Audit of Care Pathways for Hip Fracture Patients in Scotland

December 2012 to March 2013

A Report from the Musculoskeletal Audit on behalf of the Scottish Government

The information in this report is intended to be used for improvement purposes. The information has been collected by local MSK Audit co-ordinators based in each hospital. These statistics have not been through ISD’s official statistics quality assurance process but have been subject to the MSK Audit’s own quality assurance process, and were pre-circulated to each hospital for comments on accuracy.

We report on a four-month 'snapshot' audit commissioned by the Scottish Orthopaedic Service Development Group (SOSDG) on behalf of the Scottish Government that collected data on the management of hip fracture patients from all Scottish operating hospitals from 1st December 2012 to 21st March 2013.

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Introduction

Hip fracture is the most common, serious orthopaedic injury to affect the elderly with more than 6,000 patients admitted to hospital in Scotland each year after sustaining this injury. The burden of hip fracture in Scotland is likely to increase significantly over the coming decades as a consequence of our demographic changes. It is therefore essential that we manage this injury as effectively and efficiently as possible, primarily for the benefit of patients but also for the most efficient use of NHS resources. Hip fracture represents an excellent 'tracer' condition as clinical management often requires a complex journey of clinical care involving multiple hospital and primary care agencies, and different specialties and professions. As such, if we improve the quality of care for hip fracture patients, then we can expect to improve the general care provided to other fragility fracture patients.

The original Scottish Hip Fracture Audit (SHFA, see link for more detail) first collected data in 1993 and by 2003 had become a national audit. SIGN 56 was produced in 2002 which was then superseded by SIGN 111 in 2009 (see www.sign.ac.uk/guidelines/fulltext/111). Scotland was the first country to have both an evidence based treatment guideline and a prospective national audit of hip fracture care. During this time there were significant changes and improvements to the way hip fracture patients were managed across Scotland. Once the audit was demonstrating that standards of care had been significantly improved and were being maintained, Boards were tasked with internal monitoring and the audit resource was diverted to other aspects of Orthopaedic care. The Hip Fracture Audit as a concept was adopted in England and Wales and along with the best practice tariff, has resulted in significant improvements in the care of patients who sustain a hip fracture (National Hip Fracture Database National Report 2012).

With five years having passed since the SHFA concluded, the Scottish Orthopaedic Services Development Group (SOSDG) felt that the time was right to re-audit the management of hip fracture care across Scotland. This report represents a four month 'snapshot', looking at key interventions of the patient journey from Emergency Department admission to discharge from the acute orthopaedic unit. We report current standards of clinical care in what is likely the most comprehensive national audit of hip fracture care yet undertaken. As such, much of the data has been placed in the appendix section of the document with only the most pertinent data presented within the main report.

The report highlights a number of important care management issues and areas for further improvement in clinical care. We hope that this audit will represent an important step in achieving optimal care for this challenging and vulnerable patient group, the numbers of which will only increase in coming years. The aim moving forward from this audit is to implement practices identified from the best-performing hospitals to all hospitals across Scotland to improve the overall standard of hip fracture care for patients.

Summary of Findings and Recommendations

Reduction in Variation and Improved Standards of Care

The figures show that significant variation exists across Scotland in the quality of care extended to patients who sustain a hip fracture. For each intervention measured, some/many units exhibit excellent practice. Indeed, for those interventions that were also measured in the last SHFA report (2008), significant improvements in many areas of hip fracture care can be seen.

- **Recommendation** - To reduce variation and to further improve the quality of clinical care we propose a ‘Standard of Care’ document is prepared in accordance with SIGN 111, to be endorsed by SCOT and that should be applicable to EVERY patient who is admitted to hospital in Scotland after sustaining a hip fracture. This ‘Standard of Care’ will cover areas of principle improvement focus that we propose to audit again in the future. A ‘Standardised Admission Form’ should also be used by all Emergency Departments and admitting orthopaedic clinical staff, tailored to suit local needs. A national template of this document is currently being created and will be available for local use in Autumn 2013.
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‘Fast-Track’ Policies from Emergency Department to Ward (See Figures 2-6)

The majority of units in Scotland (all but 3) have a ‘fast-track’ policy for ED to ward for hip fracture patients, usually set locally as a 2 hour target. Despite these policies, only 16% of patients were transferred from the ED to an Orthopaedic ward within 2 hours. 82% were transferred within the 4 hour national HEAT target. Significant variation is noted across the country. These figures represent substantially longer times compared to 2008 SHFA data, where 28% of patients were transferred within 2 hours and 96% within 4 hours.

- **Recommendation** – All clinically appropriate patients should be transferred from the ED to the orthopaedic ward within 2 hours and it is not acceptable to have frail, elderly patients waiting more than 4 hours in the ED unless indicated for essential medical interventions. It is, however, essential to emphasise the importance of good clinical care while in the ED rather than focus exclusively on an arbitrary transfer time.

Interventions in ED (See Figures 7-12)

**Analgesia** - 94% of patients had analgesia administered prior to transfer to the Orthopaedic ward. This demonstrates an improvement from an SHFA audit in 2005 where this figure was approximately 75%. Despite the improvement, there were still 6% of patients who had no record of any analgesia being administered prior to transfer to the Orthopaedic ward.

- **Recommendation** - Local protocols for appropriate, individually-tailored analgesia starting in the ED (or earlier if being transferred) for EVERY hip fracture patient.

**Optimising Fluid and Electrolyte Balance** – 87% of patients had bloods taken and 60% had IV fluids commenced in ED.

- **Recommendation** - Early (ideally during time in ED) venous access and fluid balance assessment with action to optimise fluid and electrolyte balance for EVERY hip fracture patient.

**Pressure Area Assessment** – 33% of patients had a documented pressure area assessment within the ED and only 12% had a recorded assessment and protection in situ prior to transfer to the orthopaedic ward (see Inpatient section for further figures and recommendation).

**Scottish Early Warning System (SEWS)** - 90% of patients had a SEWS score recorded prior to transfer to the orthopaedic ward. Of these patients, 11% were found to have a SEWS 1 point higher at the time of ward assessment, and 6% were 2 points or more higher than the highest score recorded prior to ward transfer.

- **Recommendation** – EVERY hip fracture patient to have a formal SEWS assessment and interventions where necessary to ensure warning scores are addressed appropriately.

Pre-operative Inpatient Care (See Figures 13 to 23)

**Cognitive Assessment** – 71% of patients had a record of a formal cognitive assessment being undertaken during admission. This is a significant improvement on previous audit results from 2008 which suggested that only one-third of patients were discharged from orthopaedic services with documented completion of a cognitive assessment. It should be noted that the formal assessment of cognitive capacity varied greatly across the country from 6% to 100%. 30% of patients were diagnosed as having dementia. The use of the ‘Adults with Incapacity’ form was fairly consistent across units with 37% of patients overall being considered as unable to give informed consent.

- **Recommendation** – A baseline assessment of cognitive function for EVERY patient soon after admission with appropriate use of ‘Adults with Incapacity’ forms for consent to surgery where indicated. No form should be used without recorded evidence of cognitive function.

**Nutritional Assessment** – 88% of patients had a formal nutritional assessment recorded during admission. Of these patients, 30% were deemed to be at risk.
Recommendation - Early nutritional assessment for all patients and interventions to optimise where indicated as outlined in the Clinical Quality Indicators for Nursing Care (see page 20 for further details).

Falls Assessment – 93% of patients had a record of a formal falls risk assessment being undertaken during orthopaedic admission. Of these patients, 86% were found to be at risk of further falls. 7% of patients had no record of a formal risks assessment being undertaken at any point during their orthopaedic inpatient stay.

Recommendation – All patients to have a formal falls risk assessment on admission, and risk factors to be addressed as outlined in the Clinical Quality Indicators for Nursing Care.

Pressure Area Assessment - Formal pressure area assessment by Waterlow Scoring was undertaken for almost all patients during admission to the orthopaedic ward and 88% of patients were assessed as being at risk of developing pressure sores.

Recommendation – All patients to have an early pressure area risk assessment and interventions to minimise the development of pressure sores, also outlined in the Clinical Quality Indicators.

Operative Management (See Figures 24 – 35)

Time to Theatre - 92% of patients who were considered medically fit for theatre underwent surgery within 48 hours of admission. This represents an overall 6% reduction from 98% in 2008, but varied considerably between units. Lack of theatre access delayed surgery for 7% of patients. 9% of patients were not considered fit for surgery within 48 hours of admission to orthopaedic care. This is similar to the 12% recorded in 2008.

Recommendation - Surgery for all medically fit patients within 48 hours of admission and within normal working hours. There must be adequate provision of senior staff, theatres and facilities (e.g. image intensifiers) to allow 7 day access to surgery.

Fasting and Oral Fluids - On the day of operation 21% of patients had clear oral fluids withheld for 6-10 hours and 49% for in excess of 10 hours prior to surgery. 79% of patients were fasted in excess of 10 hours prior to surgery.

Recommendation - Minimise pre-operative fasting times for patients (solid food 6 hours, clear oral fluids 2 hours).

Implant Type - A wide variation in practice has been observed across the country. 70% of patients undergoing hemiarthroplasties had cemented implant designs.

Recommendation - SIGN 111 and the NICE Guideline for the management of hip fractures in the elderly patient both recommend the use of cemented designs for hemiarthroplasty.

DVT Prophylaxis – Aspirin therapy alone was prescribed to only 3% of patients. LMWH either alone or in combination with mechanical or other chemo-prophylactic agent was used in 91% of cases.

Recommendation - Opinion differs regarding the most effective DVT prophylactic policy for patients who sustain a hip fracture but a recorded assessment of VTE risk and appropriate antithrombotic prophylaxis should, however, be in place for EVERY patient with active measures taken to stabilise haematology ranges to safe operative levels in patients admitted already on anticoagulant drugs.

Pre-op Catheterisation – 34% of patients were catheterised pre-operatively.

Recommendation – Pre-operative catheterisation should not be used as ‘routine’ as stated in SIGN 111. Units are encouraged to examine their policies.

Post-Operative Management (See Figures 36 – 47)

Mobilisation – 58% of patients were mobilised on the first post-operative day and 83% by the second. Across Scotland approximately 30% of patients were mobilised initially by nursing staff and 70% by physiotherapy staff.

Recommendation - Early post-operative mobilisation for all patients (ideally by next day) with 7 day physiotherapy input.

Geriatric Services - The provision of geriatric services to hip fracture patients is both variable and in some hospitals scarce when compared to other units. Only 47% of patients receive routine geriatric
assessment with a further 11% receiving an ad hoc service. 41% of patients receive no form of geriatric assessment during admission. Only 47% of patients underwent geriatric review within a week of admission.

- **Recommendation** - Early Geriatric Medicine input with review and medical support on the Orthopaedic ward by a Geriatrician for EVERY hip fracture patient.

**Bone Protection** – 61% of patients had a bone protection medication assessment.

- **Recommendation** – A bone assessment for all appropriate patients and optimised treatment for osteoporosis, ideally through a Fracture Liaison Service.

**Length of Stay** - Median length of orthopaedic stay varied considerably between units. If discharged home, median length of stay was 12.5 days; to a care-home was 8 days and to a rehabilitation unit was 10 days. Little change was observed when compared to previous audits.

- **Recommendation** – Length of stay is an important measure of the quality of care for patients. A successful reduction in median length of stay also leads to efficiency savings. Boards are encouraged to use all of the measures in this audit to improve the patient journey and therefore impact positively on length of stay.

**Discharge Planning and Destination** - 73% of patients were admitted from their own/sheltered housing but only 27% were directly discharged back to their own home/sheltered housing. This highlights the significant effect this injury has on independent living in the short term.

- **Recommendation** - Care by a co-ordinated Multi-Disciplinary Team and early discharge planning, with involvement of patient, family/carer(s) and appropriate services (OT and Social Care).

**Patient Outcomes** – A supplementary report detailing 120-day outcomes of this cohort of hip fracture patients will be released in the Autumn of 2013 (see Page 45 for more details).

It is our intention to audit some/all of the standards detailed above in future audits as we move forward in optimising the care of this challenging and vulnerable patient group.

**Professor J Hutchison, on behalf of the Scottish Orthopaedic Service Development Group (SOSDG)**
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Methodology

We prospectively collected data on the management of patients admitted to orthopaedic care with a hip fracture in a Scottish operating hospital on any date between 1st and 21st of the four month period December 2012 to March 2013. A three-week collection period per month allowed us to remain within resource, whilst collecting a more comprehensive set of data per patient than in previous hip fracture audits. MSk Audit Local Audit Co-ordinators (LACs) collected data from patient case notes, patient information systems, results reporting and referral management systems.

Patients younger than 50 years old were not included in the audit. Patients who fractured both hips simultaneously were only included once. Table 1 provides details of the number of included and excluded patients per unit. Further in-depth detail of exclusions is provided in the footnotes below. As far as we are aware, the majority of hip fracture patients that had surgery in each hospital were audited and included in this report, except for those hospitals specified in Table 1. Otherwise, exclusions are believed to be random in nature and not biased towards any category of patient.

Data Collection

Data were prospectively collected from all 21 acute mainland orthopaedic hospitals across Scotland. Table 1 outlines the number of patients included in the audit by hospital. We audited a total of 1387 hip fractures (Table 1). Excluding periods when Local Audit Co-ordinators (LACs) were absent, 98% of all hip fractures identified from the 1st-21st of each month were audited (Table 1). Some hospitals had complete coverage but only for some of the audit period (Aberdeen, GRI and WIG), and others were retrospectively audited using samples of casenotes collected by the hospital (Ayr and Crosshouse). An extract from ISD’s SMR01 data was used as a comparison with the numbers of hip fractures identified by the audit using the ICD10 codes S720, S721 and S722. Although these are not an exact match for hip fracture, at most units the number of hip fractures on SMR01 were similar to those found by the MSk Local Audit Co-ordinators (in all units LACs found more hip fractures than recorded on SMR01, perhaps because some patients were still in long-term hospital care or because data had not been fully submitted by the extraction date). To inform the future possibility of assessing Time to Theatre targets using the routine SMR01 data, the MSk Audit intends at a later date to look in more detail at the match between SMR01 and this sample of hip fractures identified by LACs.
Table 1 – Number of patients included in this report

<table>
<thead>
<tr>
<th></th>
<th>Number of patients included</th>
<th>Number (%) excluded</th>
<th>Number excluded as after 21st of month</th>
<th>Total for 4-month period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ayr</td>
<td>37</td>
<td></td>
<td>-</td>
<td>69</td>
</tr>
<tr>
<td>Crosshouse</td>
<td>17</td>
<td></td>
<td>-</td>
<td>84</td>
</tr>
<tr>
<td>BGH</td>
<td>40</td>
<td>9 (18%)</td>
<td>14</td>
<td>63</td>
</tr>
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<td>DGRI</td>
<td>56</td>
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<td>80</td>
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<td>Fife</td>
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<td>3 (3%)</td>
<td>53</td>
<td>147</td>
</tr>
<tr>
<td>Forth Valley</td>
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<td>0 (0%)</td>
<td>49</td>
<td>147</td>
</tr>
<tr>
<td>Aberdeen</td>
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<td>46 a</td>
<td>131 a</td>
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<tr>
<td>Elgin</td>
<td>27</td>
<td>1 (4%)</td>
<td>19</td>
<td>47</td>
</tr>
<tr>
<td>GRI</td>
<td>20</td>
<td></td>
<td>-</td>
<td>139 b</td>
</tr>
<tr>
<td>WIG</td>
<td>25</td>
<td></td>
<td>-</td>
<td>104 b</td>
</tr>
<tr>
<td>Victoria</td>
<td>77</td>
<td>2 (3%)</td>
<td>39</td>
<td>118</td>
</tr>
<tr>
<td>SGH</td>
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<td>0 (0%)</td>
<td>22</td>
<td>58</td>
</tr>
<tr>
<td>RAH</td>
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<td>0 (0%)</td>
<td>46</td>
<td>152</td>
</tr>
<tr>
<td>Inverclyde</td>
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<td>1 (2%)</td>
<td>21</td>
<td>65</td>
</tr>
<tr>
<td>Raigmore</td>
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<td>124</td>
</tr>
<tr>
<td>Hairmyres</td>
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<td>1 (2%)</td>
<td>30</td>
<td>89</td>
</tr>
<tr>
<td>Monklands</td>
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<td>25</td>
<td>82</td>
</tr>
<tr>
<td>Wishaw</td>
<td>57</td>
<td>0 (0%)</td>
<td>35</td>
<td>92</td>
</tr>
<tr>
<td>RIE</td>
<td>237</td>
<td>1 (0%)</td>
<td>107</td>
<td>345</td>
</tr>
<tr>
<td>Ninewells/Stracathro</td>
<td>110</td>
<td>0 (0%)</td>
<td>48</td>
<td>158</td>
</tr>
<tr>
<td>Perth</td>
<td>49</td>
<td>0 (0%)</td>
<td>24</td>
<td>73</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1387</strong></td>
<td><strong>20 (2%)</strong></td>
<td></td>
<td><strong>2367</strong></td>
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</table>

- The audit included hip fracture patients admitted to orthopaedic care between 1st-21st December 2012, 1st-21st January 2013, 1st-21st February 2013 and 1st-21st March 2013, i.e. a total of 12 weeks unless otherwise specified (see Methodology for more detail).
- Patients under 50 years old were excluded.
- a Aberdeen audit did not start until late December. Figures given are those for January, February and March only except for three included December patients. The Total for the 4-month period was taken from SMR01.
- b Samples from Crosshouse, Ayr, WIG and GRI were not completed due to staff absences. Small samples for each were obtained for part of the audit period (WIG and GRI, December and January only, completeness unknown), or retrospectively (Crosshouse and Ayr, samples as provided from each unit’s local database of presenting ED complaints, non-audited patients may include mis-diagnosed hip fractures, direct-to-ward transfers, or patients who sustained their fracture whilst an inpatient elsewhere in the hospital). Total for 4-month period for GRI and WIG was taken from SMR01.
- The exclusion of hip fractures from sites where samples were otherwise complete was due to unavailability of casenotes (including 9 from BGH), and/or because of complex unrepresentative patient pathways.
- SMR01 data extracted in July 2013.
Patient Demographics

The median age of hip fracture patients included in this report was 82 (mean age=80.9, similar to patients in previous SHFA reports). Twenty-three percent of patients were under 75 years old, 13% were over 90 (see Appendix Fig. 1 for hospital-specific data). Seventy-one percent of patients were female.

Seventy-three percent of patients who suffered a hip fracture lived at home immediately prior to the fracture (see also Appendix Fig. 2). Nineteen percent lived in a care home. A further 8% fell whilst in hospital (acute, rehab or continuing care). Of those who lived at home prior to fracture, 54% lived independently whilst 14% lived with carers. Ten percent had a carer but not every day, 6% had a carer once a day and 16% had a carer more than once per day.

Prior to hip fracture 43% of patients walked unaccompanied and without aids whilst walking indoors. Twenty-two percent used single sticks or other aids, and 24% walked with two or more aids or a frame but were otherwise unaccompanied indoors. Nine percent of patients required accompaniment whilst walking indoors, and 2% were chair- or bed-bound (see also Appendix Fig. 3).

Sixty-one percent of this sample of hip fracture patients had documented significant co-morbidities (see Appendix Fig. 4 for more details). Seventeen percent had two co-morbidities and 5% three or more co-morbidities. Dementia was not included as a co-morbidity as such, but affected 30% of all patients.

Twenty-six percent of patients ultimately treated surgically had ASA scores of 1 or 2 prior to surgery, 53% had an ASA score of 3, and 15% had an ASA score of 4 or rarely 5 (see Appendix Fig. 5 for data by hospital). Six percent of surgical patients did not have a documented ASA score.

For patients with a documented and clear history, 33% had fallen at least once in the previous six months. Eighteen percent had fallen more than once. The percentage of patients with documented previous low impact fractures varied between 10% and 44% between units: 10% of all patients had a documented previous hip fracture, 8% a previous wrist fracture.

Ninety-seven percent of fractures resulted from low energy trauma, 2% from high energy trauma. Seventeen (1%) were pathological fractures. Type of hip fractures are shown in Fig. 1. Sixty-eight percent of intracapsular fractures were displaced. Thirty-one percent of intertrochanteric fractures were multifragment.

Fig. 1: Type of fracture
Pre-hospital management

Much debate exists regarding the relationship between time to theatre and outcome after surgery for hip fracture. The majority of studies published in the orthopaedic literature report on the time from hospital admission to surgery. However, significant delays may occur during the period between fracture and arrival in hospital, particularly when the patient resides in a rural location.

Date of fracture was known for 96% of patients. Of those that presented to ED and whose fracture date was known, 84% had fractured their hip on the same calendar day that they presented to ED and 12% had fractured the previous day. Four percent had fractured at least two days previously. Of those patients whose date of fracture was not known, it is likely that some of the uncertainty was due to the length of time following fracture, so a higher proportion may have fractured on the previous day or earlier.

The actual time of fracture was documented in only 45% of patients' medical records, and varied substantially between hospitals (see Appendix Fig. 6).

SIGN Guideline 111 (The management of hip fracture in older people) recommends transfer to hospital from the site of injury as quickly as possible. Based on data obtained from units where at least 50% of all fracture times were recorded, approximately 50% of patients were transferred to hospital within 2 hours of sustaining a hip fracture and 80% within 4 hours (see Appendix Fig. 7). In the remaining 20% transfer time was in excess of 4 hours, half of this cohort waiting more than 6 hours. Such delays most likely represent a delay in the patient being able to report the fracture rather than a delay in transfer by the Scottish Ambulance Service.

Transfers

Seventy-four (5%) patients were transferred to the surgical unit from a different receiving unit. These included 30% of Raigmore’s patients, 21% of IRH patients, 19% of SGH patients and 13% of RAH patients, reflecting the wider geographical catchments of these units. Nine percent of DGRI’s patients were transferred in from the Galloway Community Hospital, and 4% of RIE’s patients were transferred from St Johns. Twenty-eight (38%) of the 74 patients were transferred to the surgical unit via the surgical unit’s ED (mainly at RAH and Inverclyde), whilst the other 46 were transferred directly to a ward.

A total of 107 patients fractured their hip as a result of a fall whilst in hospital. Seventy-two patients fell whilst on an acute hospital ward, 20 fell whilst on a rehabilitation ward and 15 fell whilst in NHS Continuing Care. Most (93%) patients who fell whilst in NHS Continuing Care were transferred to orthopaedic care via ED, but this was less likely if the patient fell whilst in rehab (45% via ED) or on an acute ward (24%).

A further thirteen (1%) patients were admitted as direct GP referrals to orthopaedics, or as referrals via assessment units or AMUs.
Management in ED

ED data is reported for all 1237 patients who presented directly to the surgical hospital’s ED. Data are excluded for patients who presented elsewhere before transfer to the surgical hospital via the surgical hospital’s ED.

Time in ED

Fig. 2 documents the duration of time spent in ED prior to transfer to an alternative clinical setting (usually orthopaedic ward, but not always so). The transfer of patients from ED to the definitive ward should occur when the patient has undergone initial clinical assessment and management. SIGN 111 recommends transfer to the orthopaedic ward from ED within 2 hours of initial presentation. The current HEAT target for this transfer time is 4 hours although previous NHS QIS standards favoured the 2 hour target. Variation between units was substantial (Fig. 2): some units achieved the 2 hour target in only 5% of cases, others achieved it in 60%. It should be noted that there is little in the way of clinical evidence to support arbitrary transfer times and it is important that the patient is properly assessed and managed prior to transfer from ED. Overall 16% of patients were transferred within the 2 hour target and 82% within 4 hours although these figures were subject to significant variation across the country. These represent substantially longer times in ED compared to the previous SHFA 2008 data (28% of patients were transferred within the 2 hour target and 96% within 4 hours, see also Fig. 2).

Fig. 3 shows the transfer time by 15 minute time period up to 6 hours. Thirteen percent of patients were in ED for 4-6 hours, 3.5% for 6-8 hours and 22 patients (1.8%) for more than eight hours. It is clear that there is a ‘push’ at the 3.5 to 3.75 hour period and particularly from the 3.75 to 4.0 hour period in order to achieve the 4 hour HEAT target for ED patient transfer. It should be remembered that hip fracture patients frequently present with acute medical co-morbidity which may require investigation and initial management in the ED prior to transfer to the medical ward and should take priority over any arbitrary transfer time.

Fig. 2: Time in ED
The majority of units in Scotland (all but 3) have a ‘fast-track’ policy for hip fracture patients (see Appendix Fig. 8). The target for transfer from ED admission to the orthopaedic ward is 2 hours in all these units (as per SIGN 111), apart from one unit that has a more stringent 1 hour target and another with no formal recorded target time. Ninety-eight percent of patients were recorded as being suitable for ‘fast-track’ transfer from ED.

All units included on Fig. 4 have a two-hour fast-track policy for hip fracture patients (subject to clinical exclusions). The exception is DGRI that has a more stringent one-hour fast-track target. The white area for DGRI on Fig. 4 indicates treatment for patients that did not meet their one-hour target but who met a two-hour target.
Specialties assessing patients in ED

Significant variation was observed across the country in terms of orthopaedic and other specialty input in ED (Fig. 5). Many units use a departmental policy whereby hip fracture patients are initially managed by ED staff and transferred to the orthopaedic ward for further assessment without any need for an ED review by orthopaedics, but this practice varies across the country (Fig. 5). There was also variation in the seniority of staff assessing the patient in ED (see Appendix Fig. 9). On average, consultants were involved in the direct care of 19% of hip fracture patients, but this varied from 0%-73% between units.

Just over 59% of patients were managed by ED physicians, and a further 37% by a combination of ED and orthopaedics (Fig. 5). A subsequent analysis was undertaken to determine whether those patients who were also reviewed by orthopaedics were subject to an additional delay prior to transfer to the orthopaedic ward (Fig. 6). On average, patients also seen by the Orthopaedic department spent 20 minutes longer in ED, but this was relatively short compared to the variation in length of stay between units (Fig. 6). This would suggest that time in ED is more closely associated with routine unit practice than whether or not orthopaedics were involved.

**Fig. 5: Specialties seeing patient in ED**

![Image of Fig. 5](image_url)

**Fig. 6: Median length of time in ED by specialty involvement**

![Image of Fig. 6](image_url)
Interventions in ED

The effectiveness of transfer targets for hip fracture patients is cause for some debate amongst ED physicians and orthopaedic surgeons. Proponents argue that such targets reduce the period of time hip fracture patients wait in ED prior to transfer to the orthopaedic ward and this is undoubtedly the case. However, there is a paucity of evidence as to whether such targets are associated with improvements in clinical care and outcome. An analysis of our data suggested that within units longer stays were not associated with a higher frequency of analgesia given, bloods taken, inspection of pressure areas, commencement of IV fluids or ECGs carried out (see Figs. 7-11). Instead, the level of intervention is related more to the departmental policy rather than the duration of time spent in ED.

Analgesia requirements should be tailored to the individual patient. Adequate and appropriate analgesia must be administered early (SIGN 111) in anticipation of painful procedures such as the movement of the patient for radiological investigation or transfer from a trolley to a ward bed. Significant variation in the use of analgesia was observed across the country (Fig. 7). The majority of patients received parenteral opioid analgesia. Nerve blocks are used variably across the country. Although nerve blocks are associated with better analgesia and reduced administration of opioid analgesics, training is required in the administration of such blocks. NICE 2011 suggests nerve blocks could be used when pain control following administration of paracetamol and opioids is suboptimal. Ten percent of patients were given non-opioids as the only analgesia.

Six percent of patients had no record of any analgesia being administered prior to transfer to the orthopaedic ward. This is an improvement from a SHFA audit in 2005 when no analgesia was recorded in up to a quarter of patients (although both sets of figures may have partially reflected documentation issues). All patients who sustain this painful injury should be prescribed and given analgesia as soon as is possible provided there are no contraindications to such treatment.

Fig. 7: Analgesia administered by Scottish Ambulance Service or in ED

* The oral opioids category excludes patients who had also been given nerve blocks or IV/IM/SC opioids, but some of these patients also received non-opioid analgesia.

SAS records were not always easily examined. A few patients may have had additional types of analgesia given by SAS. However, additional checks on patients recorded as ‘No analgesia in ED/SAS’ were carried out post-audit, and these patients still appeared not to have had analgesia.
All patients who sustain a hip fracture should undergo routine assessment of full blood count and urea/electrolytes (with other investigations as clinically appropriate) as part of pre-operative assessment for surgery. It is important to identify and correct any fluid and electrolyte abnormalities as quickly as possible. Electrolyte abnormalities are common in the hip fracture patient, often secondary to the use of diuretics. Considerable blood loss may result from proximal femoral fracture, and such patients may also be dehydrated as a result of limited fluid intake as a result of the fall. Eighty-seven percent of patients had bloods taken during the ED admission (Fig. 8), but two units have departmental policies recommending that blood samples are not taken until orthopaedic ward admission.

Fig. 8: Were blood samples taken during ED attendance?

![Bar chart showing percentage of patients with blood samples taken during ED attendance for different sites in Scotland, 2012/13.](image-url)
Appropriate hydration and fluid balance is essential for all hip fracture patients. The prescription of IV fluids in ED was again highly variable across the country with overall 60% of patients commenced on IV fluids prior to transfer from ED (Fig. 9). An intravenous fluid prescription should be tailored to the patient’s biochemical state and intravascular volume, rather than a protocolised fluid regimen. However many patients will be intravascularly fluid deplete on presentation, and peri-operative fasting protocols mean the patient may struggle to replace lost fluid orally. In most cases IV fluid supplementation is appropriate.

Fig. 9: Were IV fluids commenced before the patient left ED?
Hip fracture patients are at high risk of developing pressure sores and all patients should undergo pressure area assessment when admitted to ED. This assessment may not necessarily be a formal Waterlow Score. While such assessments may frequently be undertaken but not formally recorded, we have assumed that if the assessment was not recorded it was not undertaken. Using this criterion almost 70% of hip fracture patients had no documented assessment of pressure areas within ED (Fig. 10). Only 12% had a recorded assessment and protection in situ prior to transfer to the orthopaedic ward.

**Fig. 10: Documented pressure area inspection during the ED attendance?**

On some occasions pressure areas will be inspected in ED, although a formal assessment tool will not always be used.

ECG assessment should be carried out in the ED to rule out arrhythmias or myocardial ischemia which may have contributed to the fall. Eighty-two percent of patients underwent ECG assessment during their ED attendance (Fig. 11). The majority of those who did not have an ECG in ED are likely to have had ECG assessment when transferred to the orthopaedic ward as part of departmental protocol.

**Fig. 11: Was an ECG performed during the ED attendance?**
Other ED diagnostics

Two of the 1237 ED patients had an MRI and 11 had an Echocardiogram. Thirteen had other diagnostics (mostly CTs of the C-spine, lumbar spine, head or hip).

SEWS score

The Scottish Early Warning Score (SEWS) requires the measurement of respiratory rate, oxygen saturation, temperature, systolic blood pressure, heart rate and neurological status. If the score is 4 or more further medical assessment should occur. NICE recommends that all hospital inpatients should be monitored using a physiological scoring system at least every 12 hours. All hip fracture patients should undergo a SEWS assessment prior to ward transfer. Ten percent of patients had no SEWS recorded prior to transfer to the orthopaedic ward (Fig. 12).

Fig. 12: SEWS score in ED

ED discharge destination

Ninety-six percent of patients were transferred directly to the orthopaedic ward from the ED. A minority (3%) were transferred to non-orthopaedic or medical assessment units. One percent went to Patient Intervention Day Units due to bed pressures within orthopaedics. Only two patients went directly to theatre.
Inpatient care

Time taken from departing ED to arrival on the ward

It was noted that there were often substantial differences between when patients were documented as leaving ED and when they were clerked as arriving onto the ward (for details see Appendix Fig. 10). Many of the longer transfer times between ED and the ward (and all of the patients that apparently arrived in orthopaedics before they were clerked out of ED) are likely to reflect discrepancies in how hospitals clerk their patients into and out of ED and wards rather than true transfer times. This is problematic as both the ED departure time and the time of arrival into orthopaedic care are important for calculation of important patient-care target times (length of time in ED and time to theatre). In most cases the time of departure from ED is likely to be more accurate due to the stringent requirement for calculation of ED waiting times.

Change in SEWS score, ED to ward

Fig. 13 documents the observed change (if any) between the highest SEWS recorded in ED and then when assessed on the orthopaedic ward. Eleven percent of patients were found to have a SEWS 1 point higher at the time of ward assessment, and 6% were 2 points or more higher. We subsequently assessed whether SEWS tended to increase or decrease in relation to the duration of ED stay. No clear relationship was evident. Those transferred to the ward within two hours tended to have a lower SEWS score in ED compared to those that remained in ED longer. This is however most likely because medically unfit patients are more likely to remain in the ED for longer for stabilisation prior to transfer.

Fig. 13: Change in SEWS score, ED to ward

Fig. 13 only includes the 88% of ED patients who had a SEWS score recorded in both ED and orthopaedic care. Green and orange colours show deteriorations in SEWS score, light and dark grey show improvements.
Audit of Care Pathways for Hip Fracture Patients in Scotland
December 2012 to March 2013

Patient Assessments

Clinical Quality Indicators (CQIs) are evidence-based indicators that support the measurement of the quality, safety and reliability of care. CQIs focus on quality improvement rather than a measure of performance. They are currently process indicators, which measure aspects of nursing care such as assessment and interventions.

The initial three CQIs in Falls, Pressure Area Care and Food, Fluid & Nutrition were ratified in May 2009, following a detailed pilot and development phase that included ensuring integration with all other NHSScotland work streams, particularly the Scottish Patient Safety Programme (SPSP) and NHS Quality Improvement workstreams on Improving Nutritional Care and Integrated and Coordinated Tissue Viability. This was complemented by a Frequently Asked Questions information sheet for Senior Charge Nurses (SCNs) and their teams.

In August 2011, the Pressure Area Care (PAC) CQI was re-launched following a wide review and revision to ensure the PAC CQI is reflective of current evidence and to include outcome measures within the CQI. A review of the Falls and Food, Fluid & Nutrition CQI is currently underway.

The following graphs pertain to the assessment tools measured in the CQIs mentioned above.

Cognitive Assessment

Both acute delirium and chronic cognitive impairment are common in hip fracture patients. Current literature suggests that up to 50% of older patients with hip fracture will develop delirium after hospital admission and that this risk can be mitigated with better identification and management planning (Marcantonio 2001, JAGS 49: 16-22). It is therefore essential to have a baseline assessment of cognitive function close to the time of admission to formally assess the patient's ability to undertake the informed consent process and to identify those patients who require further investigation.

Wide variation in practice has been identified across the country with some units assessing all patients admitted after sustaining a hip fracture, and other units assessing very few (Fig. 14).

The AMTS is the most commonly used assessment tool (Fig. 14). There is limited evidence from the medical literature as to which assessment tool should be used to diagnose either delirium or dementia in hospitals because very few tools have been subjected to evaluation and validation in this setting (Mitchell 2010, Am J Geriatr Psychiatry 18: 759-82). The AMTS, CAMS and MMSE have the highest sensitivity and specificity and the best validation for use in hospital cohorts. However, some concern now surrounds use of the MMSE due to copyright issues with this test.

Fig. 14: Type of cognition test

If the patient had multiple cognition tests, the first cognition test was recorded. For the purposes of this audit, the 4AT test was not considered as a cognition test. However, in some units it is used routinely in ED and/or during the admission process to Orthopaedics as a screening tool providing an indication of patients that would benefit from a full AMTS assessment.
Approximately 50% of patients underwent cognitive assessment either within the ED or within 4 hours of ward admission (Fig. 15). Twenty-nine percent of patients across Scotland had no record of a formal cognitive assessment being undertaken. Nevertheless, this is an improvement on previous audit results from 2008 which suggested that two-thirds of patients were discharged from orthopaedic services without completion of a cognitive assessment (SHFA 2009, The patient journey post hip fracture: What constitutes rehabilitation). Current standards from the British Geriatrics Society recommend early cognitive screening in ED as part of assessment for delirium and dementia.

Fig. 15: Timing of cognition test

Post admission times refer to post ward admission. At RIE, an AMTS score was often found in the notes, but was not accompanied by a date/time.
Falls Assessment

All patients who sustain a hip fracture should undergo a formal falls risk assessment on admission to the orthopaedic ward, ideally on initial nursing admission clerking (0-4 hours). This was the case in approximately 70% of patients (Fig. 16). Seven percent of patients had no record of any falls assessment being undertaken. A variety of nursing and AHP falls risk assessment tools were used. Once again use of such tools has substantially improved compared to the previous 2008 audit when only 40% of patients had a formal falls assessment undertaken prior to discharge from orthopaedic services. If falls risk assessment and prevention strategies are to be effective, their implementation should begin as soon as possible after hospital admission.

Fig. 16: Timing of falls risk assessment

MORSE score, Cannard assessment, and ‘in-house’ risk scoring tools have all been included. Post admission times refer to post ward admission. 
During part of the data collection period the orthopaedic trauma ward at Raigmore was closed due to an outbreak of Norovirus which may have had an impact on the patient pathway with regards to nursing documentation, physio, OT and geriatrician input.
Excludes 14 patients (8 at Aberdeen) whose notes were not seen.
The majority of hip fractures arise from a fall event. In addition, falls in hospital remain prevalent and whilst current evidence suggests they cannot be completely prevented, falls risk can be reduced by around 20% in hospitals as a result of proper assessment and tailored patient interventions (Cameron 2010, Interventions for preventing falls in older people in nursing care facilities and hospitals. Cochrane library). Although the evidence is still equivocal about their use, units may want to consider dedicated beds for falls-vulnerable patients (and/or when ordering replacements) that can be lowered at night. Fig. 17 highlights the importance of undertaking a falls assessment in all hip fracture patients. Eighty-six percent of those assessed were found to be at risk of further falls. Subsequently, 9% of the patients in this audit had a fall whilst in orthopaedic care. Recent medical literature has raised caution regarding the reliance on these assessment tools as a sole method of reducing falls risk (National Patient Safety Agency 2007, Slips, trips and falls in hospitals). Completion of falls risk assessments will only influence falls risk if each identifiable risk factor is modified accordingly by an appropriate multi-disciplinary team action plan. Gathering data on this area was outwith the scope of this audit. Given that 86% of patients assessed were at risk of falls, one could argue that falls prevention should be introduced to all hip fracture patients as a matter of course.

Fig. 17: Falls risk assessment – percentage of patients assessed who were at risk
Nutrition assessment

As a result of their age and frequent medical co-morbidities, hip fracture patients are at significant risk of nutritional impairment both prior to and during hospital admission. Poor nutrition can lead to mental apathy, muscle wasting and weakness, impaired cardiac function and lowered immunity to infection. While the majority (64%) were assessed within 4 hours of ward admission, a further 12% did not undergo any formal nutritional assessment during their acute orthopaedic stay (Fig. 18). Compared to the 2008 audit, there has been an improvement in nutritional assessment (58% of patients assessed before discharge from orthopaedic services in 2008).

Fig. 18: Timing of nutrition assessment

During part of the data collection period the orthopaedic trauma ward at Raigmore was closed due to an outbreak of Norovirus which may have had an impact on the patient pathway with regards to nursing documentation, physio, OT and geriatrician input.

Excludes 13 patients (6 at Aberdeen) whose notes were not seen.

Of those patients who underwent nutritional assessment, 30% were deemed to be at risk (Fig. 19). This highlights the importance of such assessments in this vulnerable patient group.

Fig. 19: Nutrition assessment – percentage of patients assessed who were at risk
Fig. 20: Patients at nutritional risk: dietician reviews and provision of nutritional supplements

Supplements usually have to be prescribed by a dietician, but some patients were already on supplements prior to admission, or were provided by discretionary supplements by nurses.

N=362 patients assessed as ‘at risk’.

In some units the established policy is that only patients assessed as being at a certain risk should be referred for formal dietician review. Similarly, some units allow nursing discretion to determine whether supplements are given to patients outwith dietetic review. The literature suggests that oral protein and energy feeds afford better patient outcomes (reduced complications, reduced length of stay and reduced mortality rates) alongside some evidence of further benefits associated with having adequate staff to aid with patient meals (Duncan 2006, Age Ageing 35:148-53).
Pressure area risk assessments

Around 1 in 20 people admitted to hospital with an acute illness develop a pressure ulcer. Patients over 70 years old are particularly vulnerable due to a combination of reduced blood supply, reduced mobility levels and ageing of the skin. Formal pressure area assessment by Waterlow Scoring was undertaken for almost all hip fracture patients, but variation was observed regarding the timing of this (Fig. 21). Eighty percent of patients had undergone such assessment within 4 hours of ward admission.

Fig. 21: Timing of formal pressure areas assessment (Waterlow Score)

Unlike Fig. 10, Fig. 21 required a formal Waterlow score or equivalent to be undertaken, rather than just an informal assessment tool.

During part of the data collection period the orthopaedic trauma ward at Raigmore was closed due to an outbreak of Norovirus which may have had an impact on the patient pathway with regards to nursing documentation, physio, OT and geriatrician input.

Excludes 12 patients (8 at Aberdeen) whose notes were not seen.

Eighty-eight percent of patients admitted with a hip fracture were found to be at risk of developing pressure sores (Fig. 22). Eighty-five percent of those at risk were given a pressure care intervention compared to 41% of those not at risk.

The majority of units use the Waterlow Scoring system to determine whether a patient is at risk. A typical hip fracture patient (i.e. female, 80 years old and awaiting theatre) would fall into the ‘at risk’ category, even before consideration of continence issues, nutrition levels, etc. There was evidence on closer inspection of some patients deemed NOT to be at risk that the Waterlow Scoring system had not been correctly applied, perhaps highlighting a need for some clinical education in certain units.

Fig. 22: Pressure area assessment – percentage of patients assessed who were at risk
Important measures to reduce risk of pressure ulceration are mobilisation, good nutrition, appropriate skin care and appropriate use of mattresses and cushions. Given almost all hip fracture patients are at risk, should our position for the future be that all patients receive pressure sore interventions as part of their standard care?

**Fig. 23: Pressure care interventions for patients at risk**

![Pressure care interventions chart for patients at risk](image)

*Other interventions were pressure care boots, application of cream, and use of gel pads. A small number of patients who had a turning plan and/or a mattress intervention were also given these other interventions. Note that in some units the SSkin bundle was in use. Only interventions *actioned* from the bundle were recorded e.g. activation of a turning plan, mattress ordered and in situ.*

Mattresses which are suitable for patients with a Waterlow Score of up to 20 are in use routinely in some orthopaedic wards, so there may be little need for further pressure-relieving mattresses. This may explain why in some units (e.g. Forth Valley Royal, Inverclyde Royal) a turning plan alone or indeed no interventions are recorded.
Operative Management

Surgical or conservative management

Conservative management of hip fracture is rarely indicated. Very few patients were treated non-operatively, of whom 50% died in the orthopaedic unit (N=32, 2.3% compared to approximately 4% in previous SHFA audits). Hospital-specific data is available in Appendix Fig. 11.

Time to theatre

During 2006 to 2008 the Scottish Hip Fracture Audit recorded time to theatre for hip fracture patients as a HEAT target for the Scottish Government. The aim of this target was for 98% of patients to be operated on within 48 hours of admission to orthopaedic care, subject to two important caveats. Firstly, patients should not proceed to surgery unless medically fit for the operation. Secondly, the operation should not be undertaken outwith normal working hours (normally between 8 am and 8 pm, seven days a week) unless medically indicated. This target was met by the 2008 deadline date. In order to discourage surgery outside these times, the HEAT target used the term ‘24 hours of safe operating time’ (there being 12 normal or ‘safe’ working hours each day), rather than ‘48 hours’. This report follows the previous methodology, but we refer to the target as ‘48 hours’ to reduce confusion.

In the current audit, 9% of patients were not considered fit for surgery within 48 hours of admission to orthopaedic care (Fig. 24). This is similar to the 12% of operated patients who were not ready for surgery within 48 hours of admission in 2008.

Fig. 24: Percentage of patients treated surgically but documented as unfit for theatre within 48 hours of ward admission

Unfit for theatre as specified by surgeon/anaesthetist in patient casenotes

Considering all patients managed surgically including those who were initially medically unfit for immediate surgery, 13% went to theatre on the calendar day they were admitted, 53% on the day after they were admitted, and 21% two days post-admission (Fig. 25). Twelve percent of patients went to theatre more than two days post-admission, probably as a result of a continuing low level of fitness that prevented an earlier theatre date.
However, after excluding those patients who were medically unfit for theatre within 48 hours of admission, 92% of patients underwent surgery within 48 hours of admission (Fig. 26). This represents an overall 6% reduction from 98% in 2008, but varied considerably between units (Fig. 26). This disappointing increase in delay to theatre may have been exacerbated by increased pressures on trauma theatres as a result of seasonal or weather-related factors. However, units with longer delays are urged to inspect their data over a longer period, and, if such delays are typical, measures should be put in place to reduce them.

The term ‘48 hours’ is used in preference to ‘24 safe hours’ (as used in the 2008 Scottish Hip Fracture Audit report) as the 24 safe hours occur during a 48 hour elapsed time. ‘48 hours’ refers to 48 clock hours rather than two calendar days.

Note that the Y-axis scale on Fig. 26 runs from 60-100% because the 2008 target for this measure was 98% and all units should still be aiming for this target.
Lack of theatre access delayed surgery for 7% of patients classed as being medically fit for surgery (Fig. 27).

Fig. 27: Reasons for theatre delay if more than 48 hours

Patients who were medically unfit for theatre within 48 hours have been excluded.
Fasting and fluids

AAGBI guidelines suggest fasting for solids for a minimum of 6 hours prior to hip fracture surgery. In this audit, 79% of hip fracture patients fasted for solids in excess of 10 hours on the day of surgery (Fig. 28). Clear fluids should be permitted in all patients (unless contraindicated) until 2 hours prior to surgery. Such practice is routine in elective surgical cases. Twenty-one percent of patients had clear fluids withheld for 6-10 hours and 49% for in excess of 10 hours prior to surgery (Fig. 29). It should be noted that such fluid and fasting cycles may be repeated for consecutive days if delay to theatre is experienced.

Such practice is unfortunately often a consequence of the way in which trauma services are provided in Scotland. It is common for hip fracture patients to be fasted from midnight on the eve of planned surgery even when it is unlikely that the patient will attend theatre until late morning or even afternoon. Hip fracture patients commonly have multiple medical co-morbidities and 10% are considered unfit for theatre at initial anaesthetic assessment. This creates difficulty for orthopaedic surgeons when preparing trauma theatre lists as anaesthetic assessments are frequently undertaken on the morning of surgery rather than on the evening preceding.

Borders General Hospital, which has minimised fasting times for fluids, has done so by using the role of the theatre coordinator (who attends the daily trauma meetings) to predict theatre times for emergency patients and then to use this to give fasting instructions to the wards for each patient.

Fig. 28: Period of fasting prior to induction of anaesthetic

![Period of fasting prior to induction of anaesthetic](image)

Excludes patients treated conservatively.
Fasting defined as the period that the patient was not allowed to consume any solids or non-clear fluids, and pertains only to the day when surgery took place, i.e. not on occasions when patient was fasted in prep for surgery but later cancelled and listed for another date.

Fig. 29: When were clear oral fluids stopped prior to induction of anaesthetic?

![When were clear oral fluids stopped prior to induction of anaesthetic](image)

Excludes patients treated conservatively.
**Type of operation**

Five percent of patients underwent total hip arthroplasty for treatment of their hip fracture (an increase from 2% in the 2005 audit; Fig. 30).

**Fig. 30: Type of operation**

SIGN 111 and the NICE Guideline for the management of hip fractures in the elderly patient both recommend the use of cemented hemiarthroplasty designs. A wide variation in practice has been observed across the country with 70% of patients undergoing hemiarthroplasty with cemented implant designs (Fig. 31).

**Fig. 31: Hemiarthroplasty – use of cement**

All data on Fig. 31 based on at least 5 hemiarthroplasties in all units.
VTE prophylaxis and anaesthesia

Patients admitted to hospital after sustaining a hip fracture are at high risk for VTE and should be prescribed DVT prophylaxis unless contraindicated (SIGN 111). Much controversy exists regarding the most effective chemo-prophylactic agent for patients who sustain a hip fracture. Aspirin therapy alone was prescribed to only 3% of patients. LMWH either alone or in combination with mechanical or other chemo-prophylactic agent was used in 91% of cases (Fig. 32). Twenty-eight percent of patients had mechanical prophylaxis in this audit, compared to 43% when this was last measured across Scotland in 2005.

Fig. 32: VTE prophylactic treatment

Includes patients treated conservatively.
Twelve (1%) patients across Scotland were on Rivaroxaban, 53 (4%) on Warfarin, usually in combination with mechanical or other chemo-prophylactic agent. These are all included in the ‘Other combination’ category on Fig. 32. Also in the ‘other combination’ category were 32 (2%) patients on LMWH, Mechanical and Aspirin; 7 (1%) patients on Mechanical and Aspirin; and 12 (1%) patients on Mechanical VTE prophylaxis only.
A number of recent studies have found a modest association between regional anaesthesia and a reduction in early mortality and early post-operative confusion. However, the quality of the studies reporting mortality is often poor, and, to date, there is insufficient evidence to suggest superiority of one technique over another (see [http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2044.2012.07120.x/full](http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2044.2012.07120.x/full) for further discussion).

Spinal anaesthesia remains the most common form of anaesthesia for hip fracture patients (53%; Fig. 33). Forty-one percent of patients underwent general anaesthesia (with or without nerve block). Significant variation exists across the country with respect to anaesthetic technique used for hip fracture patients. Forty-two patients were given LIAs, 50% in combination with a spinal, 40% with a GA, and the remainder with combinations including failed spinals or blocks.

**Fig. 33: Type of anaesthetic**

In addition to anaesthetics listed on Fig. 33, intrathecal opioids were used in some units. Overall, 10% of all patients (21% of all spinal patients) also received intrathecal opioids. ‘Others’ are GAs in combination with a spinal but not as a result of a failed spinal (N=9 patients), and combinations including epidurals (N=3).

**Dementia and ‘Adults with Incapacity’**

The use of the ‘Adults with Incapacity’ form was fairly consistent across units with 37% of patients overall being considered as unable to give informed consent (see also Appendix Fig. 12). It should be noted that the formal assessment of cognitive capacity varied greatly across the country from 6% to 100% (see Fig. 14).

Thirty percent of surgical patients were diagnosed as having dementia (no significant difference in rate of dementia between hospitals). Treatment for 93% of those with dementia was authorised using Adults with Incapacity compared to 13% of those who did not have dementia.
SIGN 111 states that “In general, urinary catheterisation should be avoided, except in the following specific circumstances: urinary incontinence; on a long journey where there is concern about urinary retention; and when monitoring renal/cardiac function”. Pre-operative catheterisation rates varied widely across Scotland from under 10% to 70% (Fig. 34). It is practise in some units to perform catheterisation routinely, particularly when a spinal/epidural anaesthetic is administered.

**Fig. 34: Catheterisation**

Data is for surgical patients only. Data given is for first catheterisation (a small number of patients were catheterised more than once). Patients with long-term catheters in situ were excluded.

Units should be encouraged to examine their departmental policies with regard to ‘routine’ catheterisation.
Transfusion

Anaemia is an independent risk factor for post-operative poor outcomes such as rehabilitation (Foss 2008, Age Ageing), although this may not be reversed by transfusion. Additionally a recent study indicated that a restrictive transfusion regimen in hip fracture patients, with a transfusion trigger of Hb 80g/l, might not increase complication rates or mortality (FOCUS trial, NEJM, 2011).

Transfusion levels are fairly consistent across units both pre- and post-operatively (Fig. 35). Overall 33% of patients received a blood transfusion during their hospital admission.

Fig. 35: Transfusion

Data is for surgical patients only. For the approximately 2% of patients transfused more than once, the data given is for the first transfusion.
**Post-operation**

**Physiotherapy and mobilisation**

Early mobilisation may prevent complications such as pressure ulceration and deep vein thrombosis. Early mobilisation in combination with post-operative physiotherapy may be of value in reducing pulmonary complications. If the patient’s overall medical condition allows, mobilisation and multidisciplinary rehabilitation should begin within 24 hours post-operatively. Fifty-eight percent of patients were mobilised on the first post-operative day and 83% by the second post-operative day (Fig. 37).

**Fig. 36: Time from surgery until seen by physio**

Excludes patients treated conservatively

* Patient may not have been seen by physio if they died in orthopaedic care or occasionally when they were transferred to rehab or another specialty, or were chair/bed-bound.

In some sites, physiotherapists routinely visited the patient soon after operation but did not attempt to mobilise them due to clinical reasons, accounting for some of the differences between Figs. 36 and 37.

**Fig. 37: Mobilisation**

Excludes patients treated conservatively.

* Not mobilised as either bed-bound, discharged from orthopaedics before mobilisation, or died before mobilisation.
Across Scotland approximately 30% of patients were mobilised initially by nursing staff and 70% by physiotherapy staff (Fig. 38).

**Fig. 38: Who mobilised?**

- Excludes patients treated conservatively.

### Discharge planning

The timing of discharge planning varies widely across the country (Fig. 39). In this audit earlier discharge planning did not appear to lead to a shorter length of stay, even if analyses were restricted to patients discharged straight home, or straight to rehabilitation. Indeed, for patients discharged to rehabilitation, units that started discharge planning later on average had shorter lengths of stay. However, the process of discharge planning should ideally commence as soon as the patient is admitted to the orthopaedic ward. Many hip fracture patients will require interventions such as social work assessment and although recovery after surgery can be unpredictable, predictable referrals (e.g. to social work) should begin as soon as is practically possible.

Almost all hospitals had an MDT approach to discharge planning for all patients with two exceptions where up to 25% of patients did not have an MDT approach.

**Fig 39: Days from operation to start of discharge planning**

* There may have been no discharge planning if patient died in orthopaedic care or needed transfer to another acute ward.
OT Input

Across Scotland at least 50% of patients were seen by an OT whilst in orthopaedic care. In addition to variation between units (Fig. 40), OT input was also influenced by patients’ onwards discharge destinations: 95% of patients discharged home were seen by OT whilst in orthopaedic care compared to 48% of those discharged to rehab, and only 21% of those discharged to a care home. It is likely that OT input will begin or continue in the rehabilitation settings and inform ongoing discharge processes. Whilst some units provided little or no OT input in the orthopaedic setting to patients subsequently for discharge directly to a care home, others provided such OT input to all their care home patients. This situation has changed little since 2008 and may just reflect the judgements of the MDT that some nursing home patients have limited rehabilitation potential or would be better managed in their familiar care home environment.

Fig. 40: Time from surgery until seen by OT

Excludes patients treated conservatively.

The ‘Data unavailable’ category includes patients who may have been seen by OT but nothing has been indicated in the ICP documents. It is known that in some units OT also keep their own documentation and on occasion it proved difficult for the LACs to gain access to this data.
Geriatrician input

Collaboration between orthopaedic surgeons, physicians in geriatric medicine and other members of the multidisciplinary team should be sought to assist in medical management and rehabilitation. The benefits of shared post-operative management by orthopaedic surgeons and geriatricians include earlier functional independence, reduced length of stay, improved management of medical conditions and decreased future need for institutional care, including nursing home care.

The provision of geriatric services to hip fracture patients is both variable and in some hospitals scarce when compared to other units (Fig. 41). Only 47% of patients who were 65 years old or over received routine geriatric assessment with a further 11% receiving an ad hoc service (Fig. 42). Forty-one percent of patients received no form of geriatric assessment. Only about half of patients underwent geriatric review within a week of surgery. One of the criteria which must be fulfilled as part of the English ‘Best Practice Tariff’ is that the patient is reviewed by a geriatrician within 72 hours of admission. No more than 29% of Scottish hip fracture patients aged 65 or more were seen by a geriatrician within 72 hours of admission. Forty-two per cent of patients discharged straight home were seen by a geriatrician whilst in orthopaedic care, as were 41% of those discharged straight to a care home (cf 30% and 35% in the 2008 audit). For patients discharged to rehabilitation, some units operate a protocolised transfer to rehabilitation units and so patients may well have been discussed with a geriatrician without a documented formal review. This may account for some of the ‘not seen’ group in Fig. 41 and explains why there are discrepancies between Figs. 41 and 42 (e.g. routine geriatrician review does not seem reflected in timing of patient review for some hospitals). The previous 2008 audit also acknowledged that transfer to a rehabilitation unit does not always ensure geriatrician review as some facilities receive medical input from other medical staff (e.g. General Practitioners).

Fig. 41: Time until seen by geriatrician

Excludes patients under 65 years old.
If patient treated conservatively, time given from date of admission.
Within the Victoria Hospital, Glasgow there was Monday- Friday input into ortho from the Care of the Elderly team, but it was difficult to determine the exact timing of this input. There is also a protocol for transfer to rehabilitation day 5 without need for formal geriatrician review.
During the data collection period there was a vacancy within the Care of the Elderly team at Raigmore Hospital which may have impacted on the input into orthopaedics.
Bone Protection

Osteoporosis risk assessment and treatment is integral to the prevention of further fractures alongside falls prevention strategies. Fracture begets fracture: a previous fracture almost doubles the risk of a subsequent fracture with the greatest risk occurring in the first year following the incident fracture (British Orthopaedic Association, British Geriatrics Society 2007 The care of patients with fragility fracture). There is extensive evidence showing the effectiveness of bisphosphonate and other osteoporosis treatments demonstrating up to a 50% relative risk reduction in fracture risk (NICE 2011, Alendronate, Etidronate, Risedronate, Raloxifene, Strontium and Teriparatide for the secondary prevention of osteoporotic fractures in post menopausal women). Hence admission with hip fracture offers a prime opportunity to assess and instigate osteoporosis medication as appropriate. Some units have a Fracture Liaison Service in operation which has been recognised internationally as an effective model of delivering care (McLellan 2003, Osteoporos Int 14: 1028-34).

Fig. 43: Bone protection medication assessment

Some patients on pre-admission medications may have been given additional or alternative medications as an inpatient. Patients ‘awaiting a DXA scan or outpatient assessment’ on Fig. 43 were not otherwise on bone protection medications. A further 3% of patients booked for a post-discharge DXA scan or outpatient assessment were already on pre-admission or inpatient bone protection medications.

The role of an osteoporosis nurse at some sites (e.g. RAH) includes screening, often resulting in patients being sent for a post-discharge DXA scan or outpatient assessment and their GP being informed of their suitability for bone health medication prescription.
However, some units have deliberate policies of deferring treatment until after bone densitometry assessment or outpatient fracture liaison review. Hence more patients may ultimately receive medications than the numbers reflected in Fig. 44. A proportion of patients received only calcium and vitamin D. There is now good evidence that intravenous bisphosphonates reduce the risk of hip fracture (Lyles 2007, NEJM 357: 1799-1809). This therapy is likely to be delivered after hospital discharge but relies on organised services to do so. The number of units able to offer this service is unknown.

Fig. 44: Medications for bone health during inpatient stay (includes both continuing previous and new medications)

Other medications were Prolia and strontium.
Length of stay and discharge destination

The median length of stay in acute orthopaedic care in 2012/13 for patients who were discharged to their own homes was 12 days, 8 days if discharged to a care home and 11 days if discharged to rehab. There has been little change since 2008, when median lengths of stay in acute orthopaedic care were 12.5 days if discharged home, 8 days to a care home and 10 days to rehab.

Median length of orthopaedic stay also varied considerably between units (Fig. 45). This is likely to be a consequence of downstream access to rehabilitation beds and may also reflect discharge planning processes to home or care home settings. Many units now set ‘estimated discharge dates’ at an early stage of the patient stay and work towards this target. Early supported discharge teams are often utilised to enable timely discharge home.

Fig. 45: Median length of acute orthopaedic stay by discharge destination

Large symbols based on samples of more than 5 patients, small symbols 3-5 patients, samples of 1-2 not plotted. Medians reflect normal practise and compared to mean values are less likely to be influenced by a small number of patients with lengthy admissions as a result of medical problems.
Only 27% of patients admitted after sustaining a hip fracture were discharged to their own home/sheltered housing (Fig. 46). Seventy-three percent were admitted from their own/sheltered housing at the time of fracture which highlights the significant effect this injury has on independent living in the short term. Forty-six percent were discharged to a rehabilitation ward, 15% were discharged to a nursing home and 6% to NHS continuing care or an acute ward. This has changed little since 2008. The majority of patients require further hospital care following the acute orthopaedic admission, highlighting the importance of early and appropriate discharge planning to prevent unnecessary delays.

Fig. 46: Discharge destination post-orthopaedic care

Discharge destination was 'Acute hospital' if the patient had to be transferred to another ward within the unit of treatment or to another hospital for care by another speciality. Due to the geographical area covered by NHS Highland, some patients are transferred to a hospital nearer to home. If the transfer is not to a formal rehab bed, then the discharge destination has been recorded as 'Acute hospital'. This pertains to Caithness General, Belford Hospital and Lawson Memorial Hospital amongst others.
Fig. 47: Frequency and reasons for delay to discharge

Excludes patients who died whilst in orthopaedic care.
The main reasons for ‘Admin delays’ are lack of available beds in the next receiving unit, lack of transport available, or care packages not in place by date of discharge.
Delays recorded against post-operative stays of less than a week (post-admission if treated conservatively) were not included on Fig. 47.
Patients with a combination of clinical reasons for delay plus social or administrative reasons have all been included as clinical reasons for discharge delay.

Some units apply a ‘blanket’ Estimated Date of Discharge (EDD) to all hip fracture patients. This makes it very difficult to determine the true proportion of patients that are actually delayed discharges due to clinical reasons – what may well be feasible for the ‘average’ hip fracture patient cannot be expected for another with multiple co-morbidities and complex care needs.

Patient outcomes

In addition to the data presented in this report, the MSk Audit Local Audit Co-ordinators in each unit contacted the patient or their carers four months (120 days) post-admission to gather data on patient recovery. Some patients had died or could not be contacted. For those contacted we established residence locations during these four months, changes in dependence and mobility, re-admission rates, pain at four months, further falls and fractures, and bone protection medication. We intend to analyse and distribute these data to hospitals in a supplementary report in autumn 2013.
Appendix

Appendix Fig. 1: Age of hip fracture patients

Appendix Fig. 2: Pre-fracture residence

Appendix Fig. 3: Pre-fracture walking ability indoors
Appendix Fig. 4: Medical history – number of previous co-morbidities

This information was found in the patients’ medical clerking, pre-assessment or anaesthetic assessment sheets irrespective of time since diagnosis. Co-morbidities were recorded in a number of groups (e.g. IDDM, ischaemic heart disease, CVA/TIA, pulmonary embolism, LVF/CCF, COPD, inflammatory joint disease, malignancy and chronic kidney disease). Other previous illnesses were listed and vetted centrally by the clinical co-ordinator, and added to the number of previous co-morbidities if regarded as serious.

Appendix Fig. 5: ASA grades of patients treated surgically

Appendix Fig. 6: Time of fracture recorded
Appendix Fig. 7: Time from fracture until arrival in ED

Fig. 7 only shows hospitals that recorded at least 50% of all fracture times.

Appendix Fig. 8: Patients suitable for fast-tracking

Fast-tracking policies:
Fife, Elgin and RIE have no policy in place. The rest are set at 2 hours except RAH that has no time limit and DGRI that has a 1 hour limit.

Appendix Fig. 9: Senior grade seeing patient in ED

Any specialty included. Senior orthopaedics were seldom involved in ED: only nine consultants, five staff grades and two associate specialist/GPWSI were recorded.
Appendix Fig. 10: Documented difference in time between ED departure and ward arrival

Excludes patients who were not admitted directly from ED to a ward.

Appendix Fig. 11: Percentage of patients managed conservatively

Appendix Fig. 12: Adults with Incapacity

Excludes patients treated conservatively.