmis/datadict22/pedw.dataitems.htm](http://www.wales.nhs.uk/whcsa/hmis/datadict22/pedw.dataitems.htm)
  - 18 Dixon J, Sanderson C, Elliott P, Walls P, *et al.* Assessment of the reproducibility of clinical coding in routinely collected hospital activity data: a study in two hospitals. *J Public Health Med* 1998;**20**:63–9.
  - 19 Williams JG. Information from practice: current position. In: Pusey, C (ed). *Horizons in medicine*, vol 11. London: Royal College of Physicians, 1999:221–8.
  - 20 Galland RB, Whatling PJ, Crook TJ, Magee TR. Regional variation in varicose vein operations in England 1989–1996. *Ann R Coll Surg Engl* 2000;**82**:275–9.
  - 21 Galland RB, Magee TR, Berridge DC, Hopkinson GB, *et al.* Accuracy of centrally recorded OPCS codes for vascular surgery in the United Kingdom. *Eur J Vasc Endovasc Surg* 1998;**16**:415–18.
  - 22 Galland RB, Magee TR. Survey of changes in provision of vascular surgical services in the Oxford Region over 5 years. *Br J Surg* 1998;**85**:637–40.
  - 23 Department of Health. Hospital inpatient data based on hospital episode statistics (HES): total operations. [www.doh.gov.uk/hes/standard\\_data/available\\_tables/total\\_operations/index/html](http://www.doh.gov.uk/hes/standard_data/available_tables/total_operations/index/html)
  - 24 Pritchard L. Bungled CHI mortality rates report hits staff confidence. *BMA News* 29 September, 2001.
  - 25 Audit Commission. *Setting the record straight*. London: HMSO, 1996.
  - 26 Yeoh C, Davies H. Clinical coding: completeness and accuracy when doctors take it on. *BMJ* 1993;**306**:972.
  - 27 Barrie JL, Marsh DR. Quality of data in the Manchester orthopaedic database. *BMJ* 1992;**304**:159–62.
  - 28 Cleary R, Beard RW, Coles J, Devlin HB, *et al.* The quality of routinely collected maternity data. *Br J Obstet Gynaecol* 1994;**101**:1042–7.
  - 29 Walshe K, Harrison N, Renshaw M. Comparison of the quality of patient data collected by hospital and departmental computer systems. *Health Trends* 1993;**25**:105–8.
  - 30 Colville RJ, Laing JH, Murison MS. Coding plastic surgery operations: an audit of performance using OPCS-4. *Br J Plast Surg* 2000;**53**:420–2.
  - 31 Cleary R, Beard RW, Coles J, Devlin HB, *et al.* Comparative hospital databases: value for management and quality. *Qual Health Care* 1994;**3**:3–10.
  - 32 Severs MP, Pearson C. *Learning to manage health information. A theme for clinical education*. Bristol: NHSE, 1999.
  - 33 Williams JG. Research as part of routine care. *J R Soc Med* 2001;**94**:54.
  - 34 Williams JG, Severs MP. Physicians in the information age: are we keeping pace? *J R Coll Physicians Lond* 1998;**32**:193–4.
  - 35 NHS Information Authority. *NHS data dictionary version 3.3*. Birmingham: NHS Information Authority, 2000.
  - 36 Clarke A, McKee M. The consultant episode: an unhelpful measure. *BMJ* 1992;**305**:1307–8.
  - 37 Rigby MJ, Severs MP, Swayne J, Williams JG. Time to outlaw the episode. *Br J Healthcare Computing* 1994;**11**:26–8.
  - 38 Rigby MJ, Williams JG. *Definition of episodes project. Collaborative exercise: final report*. Birmingham: NHS Information Authority, 2000.
  - 39 McKee M, Coles J, James P. 'Failure to rescue' as a measure of quality of hospital care: the limitations of secondary diagnosis coding in English hospital data. *J Public Health Med* 1999;**21**:453–8.
  - 40 Department of Health. *Building the information core: implementing the NHS plan*. London: Department of Health, 2001.
  - 41 Department of Health. *NHS performance indicators: a consultation*. London: Department of Health, 2001.
  - 42 H M Government. *Learning from Bristol: a report of the public inquiry into children's heart surgery at the Bristol Royal Infirmary 1984–1995*. CM 5207. London: The Stationery Office, 2001.

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