# Appendix

## Audit methodology

### Data analysis

**Published data**

In this audit we reviewed national and local NHS board documents on the management of NHS waiting lists and performance against waiting times targets.

We also analysed available data on NHS waiting times published by Information Services Division (ISD) Scotland on inpatient, day case and outpatient stage of treatment waiting times. This included information on waiting times for both completed waits and ongoing waits, patient availability, reasons for removal from list, non-attendance rates and episode length (the total time a patient waits including any time unavailable).

We commissioned ISD Scotland to provide us with a more detailed breakdown of the information it holds on waiting times including:

- patient unavailability by clinical specialty
- start dates of unavailability
- median, 90th percentile and maximum length of unavailability[1]
- average number of periods of unavailability by patient
- overall average length of time for reported and actual waits by year.

**Data extracted from NHS boards' electronic patient management systems**

In 2011, NHS boards used a number of different electronic systems to manage patient records and their waiting lists. Three boards used more than one main system. Exhibit A illustrates which systems were used in each NHS board.

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[1] The 90th percentile length of unavailability indicates that 90 per cent of patients had unavailability up to this length and 10 per cent of patients had longer periods of unavailability.

## Exhibit A

**Electronic patient management systems used in NHS boards, 2011**

Different electronic systems were used by NHS boards in Scotland to manage waiting lists.

| Electronic patient managment system | NHS board(s) |
|---|---|
| TrakCare | NHS Ayrshire and Arran |
| | NHS Borders |
| | NHS Grampian |
| | NHS Lanarkshire |
| | NHS Lothian |
| Topas | NHS Dumfries and Galloway |
| | NHS Forth Valley (for outpatients only) |
| | NHS Orkney |
| | NHS Tayside |
| | NHS Western Isles |
| Helix | NHS Forth Valley (for inpatients only) |
| | Golden Jubilee National Hospital |
| | NHS Shetland |
| | NHS Highland (Argyll and Bute area only) |
| Oasis | NHS Fife |
| iSoft | NHS Highland (excluding Argyll and Bute area) |
| | NHS Greater Glasgow and Clyde (North Glasgow area only) |
| Meditech | NHS Greater Glasgow and Clyde (South Glasgow area only) |

Note:   In some NHS boards a number of other systems were used in addition to the main system(s) highlighted above. Our audit did not cover these smaller systems.

*Source: ISD Scotland*

We commissioned PricewaterhouseCoopers to extract data from NHS boards' electronic patient management systems to allow a more detailed analysis of when information relating to waiting lists was being created or amended. Information was extracted to answer a number of queries for each of the 14 territorial health boards and the Golden Jubilee National Hospital (part of the National Waiting Times Board) (Exhibit B).

Complexities in the way electronic patient management systems were configured and the absence of detailed audit trails of changes made to patient records meant that we were unable to answer all queries in every NHS board's system.  In particular, we received very limited information from the iSoft system in NHS Highland, and no information from either the

iSoft or Meditech systems in NHS Greater Glasgow and Clyde. Despite attempts to work with the suppliers of both systems, NHS Greater Glasgow and Clyde was unable to identify and extract the data we needed. The board was also in the process of transferring to the TrakCare system at the time of our audit. In addition, the audit trail provided in both these boards' iSoft systems is overwritten when changes are made to patient records and not kept.

The data focused on transactions in the electronic patient management systems (for example, when any changes were made to a patient's record). If more than one change was made to a patient's record (for example, if both the start date and the end date of a period of unavailability were altered) then this could generate multiple transactions. These multiple transactions were more common in some electronic patient management systems than others making comparison between boards with different systems difficult.

Some other limitations in the data made comparisons between boards with different electronic patient management systems difficult, including:

- we did not receive a breakdown of the reason for patients being removed from the list for all boards as the level of detail available from each system varied

- transactions could be carried out by system administrators or automated processes, which inflated the number of transactions in a board - these were not always easily identifiable.

The information extracted from some NHS boards' systems included details on patients not covered by the waiting times target or subject to different targets, which also made comparison difficult. This comprised:

- information for hospital specialties which were not covered by the waiting time targets, for example mental health specialties

- return outpatients receiving follow-up treatment, who are not subject to waiting time targets

- inpatients and outpatients, who had different waiting time targets, could not always be accurately separated in Topas.

## Exhibit B

**Queries to be answered by boards' electronic patient management systems and any associated limitations.**

| Our detailed questions | Data query to extract from system | Specific limitations | Electronic systems affected |
|---|---|---|---|
| Have periods of unavailability been created to extend the patient guarantee date?<br><br>Have high numbers of patients been made unavailable over a short period of time? | When are periods of patient unavailability being created for the first time?<br><br>What is the highest number of periods of patient unavailability created per hour? | Unable to distinguish between patient unavailability being created for the first time or amended, so we received these combined together. The information on the highest number of periods of unavailability created or amended per hour, only included the most recent amendments as any previous amendments are overwritten. | TrakCare |
| | | Data incomplete as available for outpatients only. | Oasis |
| | | Not possible as the dates of unavailability being created or amended are not held in the system. | iSoft |
| | When are periods of patient unavailability being lengthened or shortened?<br><br>What is the highest number of periods of patient unavailability amended per hour? | Unable to distinguish between unavailability being created or amended. Instead, we received information on any creations of or amendments to unavailability which have affected the guarantee date and the highest number of periods of unavailability created or amended per hour. | TrakCare |
| | | Unable to determine how unavailability has been amended, therefore some of the amendments reported may not have lengthened or shortened unavailability. | Topas<br>Oasis |
| | | Data incomplete as available for inpatients only. | Oasis |

| Our detailed questions | Data query to extract from system | Specific limitations | Electronic systems affected |
|---|---|---|---|
| | | Not possible as the dates of unavailability being created or amended are not held in the system. | iSoft |
| Have new periods of social and medical unavailability for inpatients, day cases and outpatients been created or changed for past periods to extend guarantee date? | When are periods of patient unavailability being created retrospectively (eg being created after the start date)? | Unable to distinguish between unavailability being created for the first time retrospectively or amended retrospectively, so we received these combined together. | TrakCare |
| | | The system is designed to overwrite existing data, so we only have information on whether the most recent creation of, or amendment to, unavailability was retrospective. | Oasis |
| | | Not possible as the dates of unavailability being created or amended are not held in the system. | iSoft |
| Is there any evidence of NHS boards applying periods of unavailability inappropriately after cancelling a patient's appointment? (some might be appropriate given appointment has been cancelled and a new offer has to be made which might not suit the patient) | When are periods of patient unavailability being created within five days of the hospital cancelling an appointment? | Unable to look at this as information has been provided for all cancellations, not specifically cancellations initiated by the hospital. | TrakCare Topas Helix Oasis |
| | | Not possible as the dates of unavailability being created or amended are not held in the system. | iSoft |

| Our detailed questions | Data query to extract from system | Specific limitations | Electronic systems affected |
|---|---|---|---|
| Of the patients who refused offer of treatment outside the board area, how many were recorded as socially unavailable? | When are periods of patient unavailability created within five days of the patient refusing an offer of treatment outwith their board area? | Not possible as consultants were unable to extract the relevant information. | TrakCare Topas Helix Oasis iSoft |
| Are periods of unavailability being removed from the system? | When are periods of patient unavailability being deleted? | Information on the type of unavailability deleted was not included. | Helix |
| | | Data incomplete as available for inpatients only | Oasis |
| | | Not possible as the date of deletion is not held in the system. | iSoft |
| How many patients were coded as 'removal from waiting list', broken down by reason, eg treatment no longer needed? | When are patients being removed from the waiting list? | Removal codes were not provided for all patients as patients who received treatment were excluded from this analysis. | TrakCare Topas Helix Oasis iSoft (NHS Highland only) |
| | | No reasons for removal from the list were provided. | TrakCare |
| Are high numbers of patients being offered appointments over a short period of time? | What is the highest number of offers of an appointment per hour? | The time an offer is made is not recorded and it is not possible to link offers to specific member of staff.  We received information on the number of offers made per day by hospital specialty. | TrakCare |
| | | Not possible as the dates of offers being created or amended are not held in the system. | iSoft |

| Our detailed questions | Data query to extract from system | Specific limitations | Electronic systems affected |
|---|---|---|---|
| Are high numbers of patients declining offers over a short period of time? | What it is the highest number of offers of an appointment declined per day? | Not possible as offer dates are not recorded within the system. | iSoft |
| How many patients had multiple periods of unavailability applied? How does the length of unavailability vary by board? | How many patients on the current waiting list as at the 30 of June 2012 have had periods of unavailability during their wait, how long have they been on the list and what is their guarantee date? | The date that some patients were added to the list was not accessible which means their length of time on the list could not be calculated. | TrakCare |
| | | The profile of the current waiting list has not always been provided as at the 30 of June 2012, making comparison between boards difficult. | TrakCare Topas Helix Oasis |
| | | No guarantee date is calculated in the system so this was estimated. | Oasis iSoft (NHS Highland only) |
| Are original referral dates being altered? | When has the referral date been moved by more than five days? | Not possible as consultants were unable to extract the relevant information. | TrakCare Topas iSoft |
| | | We received information on the number of instances where the referral date had been edited, rather than moved by more than five days. | Helix |
| | | Data incomplete as available for inpatients only. | Oasis |

| Our detailed questions | Data query to extract from system | Specific limitations | Electronic systems affected |
|---|---|---|---|
| Are patients who cannot accept a 'short notice offer' recorded appropriately? | When are the dates of an offer and an appointment within three days of each other? | Not possible as offer dates are not recorded within the system. | iSoft |

## Fieldwork with NHS boards and other stakeholders

Our analysis of the data allowed us to identify a number of instances which required further investigation to identify whether NHS boards were appropriately applying waiting time guidance.  In order to examine this it was necessary to review patient records, for example to determine whether there were notes in the patient record to explain why the patient had been made unavailable.  We focused sampling of individual patient records in those boards where we identified high levels of changes in patients' records or where we were unable to extract data from patient management systems (Exhibit C).

**Exhibit C**

**Patient records sampled in each NHS board**

| NHS Board | Number of patient records sampled |
|---|---:|
| NHS Fife | 37 |
| NHS Forth Valley | 60 |
| NHS Grampian | 48 |
| NHS Greater Glasgow and Clyde | 109 |
| NHS Highland | 23 |
| NHS Lanarkshire | 33 |
| **Total** | **310** |

As we were unable to get any information from NHS Greater Glasgow and Clyde's patient management systems, we based our sampling in that board on specialties with high unavailability identified from ISD Scotland data and internal management reports, specifically ophthalmology, orthopaedics and general surgery.  We received information on a random sample of 20 inpatients and 20 outpatients unavailable in each specialty in each of the months of April, August and November 2011.  From this information we selected a random sample of patient records to examine in more detail.

In boards where we sampled patient records, we also interviewed staff who were involved in managing waiting lists, including waiting list managers, specialty service managers and outpatient booking co-ordinators.

We reviewed the following documents:

- communication between the Scottish Government and NHS Lothian about waiting times and capacity issues in 2011/12.
- internal audit reports on waiting times for each of the 14 territorial boards and the Golden Jubilee National Hospital.

We also carried out interviews with other stakeholders including:

- staff from the Scottish Government responsible for monitoring NHS boards' performance against the waiting times guarantees

- staff in ISD Scotland responsible for preparing national statistics about NHS Scotland's performance against waiting time targets

- representatives of the Royal College of Nursing, Royal College of GPs, British Medical Association and Unison.