Using data to improve surgical care
~ the surgical profiles project
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**Foreword**

Information about the delivery and outcomes of clinical care can make a vital contribution to facilitating improvements to the safety and effectiveness of health care. However, there are many obstacles to navigate if the power of such data is to be truly realised. These range from challenges in developing robust datasets, to the complexities of understanding and establishing data usage as a routine and integral part of providing clinical care.

NHS Quality Improvement Scotland’s (NHS QIS) approach\(^1\), \(^2\), is to promote the best use of existing nationally consistent data, while simultaneously working to facilitate improvements to the data that are available for NHSScotland.

This report provides an overview of the early stages of the surgical profiles project – a collaboration between NHS QIS, the Information Services Division of NHS National Services Scotland (ISD), national clinical audits, and NHS Boards. The aim of the work is to lead to more effective and influential usage of data about surgery.

A surgical profile is a report presenting a suite of clinical indicators, setting data for local NHS Boards/hospitals in the context of the Scotland-wide picture. The indicators were designed to be interpreted and used locally, by front line clinicians and managers, to identify opportunities for attention. Each NHS Board was asked to respond formally to its surgical profile, and a clinically led national panel assessed how the data were being used across the country.

The feedback from NHS Boards showed that they are utilising the data to guide improvements in their surgical services, and the review panel’s conclusions were very encouraging. While it is too early to see a change in outcomes as a result of using the surgical profile, valuable insights have been gained into issues in the use of such data. These will help NHS QIS and ISD refine their continuing programmes of work.

I would like to thank the many people who contributed their hard work and expertise to this project – in particular the clinicians and analysts who developed the surgical profile, all those in NHS Boards who reviewed and responded to the profile, and the panel that assessed the responses.

Sir Graham Teasdale  
Chairman, NHS Quality Improvement Scotland

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Executive Summary

NHS Quality Improvement Scotland (NHS QIS) and the Information Services Division of NHS National Services Scotland (ISD) have, with enthusiastic support from clinicians (surgeons and anaesthetists) and NHS Boards, developed a report called a surgical profile. The profile brings together a suite of clinical indicators, drawn from existing data sources, about the surgical care provided by an NHS Board – presenting these data in the context of information for other NHS Boards and Scotland as a whole. For example, there are rates of mortality, unplanned readmission to hospital, deep vein thrombosis/pulmonary embolism, and post operative infection.

The surgical profile is a tool to help the NHS Board improve the delivery and outcomes of patient care – by identifying potential areas for attention, and also good practice points. The surgical profile is designed to be used by those involved in the provision of surgical care locally, to stimulate reflection on clinical practice. The indicators themselves cannot be used to make reliable external judgements about quality, and in particular NHS QIS/ISD do not create league tables from the indicators.

A surgical profile was given to the fifteen NHS Boards that provide surgical services. Of these, fourteen provided a formal response to the profile, explaining how the data had been considered and how the exercise could contribute to wider efforts to improve patient care.

A clinically led national review panel then considered the responses, assessing how each NHS Board had responded to the data in the profile. The panel concluded that all responses provided evidence that i) the surgical profile had been reviewed, ii) areas where data appeared to differ markedly from the national average had been considered, and iii) plans to follow up any issues highlighted by the profile had been made.

NHS Boards’ responses provided important insights which will be used to inform further work in this area. Issues raised included how case-mix and social deprivation may contribute to variation in an indicator, and also the potential value of clinical indicators derived from both administrative and clinical datasets.

The review panel concluded that the first cycle of the surgical profiles project has made a valuable contribution to supporting more effective and consistent use of data about surgical care. It will form part of an ongoing programme of work aimed to advance the collation and consideration of data on surgery in Scotland, and consideration of how this information is used to facilitate improvements to the delivery and outcomes of surgical care.
Data on surgery in Scotland

Organisations and individuals that provide clinical services need a range of data to monitor, and facilitate improvement of, the delivery and outcomes of patient care.

Clinical indicators, drawn from centrally maintained national datasets, can flag up areas where further local investigation and quality improvement activities might be fruitful. More detailed information from local (and often clinically led) data systems is also required to run safe and effective clinical services, eg to gain insights into areas highlighted by indicators.

Scotland has a strong track record in collecting clinical data, and this includes well established nationwide projects dedicated to providing data on specific aspects of surgery, such as: deaths that occur under the care of a surgeon; hip fracture; joint replacement surgery; and; critical care. Nationally consistent information on many other aspects of surgery (both clinical processes and outcomes) can also be produced, drawing on data that hospitals routinely collect.

In addition to these national projects, data on surgery for cancer are collected by three regional cancer networks, and clinical audit on surgery is carried out and supported by clinicians and professional associations (eg, the Royal Colleges).

However, the availability of data itself will not lead to improvement in the quality of patient care. Of equal importance to having robust data is making sure this information is used. In this respect, the picture in Scotland mirrors that in other countries – in that the balance of attention is often directed towards the more technical aspects of data collection, analysis, and presentation, while less effort is put into establishing local and national frameworks for supporting the use of data in influencing clinical practice.

This report provides a summary – for health service staff and members of the public – of the early stages of the surgical profiles project. The aim of the project is to facilitate more effective and consistent use of existing data about surgical services throughout Scotland.

3 Scottish Audit of Surgical Mortality (www.sasm.org.uk)
4 Scottish Hip Fracture Audit (www.show.scot.nhs.uk/shfa)
5 Scottish Arthroplasty Project (www.arthro.scot.nhs.uk)
6 Scottish Intensive Care Audit (www.scottishintensivecare.org.uk/sicsag)
7 Scottish Morbidity Recording schemes (www.isdscotland.org)
8 Regional cancer audit networks (www.isdscotland.org)
Surgical profile

NHS Quality Improvement Scotland (NHS QIS) held a meeting with various stakeholders in 2004 to discuss how better use could be made of existing data to facilitate improvements to the quality, safety and effectiveness of surgical care. Following from this, NHS QIS and the Information Services Division of NHS National Services Scotland (ISD) embarked upon the development of a report drawing together relevant data on surgical care.

The resulting report, called the surgical profile, presents a set of clinical indicators about the surgical care provided by an NHS Board. It is a tool to help the NHS Board to improve the delivery and outcomes of patient care – by identifying potential opportunities for improvement, and also good practice points. The content of the surgical profile was developed by a clinically led design group, chaired by Professor Peter Stonebridge (Professor of Vascular Surgery, Ninewells Hospital and Medical School, Dundee), working with ISD. Two NHS Boards – Fife and Tayside – piloted the use of a prototype of the profile, and this process informed refinements to the indicators included.

The data in the surgical profile are presented at the level of NHS Board and hospital, and there are no data about individuals (either clinicians or patients). Each NHS Board can compare its own data with those for other NHS Boards/hospitals and the national average, and can also monitor its own data over a period of time.

The surgical profile presents clinical indicators under three main headings: surgical mortality – all specialties, general and vascular surgery, and orthopaedic surgery. For example, there are rates of mortality, unplanned readmission to hospital, deep vein thrombosis/pulmonary embolism, and post operative infection (a list of all the clinical indicators in the surgical profile is included on pages 18 and 19). The profile also includes background data to provide some context for interpreting the clinical indicators (eg data on length of stay).

Participants included: the Chief Medical Officer; President of the Royal College of Physicians & Surgeons of Glasgow; President of the Royal College of Surgeons of Edinburgh; Medical Directors; the clinical leads from the Scottish Audit of Surgical Mortality, the Scottish Arthroplasty Project, and the Scottish Hip Fracture Audit, and; representation from the Scottish Executive Health Department, the Royal College of Nursing, the Scottish Consumer Council, ISD and NHS QIS.
Variations in data

Most of the clinical indicators in the surgical profile are presented as control charts. Control charts, which have been widely used in the manufacturing industry and have more recently been applied in healthcare settings, are simple graphical tools that flag up areas where further investigation might be beneficial.

There are three key lines in the control chart – the average, and the two control limits (one either side of the average). In the surgical profile the average, shown as a dark blue horizontal line, is the average for Scotland. The (upper and lower) control limits are depicted as red lines. Data points within the control limits are said to be ‘in control’. Data points outwith the control limits (sometimes called ‘outliers’), and certain other patterns, are said to exhibit something called ‘special cause variation’. This is where further investigation is required.

There are two types of control chart in the surgical profile. The first allows comparisons to be made between different service providers (ie NHS Boards or hospitals) and with the national average (see pages 7-9 for examples). The second allows a single service provider to look at how its own data changed over a period of time.

Variations observed on an indicator may reflect a number of factors, such as characteristics of the patients being cared for (case-mix) and the quality of clinical care – or even inaccuracies in how hospitals have coded data, and variations by chance. To guard against a large number of ‘outliers’ occurring by chance variation, for the charts in the surgical profile the control limits were plotted using a 99.7% confidence interval (3 standard deviations from the average) – which means that for every 1,000 data points plotted it can be expected that there will be only 3 ‘outliers’ due to chance variation.

For most of the indicators in the surgical profile, statistical methods (case-mix adjustment techniques) were used to take some patient characteristics into account. For example, all rates of mortality were adjusted for age, sex and social deprivation. Nonetheless, case-mix adjustment techniques are necessarily incomplete, and aspects of case-mix that were not adjusted for (eg, surgical procedure, coexisting illnesses or diseases, severity of illness) may still contribute to observed variations.
National patterns in data

The surgical profile was designed primarily to give NHS Boards data about their own surgical services, to be used locally in the context of information for the rest of Scotland. In order to illustrate the nature of the data included in the profile, some examples are presented here. For the purpose of this national report individual NHS Boards/hospitals are not identified, in order to focus attention on the picture across Scotland which can contribute to national considerations regarding the quality, safety and effectiveness of surgical care.

Some admissions to surgical care are planned (elective admissions) and others are an emergency (non-elective admissions) – and for both types of admission some patients undergo an operative procedure whereas others do not. Within these broad categories, the rate of mortality at 120 days following admission to a surgical specialty in Scotland has remained fairly constant in recent years, at around 1.5% for elective admissions, and 7-8% for non-elective admissions (Figure 1). A similar pattern was observed when focusing on those admissions where an operation was performed. Furthermore, for non-elective admissions the rate of mortality appeared to follow a seasonal pattern, as this rate was higher in October-March than April-September.

Figure 1. Rate of mortality at 120 days following admission to a surgical specialty in Scotland for 2000-2005

Source: ISD Scotland (SMR01) linked dataset
Individual hospitals’ mortality rates for elective and non-elective admissions are shown in Figures 2 and 3, respectively. Each data point represents one hospital and, as already explained, these points are plotted in relation to the average rate for Scotland (horizontal blue line) and control limits (curved red lines). Each hospital is plotted according to the number of admissions, which increases moving from left to right (the ‘funnel’ narrows towards the right of the graph as the data points here are based on a larger number of episodes and are thus more stable).

Further investigation into an ‘outlier’ is required locally to identify the cause of this variation, e.g. does this reflect problems with how the data were coded by a hospital, the type of surgery carried out in that unit or case-mix, or the quality of clinical care?

**Figure 2. Rate of mortality at 120 days following elective (planned) admission to a surgical specialty – data for individual Scottish hospitals for 2004-2005**

![Graph showing rate of mortality at 120 days following elective admission](image)

Source: ISD Scotland (SMR01) linked dataset
As can be seen, there were more ‘outliers’ for elective admissions than for non-elective admissions. For elective admissions, the mortality rate for 10 of the 34 hospitals (29%) appeared to vary markedly from the national average (Figure 2) – while for non-elective admissions the mortality rate for only 1 hospital (3%) appeared to be markedly different from the Scotland rate (Figure 3). One reason for this could be a greater variation between hospitals in the type of surgery carried out for elective admissions than for non-elective admissions. Another could be systematic variations between hospitals in the overall quality of clinical care of those people who died. As the next example illustrates, this possibility can be explored by looking at data from the Scottish Audit of Surgical Mortality.

Figure 3. Rate of mortality at 120 days following non-elective (emergency) admission to a surgical specialty – data for individual Scottish hospitals for 2004-2005

Source: ISD Scotland (SMR01) linked dataset
The Scottish Audit of Surgical Mortality (SASM) ensures that the management of a patient recorded to have died under the care of a surgeon (whether an operation has taken place or not) is subject to peer review. The results are then fed back to the surgeon and if relevant the anaesthetist. While participation in the audit is voluntary, compliance is very high (>90%).

As can be seen in Figure 4, in about a third of fatalities some aspect of the management of the patient was considered to have been potentially adverse (top graph), and in about 7% it was considered to have contributed to death (bottom graph).

The samples of data presented in this report illustrate i) the sort of data that are included in the surgical profile, and ii) that Scotland-wide patterns in such data have a key role to play in informing a national debate about the quality of surgical care.

**Figure 4. Percentage of returns to the Scottish Audit of Surgical Mortality where i) an adverse event occurred (top), and ii) an adverse event contributed to death (bottom) – for Scottish hospitals for 2001-2004**

Source: Scottish Audit of Surgical Mortality
Using the surgical profile

The emphasis of the surgical profiles project is on making creative use of the nationally consistent data currently available. Therefore, in addition to the development of the surgical profile itself, NHS QIS provided guidance about how the clinical indicators should be used and responded to by NHS Boards.

The surgical profile was designed to be used by those involved in the provision of surgical care locally, to stimulate reflection on clinical practice. This is because clinical indicators rarely, if ever, provide a direct measure of quality or performance – and so cannot be used to make reliable external judgements about the quality of patient care. Instead indicators are most effective when used locally, as flags or pointers.

Each NHS Board was asked to provide NHS QIS with a written response to its surgical profile, explaining how the profile was being used as part of clinical governance activities. For example, the response was to describe who reviewed the clinical indicators locally, and was to cover all instances where the data for an NHS Board/hospital appeared to differ markedly from the national average.

Each NHS Board has a clinical governance committee, that is responsible for oversight of clinical governance locally. NHS QIS asked for each NHS Board’s response to be signed off by the local clinical governance committee.
NHS Boards’ responses

Each NHS Board was given its own surgical profile at the end of November 2006, and was asked to provide NHS QIS with a written response by March 2007. The surgical profiles were also made publicly available on the internet\(^\text{10}\), together with supplementary information and guidance on how the data should (and should not) be used.

All fifteen NHS Boards\(^\text{11}\) that provide surgical services were given a surgical profile, and of these fourteen provided NHS QIS with a formal written response. A clinically led panel then reviewed the responses, assessing each NHS Board on how it was using the data in the profile.

NHS Boards’ responses collectively were extremely encouraging. They described how the surgical profile was being used – and in all NHS Boards key staff had reviewed and responded to the data. The exact way in which this was done varied from region to region. This would be expected given each NHS Board is a unique organisation (eg some are considerably larger than others), and also because this was the first time that NHS Boards had been asked to respond to these data in this way.

In all NHS Boards, the surgical profile was reviewed by senior clinicians and managers. For example, in many regions clinical directors and clinical specialty leads played a key role in reviewing and responding to the data about their own areas of expertise. Most NHS Boards reported that clinical governance and clinical effectiveness staff were involved in responding to the surgical profile – and some reported that information departments and patient records staff also contributed to this.

In addition to circulating the surgical profile to key staff, NHS Boards typically reported that the profile had been discussed locally at meetings – for example at existing clinical and governance forums and/or at meetings arranged specifically to review the profile.

Furthermore, each NHS Board’s response was signed-off by the local clinical governance committee. Local clinical governance structures have demonstrated how they can focus on evidence about clinical processes and outcomes, and use this information to facilitate improvements to clinical services.

Taken together, the responses reveal that across Scotland a wide range of clinical, managerial, clinical governance, and other staff have been involved in responding to the surgical profile – and the data have stimulated considerable reflection, discussion, and activity.

\(^{10}\) www.indicators.scot.nhs.uk
\(^{11}\) NHS Ayrshire & Arran, NHS Borders, NHS Dumfries & Galloway, NHS Fife, NHS Forth Valley, Golden Jubilee National Hospital, NHS Grampian, NHS Greater Glasgow & Clyde, NHS Highland, NHS Lanarkshire, NHS Lothian, NHS Orkney, NHS Shetland, NHS Tayside, NHS Western Isles
Each NHS Board was asked to cover all the ‘outliers’ from its profile in the response, explaining what conclusions had been drawn from these data, together with what investigations or actions had been carried out/were planned. Indeed, the responses did cover all ‘outliers’ where the data flagged up potential areas for concern, eg where the rate of mortality appeared to be notably higher than the national average.

Before the surgical profile was given to NHS Boards, it was anticipated that ‘outliers’ would reflect a range of underlying factors – and this was borne out in the responses. In some instances, further local investigation revealed that the variation was simply caused by inaccuracies in the coding of data by the hospital. It is important to identify and rectify such data coding problems, so that data submitted subsequently are accurate and credible. In other cases, NHS Boards reported they were confident that variation reflected predictable aspects of service provision or case-mix (eg where a hospital carries out high risk and complex cases). However, NHS Boards reported that other ‘outliers’ flagged up areas of concern and opportunities for improvement.

Investigating why a data point is an ‘outlier’ may involve carrying out a local audit or case note review – and some NHS Boards have sought additional data from ISD to gain insights into the data in the surgical profile. Such activities take time and, as expected, much of the local activity arising from the surgical profile was still underway at the time that NHS Boards were asked to respond to the data. However, in their responses NHS Boards described how they were investigating issues flagged up by the profile, and NHS QIS will seek updates from NHS Boards on these investigations – and it is encouraging that some progress reports have already been provided voluntarily.

In addition, some NHS Boards reported that they had picked up on subtler patterns of data in the surgical profile (ie where the data were not ‘outliers’), and had also used these data to stimulate local activities.

While it is too early to see improvements to patient care as a result of using the surgical profile, the responses from across Scotland provided encouraging insights into how the data were being used to support the provision of surgical services. To illustrate that the profile has been used in a range of settings, elements of the responses from two very different NHS Boards (one large and the other small) are presented below. These examples are representative of NHS Boards’ responses collectively, in that a lead/s was identified with responsibility for reviewing the data and reporting their recommendations for wider consideration locally. These areas also provided examples of how the surgical profile was used as a catalyst to guide activity at service delivery level.
NHS Lothian

NHS Lothian serves a predominantly urban-based population of around 790,000, and surgical services are primarily delivered via three hospitals with the type of services provided varying from site-to-site. NHS Lothian is also a regional and national centre for some surgical services. In NHS Lothian, the surgical profile was circulated to all relevant Clinical Directors, who were asked to review/respond to the data. NHS Lothian reported that the surgical profile was a useful tool that pointed out some areas where further investigation was required, and others that appeared to be areas of good practice. For example, the data on time from admission to theatre for hip fracture had led to work to improve performance (eg provision of additional consultant cover) – and this continues to be monitored.

NHS Shetland

In contrast, NHS Shetland provides services in a rural setting for a population of 22,000. The majority of surgery is carried out at one hospital. One consultant surgeon reviewed the profile in detail, and gave a presentation on this at the monthly surgical audit meeting. NHS Shetland’s data did not differ markedly from the national average, although the clinical team noted that the rate of emergency readmission following cholecystectomy surgery was higher than might be expected. An audit was therefore carried out to establish the reasons underlying these data.
Conclusions of review panel

The national review panel concluded that all responses had provided evidence that i) the surgical profile had been reviewed, ii) areas where data appeared to differ markedly from the national average had been considered, and iii) plans to follow up any issues highlighted by the profile had been made.

In addition, the responses from two NHS Boards (NHS Lothian and NHS Shetland) were considered to describe good practice in using data to facilitate improvements to clinical services (see page 13). None of the 14 responses received were assessed as being unsatisfactory.

The review panel’s interpretation of NHS Boards’ responses collectively was that this stage of the surgical profiles project has made a valuable contribution to the overall aim of leading to more effective and consistent use of the nationally consistent data currently available.

Furthermore, the panel recognised that NHS Boards’ responses provided important insights which should be used to inform the work to be carried out on this and related projects in the future. Some of the issues raised by NHS Boards are discussed next.
Case-mix and social deprivation

As expected, one issue that was raised in some of the responses to the surgical profile was that of case-mix. Observed differences on a clinical indicator may reflect characteristics of the patients being cared for (case-mix) rather than differences in clinical practice. This is one reason why clinical indicators cannot be used to make reliable external judgements about the quality of care, as knowledge of the local patient population is required to interpret the data.

There are statistical methods (case-mix adjustment techniques) that can be used to take various patient characteristics into account, although such techniques are necessarily incomplete. Most of the clinical indicators in the surgical profile were adjusted to take account of age, sex, and social deprivation – although other patient characteristics (eg surgical procedure, coexisting illnesses or diseases, severity of illness) were not adjusted for, and may contribute to observed variations in the indicators.

Administrative databases typically capture less detailed information than clinical datasets (see page 16), and this puts some constraints on the case-mix adjustment that can be carried out. Nonetheless, ISD are actively pursuing opportunities for developing more advanced case-mix adjustment using SMR01 data. For example, it would be advantageous to adjust for the nature of the surgical procedure when using the administrative dataset, as this would make it easier to interpret data for heterogeneous groups of patients (eg elective admissions to general surgery).

Another factor that is known to impact on clinical outcomes is social deprivation. For a range of clinical indicators it appears that those from affluent areas fare better than those from areas of social deprivation12. In an attempt to take this factor into account, most of the clinical indicators in the surgical profile were adjusted for social deprivation (using the Scottish Index of Multiple Deprivation). However, it remains unclear how robust this adjustment is, and further work is required to develop more sophisticated analyses to explore the impact of deprivation on clinical outcomes for different conditions. In addition, from the data currently available it appears that the impact of social deprivation is far from clear and may be counterintuitive – as illustrated by analyses of complication rates following total hip or knee replacement13.

Data can come from different types of sources, and a distinction can be made between administrative and clinical databases. The NHS routinely submits information to administrative databases, which were established primarily for management and accounting purposes but may also capture some information about clinical care. On the other hand, clinical databases are typically established and run by clinical societies and professional bodies specifically to support activities such as audit and research.

The clinical indicators in the surgical profile are mostly derived from an administrative database, the SMR01 scheme maintained by ISD (and which can be linked to other datasets, such as information on deaths held by the General Register Office for Scotland). In addition, some of the indicators are based on clinical datasets (e.g., Scottish Audit of Surgical Mortality, Scottish Hip Fracture Audit), and the indicators on joint replacement surgery were provided by a clinically led project (Scottish Arthroplasty Project) that utilises SMR01 data.

There are relative advantages and disadvantages of administrative and clinical databases. For example, a major advantage of the SMR01 dataset is that it does not depend on voluntary participation – data are routinely provided from all hospitals in Scotland and about every episode of inpatient stay. However, it was already known that the SMR01 data are not as accurate and up-to-date as would be liked, and there are concerns about the level of sophistication of the analyses that can be carried out. For such reasons, there is a degree of scepticism about the usefulness of the SMR01 dataset for supporting continuous quality improvement. It is important to note, however, that NHS Boards are responsible for submitting information to the SMR01 database – and it is hoped that by encouraging better use to be made of these data, one of the outcomes of the surgical profiles project will be an improvement in the accuracy and timeliness of the SMR01 data submitted by hospitals.

While the extent to which administrative databases can contribute meaningfully to local quality improvement activities remains to be seen, the potential for utilising such information was highlighted by cases such as the inquiry into high rates of death following paediatric cardiac surgery in Bristol. Administrative datasets have the potential to be a significant resource, and the creative use of such information could complement clinical databases.

In the longer term, data will be recorded as a by-product of clinical care, in an electronic patient record and according to agreed national definitions and standards. NHS QIS and ISD will be fully involved with the eHealth agenda, to ensure that the benefits of such data for patient care can be fully realised.

Next steps

The responses from NHS Boards, coupled with the conclusions of the review panel, indicate that the early stages of the surgical profiles project has made a valuable contribution to supporting more effective and consistent use of data about surgical care.

At the same time, this is just one step in an ongoing programme of work, and there is still a long way to go in terms of improving both the data on surgery in Scotland, and how this information is used to facilitate improvements to surgical care.

The nationally consistent data on surgery, imperfect though they are, are significantly better than the data currently available for many other clinical topics. That is why this project – where the emphasis is on making best use of existing data – focused on surgery.

NHS QIS and ISD will continue to carry out programmes of work to support improvements to data, and the use of data, across a range of clinical topics. For example, the following actions follow directly from the first cycle of the surgical profiles project:

- To coincide with the publication of this report, NHS QIS held a seminar at which stakeholders discussed the surgical profiles project and made suggestions for how this work will be taken forward collaboratively.

- NHS QIS and ISD will work with key partners, including NHS Boards, Scottish audit projects, and the National Patient Safety Alliance, to explore opportunities for embedding the routine use of clinical data in the activities of local clinical governance systems.

- NHS Boards will be asked to provide NHS QIS with an update, by March 2008, on actions that were planned in response to the surgical profile. They will also be invited to provide feedback on the perceived utility/impact of the surgical profiles project.

- ISD will update the clinical indicators in the surgical profile, so data for a more recent time period (an additional year) are available to NHS Boards. These data will be updated on the internet. NHS QIS will not ask NHS Boards for a detailed response to the updated data, although we will seek notification that these data have been received and considered (eg by a copy of the minute of the Clinical Governance Committee).

- Using NHS Boards’ responses to the surgical profile, a clinically-led group will oversee developments to the analyses/indicators included in the profile. For example, work will be carried out to develop more sophisticated case-mix adjustment.

- NHS QIS and ISD will commence work to explore the possibility of rolling out the surgical profiles approach to cover medical specialties.
List of indicators in profile

The following clinical indicators were included in the surgical profile:

**Surgical mortality – all surgical specialties**

- Rate of mortality at 120 days following elective admission to a surgical specialty (for both all admissions, and those admissions where an operation was performed).
- Rate of mortality at 120 days following non-elective admission to a surgical specialty (for both all admissions, and those admissions where an operation was performed).
- Percentage of returns to the Scottish Audit of Surgical Mortality where i) an adverse event occurred, and ii) an adverse event contributed to death.

**General surgery (including vascular)**

- Rate of mortality at 120 days following admission to general surgery (for both elective and non-elective admissions).
- Rate of deep vein thrombosis/pulmonary embolism within 90 days of admission to general surgery.
- Rate of emergency readmission within 28 days of discharge from general surgery.
- Rate of mortality at 120 days following admission for cholecystectomy surgery (for both elective and non-elective admissions).
- Rate of emergency readmission within 28 days of discharge following cholecystectomy surgery.
- Rate of mortality at 120 days following admission for aortic aneurysm surgery.
- Rate of emergency readmission within 28 days of discharge following aortic aneurysm surgery.
- Percentage of invasive tumours <=20mm in maximum diameter receiving breast conserving surgery.
- Percentage of mastectomy patients receiving reconstructive surgery within 1 year of mastectomy.
Orthopaedic surgery

- Rate of mortality at 120 days following admission to orthopaedic surgery (for both elective and non-elective admissions).
- Rate of deep vein thrombosis/pulmonary embolism within 90 days of admission to orthopaedic surgery.
- Rate of emergency readmission within 28 days of discharge from orthopaedic surgery.
- Rate of survival at 120 days following admission for hip fracture.
- Percentage of patients who went to theatre within 24 safe operating hours following admission for hip fracture.
- Percentage of patients who returned home within 30 days following admission for hip fracture.
- Rate of deep vein thrombosis/pulmonary embolism within 90 days of admission for hip fracture.
- Rate of emergency readmission within 28 days of discharge following admission for hip fracture.
- Rate of mortality within 90 days of hip arthroplasty.
- Rate of i) dislocation, and ii) infected prosthesis, within 365 days of hip arthroplasty.
- Rate of deep vein thrombosis/pulmonary embolism within 90 days of hip arthroplasty.
- Rate of mortality within 365 days of knee arthroplasty.
- Rate of i) revision, and ii) infected prosthesis, within 365 days of knee arthroplasty.
- Rate of deep vein thrombosis/pulmonary embolism within 90 days of knee arthroplasty.
Contacts and further information

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Further information about the surgical profiles project is available from the website of the Clinical Indicators Support Team at ISD:

www.indicators.scot.nhs.uk
You can read and download this document from our website. We can also provide this information:

- by email
- in large print
- on audio tape or CD
- in Braille, and
- in community languages.

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