Emergency hospital admissions and timely surgery: fractured proximal femur

Purpose:

The purpose of the indicator is to help monitor National Health Service (NHS) success in prevention and treatment of fractured proximal femur. This is a serious condition causing pain and immobility, requiring hospitalisation. Mortality is high, with approximately one in five patients with the fracture being dead within one year. Some fractures are potentially preventable through interventions aimed either at whole populations (e.g. reducing smoking rates, promoting better nutrition and higher levels of physical activity) or at people at risk of having a fracture. The latter include timely identification of those at risk (e.g. those with osteoporosis, likelihood of having an accident) and management of risk e.g. medication, home safety, mobility aids, padded clothing etc.

Observational studies of surgical outcomes associated with fractured proximal femur have suggested that where there is a significant delay from admission to surgery, there is an increased risk of morbidity, complications, and poor rehabilitation. Guidelines from the Royal College of Physicians have specified that operations for fractured proximal femur should normally occur within 24 hours of admission. However, it is acknowledged that delayed surgery may be more a reflection of patients with other medical conditions making them unfit for surgery than of inadequate management. Whatever the reason for delayed surgery, it is a proxy for poorer outcomes.

The NHS may be helped to learn lessons from organisations with lower rates of hospitalisation and higher rates of timely surgery following fractured proximal femur.

Definition of indicator and its variants:

(i) Emergency admissions to hospital of persons with fractured proximal femur.

(ii) Relevant surgery within the first two days following emergency admissions to hospital of persons with fractured proximal femur.

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<td>Indirectly age and sex-standardised rate per 100,000 (standardised to 2007/08)</td>
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| Indirectly age and sex-standardised percent (standardised to 2007/08) | P    | F         | All Ages     | FY 2011/12 | FY 2002/03 | 32A_020ISP7DP_12_V1         |
|                                                                     | F    | M         | E; Region; ONS area (boundaries as at April 2009); SHA (boundaries as at July 2006); County; LA (boundaries as at April 2009); PCO (boundaries as at April 2011) | FY 2011/12 | FY 2003/04 | 32A_020ISP7DF_12_V1 |
|                                                                     |     |           |              | FY 2004/05 | FY 2005/06 | 32A_020ISP7DM_12_V1         |
|                                                                     |     |           |              | FY 2006/07 | FY 2007/08 |                             |
|                                                                     |     |           |              | FY 2008/09 | FY 2009/10 |                             |
|                                                                     |     |           |              | FY 2010/11 |              |                             |

Numerator:

Numerator data – (i) The number of finished and unfinished continuous inpatient (CIP) spells, excluding transfers, for patients of all ages with an emergency method of admission and with any of the following primary diagnoses (DIAG_01 in the 1st episode of the spell, ICD 10 codes) in the respective financial year:

Fractured proximal femur
S72.0 Fracture of neck of femur;
S72.1 Pertrochanteric fracture;
S72.2 Subtrochanteric fracture.

The following fields and values are used for the numerator:

The first episode in the CIP spell has:
- DIAG_01 in the valid list for this indicator (primary diagnosis);
- ADMISORC not = 51, 52 or 53 (admission source);
- EPITYPE = 1 (episode type);
- SEX = 1 or 2 (sex);
- EPIORDER = 1 (episode order);
- ADMIMETH = 21, 22, 23, 24 or 28 (admission method);
- EPISTART is >= 01/04/YYYY and EPISTART <= 31/03/YYYY+1 (episode start date within year);
- CLASSPAT = 1 (patient classification);
- STARTAGE is 0-120 or 7001-7007 (age at start of episode);
- DOB not 01/01/1900 or 01/01/1901 (date of birth).

Fields used from the first episode in a spell where there is a valid patient postcode allowing the derivation of the following organisation of residence codes include:
- SPELLRESPCTC, SPELLRESLADSTC, SPELLRESSTHAC. Other organisational levels (E, Region, ONS Areas, Counties) are aggregates of the SPELLRESLADSTC field.

Counts are by:
- age / sex / organisation of residence in CIP spell (values for England are aggregates of these)

where:
- age bands <1, 1-4, 5-9, … , 80-84, 85+;
- sex is 1, 2 (male and female).

Numerator data – (ii) The number of continuous inpatient spells (CIPS) selected for the numerator of (i), where the patient undergoes relevant surgery between 0-1 days (inclusive) of the date of admission in the respective financial year (OPCS 4 codes found in any of the operation fields in any episode in a CIP spell).

- W19.1 Primary open reduction of fracture of neck of femur and open fixation using pin and plate;
- W24.1 Closed reduction of intracapsular fracture of neck of femur and fixation using nail or screw;
- W19.2+Z76.2 Primary open reduction of fracture of long bone and fixation using rigid nail NEC + Neck of femur;
- W19.3+Z76.2 Primary open reduction of fracture of long bone and fixation using flexible nail + Neck of femur;
- W24.2+Z76.2 Closed reduction of fracture of long bone and rigid internal fixation NEC + Neck of femur;
- W19.2+Z76.3 Primary open reduction of fracture of long bone and fixation using rigid nail + Trochanter of femur;
- W19.3+Z76.3 Primary open reduction of fracture of long bone and fixation using flexible nail + Trochanter of femur;
- W24.2+Z76.3 Closed reduction of fracture of long bone and rigid internal fixation NEC + Trochanter of femur;
- W37.1 Primary total prosthetic replacement of hip joint using cement;
- W38.1 Primary total prosthetic replacement of hip joint not using cement;
- W39.1 Primary total prosthetic replacement of hip joint NEC;
- W46.1 Primary prosthetic replacement of head of femur using cement;
- W46.2 Conversion to prosthetic replacement of head of femur using cement;
- W47.1 Primary prosthetic replacement of head of femur not using cement;
- W47.2 Conversion to prosthetic replacement of head of femur not using cement;
- W48.1 Primary prosthetic replacement of head of femur nec;
- W48.2 Conversion to prosthetic replacement of head of femur NEC;
- W93.1 Primary hybrid prosthetic replacement of hip joint using cemented acetabular component;
W94.1 Primary hybrid prosthetic replacement of hip joint using cemented femoral component;
W95.1 Primary hybrid prosthetic replacement of hip joint using cement NEC;

The date of the first eligible procedure in any operation field, and the episode start date from the first episode in a CIP spell, are used to determine the interval between admission and the operation. Where the operation date is missing or invalid, it is assumed that the procedure takes place one day after the start of the episode containing the procedure. If the episode start date is not valid then it is assumed the procedure took place one day after the admission date of the spell. If this is still not valid, then the date is left blank. If the procedure date is before the start of the CIP spell, then the spell is not included in the numerator.

Source of numerator data - (i) and (ii) Hospital Episode Statistics (HES) for CIP spells intersecting the respective financial year. England, Health and Social Care Information Centre (HSCIC).

Comments on numerator data - It is important, for the purposes of measuring incidence, to count persons as opposed to episodes of care, as each person with the condition should only be counted once during each admission. This is done by counting CIP spells (epiorder 1) only. Some transfers which are also coded epiorder 1 and emergency could lead to double counting. In order to avoid this, spells which have an admisorc of 51-53, indicating a transfer from another NHS Trust, are excluded.

Deaths in the community prior to admission are not included, nor are patients who get treated in the community, as data about them are not available.

Emergency method of admission and primary diagnosis are used to distinguish between new fractures and either readmission for the same problem previously treated in hospital or a fracture occurring in hospital. However, there could be double counting if the readmission is coded as an emergency and has the same primary diagnosis.

Spells are attributed to the organisation of residence, based on the numerator.

There is variation in the completeness of hospital records and quality of coding (see Data Quality sections in Annex 4 (Additional reading > Statistical methods > Methods section of the HSCIC Indicator Portal http://indicators.ic.nhs.uk) for details). These show the proportion of diagnoses not coded. There may be variation between hospitals in the way that they code diagnoses to the fourteen diagnosis fields in each episode, particularly primary diagnosis. For instance, they may code in the order in which diagnoses were made, or according to the perceived importance or complexity. This may affect whether a particular spell is selected for inclusion in the numerator of this indicator.

Individual spells may contain more than one eligible procedure but are only counted once. Alternatively, a single person may have a second eligible spell (for a second fracture) within the same year. Separate spells for an individual during the same year are counted separately in the numerators.

Denominator:

Denominator data – (i) The denominator is the resident population for the respective organisation.

Data are based on the latest revisions of ONS mid-year population estimates for the respective years.

For further details on revisions to ONS mid-year population estimates, and their availability, see the comments in the specification for the ‘Estimates of resident population’ indicator.

Counts are by:
- age / sex / organisation of residence (values for England are aggregates of these)
where:
- age bands are <1, 1-4, 5-9, … , 80-84, 85+;
- sex is 1, 2 (male and female).
Denominator data – (ii) The denominator is the numerator for indicator (i).

Source of denominator data – (i) Office for National Statistics.

(ii) Hospital Episode Statistics (HES) for the respective financial year, England, Health and Social Care Information Centre (HSCIC).

Comments on denominator data – see comments on the numerator for indicator (i).

Statistical Methods:

The indicator is indirectly standardised by age and sex. The person-based rate is standardised by age and sex using England age and sex rates as standards. The gender-specific rates are standardised by age using person-based standards, in order to highlight differences across gender. Indirect standardisation involves the calculation of the ratio of an organisation’s observed number of events and the number of events that would be expected if it had experienced the same event rates as those of patients in England, given the mix of age and sex of its patients. This standardised ratio is then converted into a rate by multiplying it by the overall event rate of patients in England.

The percentage change in admission rate (i), or timely procedure rate (ii), from a previous year plus the statistical significance of these changes, have also been calculated. For both indicators a positive percentage represents improvement and a negative percentage represents deterioration.


Data on the NHS version of the Indicator Portal are unsuppressed and may potentially identify an individual. There are strict terms and conditions of use for unsuppressed data.

Data on the Public version of the Indicator Portal have had any required suppression applied: data that may potentially identify an individual have been removed (in cells marked by X). Further information is available in the “Statistical methods and disclosure control” section of the website.

Interpretation of indicator:

Type of indicator - This is a condition-specific, cross-sectional annual comparative indicator, acting as a proxy for outcome. In the absence of an absolute standard, comparative data are useful for monitoring in relation to rates achieved in comparable organisations.

Quality of Indicator – Annex 12 (Additional reading > Statistical methods > Methods section of the HSCIC Indicator Portal http://indicators.ic.nhs.uk) describes the criteria that should be used to judge the quality of this indicator. The application of the criteria is dependent on the context (e.g. describing a single organisation, comparing several organisations) and the level (e.g. national / regional with large numbers of events, local with small numbers of events) at which the data are to be used.

Confidence Intervals - Some of the values and factors influencing the indicator may be chance occurrences, with values fluctuating at random between organisations and from year to year. Numbers of admissions may be small at Primary Care Organisation and Local Authority level. The results should therefore be interpreted with caution and with the aid of confidence intervals. The 95% confidence interval provides a measure of the statistical precision of the rate for an area or institution. It indicates a range which, with 95% confidence, will contain the underlying value of the indicator. If the confidence interval for an area’s rate does not contain the overall national rate, the difference between the two rates is considered statistically significant. If the confidence interval overlaps the national rate, in most cases the difference between the rates would not be considered statistically significant. 95% and 99.8% confidence intervals have been calculated.

Effect of case-mix/severity - A number of factors outside the control of hospitals, such as the socio-economic mix of local populations and events prior to hospitalisation, may determine whether a patient gets admitted or not and may influence rates. Differences in case-mix (beyond that accounted for by standardisation), concurrent illnesses and other potential risk factors also contribute to the variation. Current data do not allow assignment of severity of illness across continuous inpatient spells, nor do they allow adjustment for any of these factors. We have tried to deal with this constraint partially by presenting the data in clusters that are similar with respect to organisation type. Gender specific data standardised to person rates are available.
Other potential confounding factors - The patterns of providing care may vary between organisations in terms of:
extent of treatment in primary care settings; referral policies and practices; hospital outpatient facilities/walk-in clinics;
and hospital inpatient admission policies and practices.

Potential value of indicator:
To stimulate discussion and encourage local investigation, and to lead to improvement in data quality and quality of
care.

Potential for follow-up action leading to change:
Studies to assess the extent to which admissions were potentially avoidable are recommended.

Relevant national initiatives:
These indicators were recommended as part of a feasibility study of population health outcome indicators undertaken
for the Department of Health by the Faculty of Public Health Medicine, as well as by a working group on health
outcomes of fractured proximal femur, set up by the Department of Health. The National Service Framework for Older
People contains standards and guidelines for the prevention and treatment of fractured proximal femur.

Further reading
Faculty of Public Health Medicine, 1993.
6. Royal College of Physicians. Fractured neck of femur: prevention and management. Royal College of
associated with operative delay in older patients who have a fracture of the hip. Journal of Bone and Joint

Updated: September 2013