Inpatient survey 2011: Sampling Problems

1. Introduction

Final sampling inspection by the Co-ordination Centre was introduced for the 2006 inpatient survey and was found to be useful for identifying errors made when drawing samples and thereby helping trusts to avoid the common mistakes that can result in delays to the survey process, and problems with poor-quality samples. This document describes the errors that have been made when samples have been drawn and the recommendations made by the Co-ordination Centre to correct these. Errors are divided into major (those requiring the sample to be re-drawn or patients to be replaced) or minor (those that could be corrected before final data submission).
This document should be used by trusts and contractors to become familiar with past errors and to prevent these from recurring. If further assistance is required, please contact the Co-ordination Centre on 01865 208127.

2. Frequency of errors

This year it was decided that approval should be sought for the National Inpatient Survey 2011 under section 251 of the NHS Act 2006. This resulted in a slight delay to the start of fieldwork and it was decided that, for this year only, trusts submitting their sample to a contractor would not then require approval from the Co-ordination Centre (as it was considered that the thorough checks undertaken by the contractors would be adequate). This means that the results for 2011 in the tables below are based only on errors identified in the samples of the 20 trusts which conducted the survey in-house. Consequently, the number of errors in 2011 cannot be directly compared with previous years, however, it is still considered important to highlight the issues which arose this year as well as those from earlier studies.

In 2011 there were sixteen major errors noted in the sample checking phase and the Co-ordination Centre advised eleven trusts to re-draw their sample (sometimes more than once). Further to this, an additional eleven minor errors were also identified, as can be seen in Table 1.

Table 1 – Frequency of major and minor errors by survey year

	2011[†]	**2010**	**2009**	**2008**	**2007**	**2006**
Major errors	16	9	19	24	28	38
Minor errors	11	41	39	70	70	141

[†]Note that in 2011 only in-house trust samples were checked

3. Types of major error

Sixteen major errors were identified during sample checking in 2011, spread across eleven trusts (see Table 2 below). Errors are classified as major if they require the trust to re-sample, or to replace patients from the sample. If major errors are not corrected, the trust's survey data cannot be used by Care Quality Commission for regulatory activities, such as monitoring trusts' compliance with the essential standards of quality and safety, and the trust will be reported as not submitting data for the national survey. Table 2 below outlines the frequency of major errors by the type of error that was made. More detail about each of these errors is provided below.

Table 2 – Frequency of major errors by type of major error and survey year

Major errors	2011†	2010	2009	2008	2007	2006
Inclusion of ineligible patients (based on route of admission information)	6	6	5	n/a	n/a	n/a
Sampled by consecutive admission	2	2	3	4	2	3
Random samples	0	1	4	5	9	10
Sampled incorrect period	0	0	2	3	3	1
Screened single night stays	1	0	2	0	1	1
Incorrectly excluded by age	1	0	1	4	0	1[1]
Zero overnight stay patients included	2	0	1	0	2	2
Inclusion of private patients	0	0	0	3	0	1[2]
Inclusion of maternity/termination of pregnancy patients	2	0	0	2	8	8
Exclusion of some hospital sites	0	0	0	1	1	0
Inclusion of psychiatry patients	0	0	0	1	0	0
Incorrectly excluded by specialty code	0	0	0	0	2	4
Other	2	0	1	1	0	7
Total	**16**	**9**	**19**	**24**	**28**	**38**

†Note that in 2011 only in-house trust samples were checked

Inclusion of ineligible patients (based on route of admission information)

In the sample file, acute trusts are asked to include the two-digit route of admission code for each patient. This information has been required since 2009[3] and allows ineligible patients to be more easily identified and excluded.

Six trusts had patients in their sample whose ineligibility was identified by their route of admission codes (see Table 2 above). For some trusts, substantial numbers of patients in the sample were found to be ineligible when route of admission codes were examined; these were usually patients admitted through maternity services (i.e. route of admission codes of 31 or 32).

In these cases trusts were informed of this issue, reminded of the eligibility criteria and asked to resubmit having replaced the ineligible records.

[1] In 2006, one trust incorrectly excluded patients who were 16 years old and thus eligible for the survey. In the 2007 sampling errors document, this trust was coded as "other" because there were no other examples of this occurring. In this document, they have been recoded to match this category of major error.

[2] In 2006, one trust incorrectly included private patients in their sample. In the 2007 sampling errors document, this trust was coded as "other" because there were no other examples of this occurring. In this document, the have been recoded to match this category of major error.

[3] In fact 2008 was the first survey year that route of admission information was requested. However, in this first year of it being asked, trusts were required to recode the information to indicate whether a patient was 'emergency' or 'planned'. Inconsistencies in coding this information across trusts led to full information on route of admission being requested in 2009.

Sampled by consecutive admission date

In 2011 two trusts submitted samples which included patients that had been discharged in September and October, indicating that at some point in the process the list of patients had been sorted by date of admission. After closer investigation this was confirmed to be the case.

This major error has been detected in samples in every year since 2006, as shown in Table 2. This error can also be identified by the maximum length of stay being of short duration in comparison to that of the previous year. For example, if a trust's maximum length of stay was 90 days in the previous year's study but appeared as only 18 days in the current study it is likely that this mistake has been made.

This error can occur at multiple stages of the sample generation. For example, a trust may generate a large initial sampling frame that conforms to all the inclusion criteria, then generate a second list once the exclusion criteria have been applied, then another list of 900 patients to be sent to the Demographics Batch Service, and a final list of 850 patients to be sent to the Co-ordination Centre. If any of these lists are sorted by admission date rather than discharge date, this error could occur.

Random samples

Although this did not happen in 2011, in previous years a number of trusts have submitted samples that led us to suspect they had drawn a random sample of all patients seen over a period of one or more months. In these samples it was typical to find the earliest date of discharge very close to the start of the month (usually the 1st of the month) and the latest date of discharge at the very end of the month. Given that trusts are instructed in the guidance manual to sample back from the end of one of three possible months (June, July or August), the last day of that chosen month should always be the latest discharge date. However, if a trust draws their sample correctly, it would be unlikely for the earliest date of discharge to be in the first few days of the month. Any samples where the earliest date of discharge falls in the first few days of the month are investigated further, initially by comparing the sample with samples from the same trust submitted in previous years, and then by contacting trusts to seek resolution and reassurance on the issue. If it is the case that the trust has drawn a random sample, trusts will be required to re-draw the sample and to resubmit it for final approval

Sampled incorrect period

In previous years trusts have sampled periods not prescribed by the survey guidance (see Table 2). This can be a failure to sample from the end of the month or sampling outside of the three months specified in the guidance. No trust made this error in 2011.

Screened single night stays

In 2011 one trust made the mistake of **excluding** patients who had stayed for one night only. The trust was advised to re-draw their sample and include patients who had spent just one night in hospital.

Incorrectly excluded by age

Previously, in order to be sure that no patients under the age of 16 were included in the sample, trusts have excluded all patients born in the most recent eligible year. In the case of the 2011 survey this was 1995 and one trust made this error. This is not permissible because it also excludes eligible patients just above the age cut-off.

In 2011 a number of trusts submitted samples without patients born in 1995, but when queried by the Co-ordination Centre, acceptable assurances were given that no patients had been wrongfully

excluded on this basis. Equally, all trusts that submitted samples including patients with a year of birth of 1995 were asked to confirm that patients were aged 16 at the time of sampling.

Zero overnight stay patients included

To be eligible for the survey, patients must stay overnight in hospital. For the purposes of this survey, this requires that their discharge date is at least one day later than their admission date. In 2011, two trusts submitted samples which included patients who had not spent a night in hospital. These patients were removed from the sample and replaced.

Inclusion of private patients

The national inpatient survey only samples NHS patients and specific instruction is provided in the guidance manual to exclude all private patients. In 2011 no trust made this error, though this has been an issue in past survey years (see Table 2).

Inclusion of maternity/termination of pregnancy patients

The guidance manual explicitly states that maternity patients must be excluded from the sample, as in all previous inpatient surveys in the NHS patient survey programme. This refers to any patients coded with a main specialty of 501 (obstetrics) or 560 (midwife) and admitted for management of pregnancy and childbirth, including miscarriages. In addition, any patients admitted for a planned termination of pregnancy must also be excluded from the survey due to issues of privacy and sensitivity.

In 2011 two samples were submitted to the Co-ordination Centre containing patients with main specialty codes of 501 and/or 560 who should have been excluded. In the two years prior to this no trusts had made this error.

Exclusion of some hospital sites

In 2008, one trust made this error by excluding their new children's hospital on the mistaken assumption that all patients treated there would be too young to participate. For the past three survey years no trusts have made this error as can be seen in Table 2.

Inclusion of psychiatry patients

The guidance manual states that patients admitted to hospital for primarily psychiatry reasons should not be included in the sample, as in all previous inpatient surveys in the NHS patient survey programme. As can be seen in Table 2, trusts have not made the mistake of including psychiatry patients in their samples for the past three survey years. However, in 2008 one trust submitted a sample containing a patient who was admitted under the specialty of learning disability.

Incorrectly excluded by specialty code

This has not been a problem for a number of years now, but in 2007 two trusts submitted samples where patients with certain specialty codes had been excluded from the sample.

Other

In 2011 two trusts made errors which did not fall into the above categories: one submitted a sample where only patients who were both discharged and admitted in their chosen month were selected, while another submitted a sample containing ethnic codes of 'U'.

4. Types of minor error

Eleven minor errors were identified during sample checking in 2011, spread across 10 trusts[1]. Errors are considered to be minor if they can be corrected without the need for the sample to be re-drawn or for patients to be replaced. Trusts that have made minor errors are advised to make the necessary corrections to the sample information prior to submitting the final data set to the Co-ordination Centre at the close of the survey.

Table 3 (below) details the frequency of minor errors by type of minor error and survey year. More details about each of these errors are provided below.

Table 3 – Frequency of minor errors by type of minor error and survey year

Minor problems	2011†	2010	2009	2008	2007	2006
Incorrect PCT coding	3	15	9	26	19	30
Missing or incorrect route of admission data	1	8	10	8	n/a	n/a
Incorrect ethnic or gender coding	1	5	7	18	12	19
Missing or incorrect treatment centre data	2	4	5	1	6	12
Main specialty miscoding	0	3	1	4	6	0
Date format used	1	3	0	3	6	22
Incorrectly calculated 'Length of Stay' (LOS)	0	3	5	9	11	15
Treatment coding used instead of main specialty	0	0	0	1	7	16
Other	3	0	2	0	3	27
Total	**11**	**41**	**39**	**70**	**70**	**141**

†Note that in 2011 only in-house trust samples were checked

Incorrect PCT coding

Incorrect coding of PCT of referral was found in three samples submitted by trusts in 2011. The problems detected this year were either in relation to **missing PCT codes** or **five-digit codes**. In previous years there have also been issues with **outdated PCT codes** and instances where **SHA codes have been used instead of PCT codes**.

Missing or incorrect route of admission data

As mentioned above, acute trusts are asked to include the two-digit route of admission code for each patient in the sample file. This information can be used to identify ineligible patients, which if present constitute a major error (see above). Minor errors relating to route of admission information have also been found for a number of years however. In 2011 one trust submitted data with errors in the route of admission data.

The main issues have been:

- Missing codes
- Use of basic codes '1' and '2'
- Incorrect codes
- Invalid codes used

Incorrect ethnic or gender coding

In all survey years a number of trusts have coded ethnic group or gender incorrectly (see Table 3).

[1] These numbers are much lower than last year due to the fact that only in-house trust's samples were checked in 2011, as mentioned previously.

Although no trust made this error in 2011, in the past there have been several times where trusts have incorrectly coded missing ethnicity information as '99' or '999', rather than leaving the cell blank.

With respect to errors with coding gender, in 2011 one trust made the common mistake of using 'M' and 'F' rather than the specified codes of '1' and '2'. Another error seen in the past is missing gender information for some patients in the sample.

Missing or incorrect treatment centre data

The guidance states that patients who spend any of their hospital stay at a treatment centre should be coded as '1' in the sample information or '0' if they did not. In 2011 two trusts submitted data which contained a blank column for treatment centre information. In previous survey years trusts have also made the mistake of coding all patients as treatment centre patients.

Main specialty miscoding

No trusts made any errors in 2011 with regard to the 'main specialty on discharge' data field in the sample file. However, in last year's survey, errors were found in three samples. Common mistakes were either leaving the column blank or incorrect codes.

Date format used

In 2011 one trust submitted a sample where dates (e.g. date of admission) were supplied in one column in date format, rather than in numeric form in separate columns for day, month and year as specified in the guidance. In such cases the Co-ordination Centre has to change these files before they can be properly checked.

Incorrectly calculated 'Length of Stay'

There were no issues with length of stay calculations in 2011, however in 2010 three trusts submitted data which included cases where length of stay had been calculated incorrectly. For one trust this was simply a data entry error (a value of 2009 had been entered rather than 2010); for another trust admission and discharge dates had been accidentally swapped for three cases; for the final trust 216 cases had been miscalculated. All trusts were informed of this issue and asked to rectify it before their samples were once again checked to ensure no ineligible patients had been included as a result. Table 3 shows a general decline in such errors across survey years.

Treatment coding used instead of main specialty code

Although this has not been an issue for a number of years now, in the past some trusts have made the mistake of submitting treatment codes rather than main specialty code (see Table 3). When specialty codes were first assessed for inclusion in the 2005 adult inpatient survey, the Co-ordination Centre was informed that treatment codes were deemed to be both unreliable and more likely to disclose the actual treatment (and by inference the condition) of the patient.

Other

A number of other errors were noted in samples submitted by trusts for final checking in 2011. Two trusts submitted data where some (or all) columns were formatted as 'text' rather than 'number' while a further trust submitted data which included columns that had been labelled incorrectly.

