Helen Ridley, Programme Lead,
North East & North Cumbria Academic Health Science Network
### 4.14i - Hip fractures in people aged 65 and over (Persons) 2014/15

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**Source:** Hospital Episode Statistics (HES), Health and Social Care Information Centre for the respective financial year, England.
2014/15
AHSN Single Sponsored Project
Hadrian Primary Care Alliance
(West Northumberland)

2015/16
AHSN Patient Safety Collaborative Project
Multiple Sites – Population Benefit
Osteoporosis “porous bone”

- Bone loss outpaces growth of new bone
- The risk of fracture is greatly increased
- Occurs silently and progressively
- No symptoms until the first fracture

Osteoporotic fracture

- Hip, spine and wrist
- 1 in 3 women and 1 in 5 men
- Estimated to occur every 3 seconds
Hip fracture (data taken from 2015 National Report of Hip Fracture Database)

- Around 65,000 hip fractures occur each year in the UK
- Account for ~4000 in patient beds DAILY
- Commonest cause of injury-related death – 30 day mortality rate 8.2%
- Loss of independence – 46% patients return home within 30 days
- Loss of mobility - 50% of patients with hip fracture suffer permanent disability (only 30% fully recover)
- Care costs exceed £2 billion a year (excluding social care costs)
Improving Bone Health
Academic Health Science Network
Patient Safety Collaborative
Interface Clinical Services – Toolbox

1. CaD3 Therapy Review
   Identification and review of patients at risk of CaD3 deficiency

2. Attend2: Fracture Risk Assessment Tool
   Proactive identification of patients at risk of osteoporotic fracture – underpinned by FRAX

3. BSA: Current Prescribing
   Review of patients currently receiving BSA to support safe and effective preventative therapy (potential future engagement)
Guidelines followed to identify at risks groups were

- SIGN guideline (56)
- NICE Guidelines (160 and 161) (2011)
- RCP Guideline
- NOGG Guideline (2010)

To reduce morbidity and mortality associated with fragility fractures
Project Aim (identification)

To reduce morbidity and mortality associated with fragility fractures

- Identification and intervention within high risk groups
  - Osteoporosis
  - Patients receiving bone sparing drugs
  - Frail elderly housebound
  - Receiving steroid treatment
  - Previous fragility fracture patients
  - Sub-optimal compliance with treatment
  - Receiving sub-optimal treatment
Clinical Audit Process

To reduce morbidity and mortality associated with fragility fractures

- **Audit**
  - Practice audit
  - Case finding
  - Identify gaps in care

- **Review**
  - Clinical review
  - Medicines optimisation & therapy intervention

- **Report**
  - Individual dashboards
  - Group/federation dashboards

- **Re-audit**
  - Re-audit & review
  - Peer education (primary & secondary care)
Project Delivery and Findings

- Initial Pilot in Hadrian Primary Care Alliance – 2014
- Now accessed by 55 GP practices across the North East and Cumbria (total registered population of 386,553)

Key Findings

- Patients within deficiency risk groups (baselines): 62,253
- Total Patients Reviewed: 22,433
- Therapy interventions (may include, initiation, change, information and compliance advice): 7,209
Audit Exclusion Summary

- Contraindicated as per audit protocol: 665
- Acute / severe renal disease (CKD 4/5): 271
- Palliative care: 301
- Clinically unsuitable: 812
- Allergy / intolerance: 685
- For practice consideration: 517
- Excluded at prescribers request: 524
- Not meeting audit criteria: 530
- Other: 1991
Studies have shown compliance with CaD3 to be as little as 40% at 1 year.

Within the practices reviewed - 2,251 Patients were found to be non-compliant with CaD3.

The support pharmacist contacted 72% of non-compliant patients through a variety of means.
Compliance with CaD3 – Patient Reported

INTERVENTIONS

- 47% Education Support Provided
- 40% Therapy Ceased
- 9% Change of Brand/Prep
- 2% Change of Flavour
- 2% Other

Data Taken From HPCA – Audit
Osteoporosis QOF

- **409** The combined number of patients included within the Osteoporosis QOF Registers (Ave 7.5 patients per practice)
- **2249** The number of patients identified for Osteoporosis QOF register Inclusion (Ave 41 patients per practice)
- **9** The number of points allocated to the Osteoporosis QOF
- **£170** The average additional income realised per patient added to the osteoporosis register
To Support the Review and Implementation of NICE Clinical Guideline 146 (CG 146)

**Project Aim**

- **Proactive risk assessment:** Fracture risk assessment of all patients recommended within NICE clinical guideline 146 using a validated algorithm (FRAX)
- Support primary care to deliver systematic quality improvement
  - Therapy Naïve Patients: Identification of patients at risk of fragility fracture currently without preventative management
  - Embed guidelines in standard care
- Transfer learnings across to other AHSN programmes
To Support the Review and Implementation of NICE Clinical Guideline 146 (CG 146)

Project Rationale

- High level of unmet need within primary care
  - CG146 not embedded within clinical practice despite fracture risk tools being available for use (evidenced from pilot work)
- Disconnect between QOF “fragility fracture” data and actual coded low trauma fractures despite this being incentivised within QOF
  - NICE suggest that 300,000 people present to UK hospitals with fragility fracture annually despite less than 50,000 people being on the osteoporosis QOF register (HSCIC data 2014/15)
Clinical Audit Process

To Support the Review and Implementation of NICE Clinical Guideline 146 (CG 146)

**Stratify**
- Stratification and collation to inform Attend2: Fracture tool

**Present**
- Dashboard results
- Key audit cohorts for review
- Identify practice capacity for work streams
- Agree priority cohorts

**Action**
- Invite patients for bone health assessments
- Recommend bone sparing therapies
- Recommend DXA referral

**Facilitate**

Attend2: Fracture Risk Assessment Tool
Attend2: Fracture - Process

1. Remote services team log into practice clinical system

2. Interrogation of practice clinical system (Emis, TPPSystm1)

- Extraction of cohorts as per NICE CG146 and all RAW clinical data
- Extraction of age banded Baseline Data (comparison)

3. Creation of baseline data (CRF and clinical markers)

   - Analysis of clinical risk factors (CRF)
   - Validation of Cohorts as per NICE CG 146

4. Final creation of Attend2 Fracture clinical tool with clinician validation by remote services pharmacist

   - Conversion of data to FRAX format for upload
   - Manual upload to FRAX multi-patient
   - FRAX results output from FRAX multi-patient tool
   - Upload & integration of FRAX results into ICS Attend2 Fracture tool
   - Output FRAX format file .csv

5. Report delivered to practice

*Step 1 requires 10-15 mins of practice time to log remote services technician onto clinical system
Case for change

- NICE clinical guideline CG146: assessing the risk of fragility fracture
  - Consider assessment of fracture risk in:

  1. All women aged 65 years and over and all men aged 75 years and over

  2. Women aged under 65 years and men aged under 75 years in the presence of clinical risk factors (CRF):
     - Previous fracture
     - Oral corticosteroids
     - Low BMI
     - Family history of hip fracture
     - Secondary causes osteoporosis
     - Smoking
     - History of falls
     - Alcohol intake

  3. People aged under 50 years if they have major risk factors:
     - Previous fracture
     - Untreated premature menopause
     - Oral corticosteroids
Attend2: Fracture – Risk Assessment Tool

- Interface have developed a clinical tool to systematically stratify a practice population according to fracture risk:
  - A suite of queries incorporating FRAX CRFs as well as additional CRFs
  - Development support and collaboration from FRAX – University of Sheffield
  - Evidence based cohorts that can be tailored to organisational priority and clinical need
  - An interactive decision support tool allowing clinicians to make appropriate clinical decisions in line with best practice and guidelines

- Patients at high risk of major osteoporotic fracture without documented investigation or intervention
- Patients with a history of fracture and increased risk of major osteoporotic fracture without documented investigation or intervention
- Patients with no prior fracture but with an increased risk of major osteoporotic fracture without documented investigation or intervention
- Patients with a low risk of major osteoporotic fracture currently receiving bone sparing therapy
Attend2: Fracture - Engagement

- Fracture risk stratification undertaken across a GP practice footprint of over 250,000 patients across 3 clinical commissioning groups
  - Sunderland (Washington federation)
  - Durham Dales (Durham CIC federation)
  - Cumbria (1st Care Cumbria)
- Stratification and fracture risk assessment of 101,147 patients (40% of registered population):
  - Durham federation project screened 93% federation population and performed fracture risk assessment on 60%
- Interface have stratified:
  - all females over 65, all males over 75 (n = 32,992)
  - All females 50-65 and males 50-75 with ≥1 clinical risk factor (n = 60,726)
  - All males and females <50 with major clinical risk factor (n = 7,429)
Executive summary from fracture risk assessment of 101,147 patients:

- Based on risk assessment (according to NOGG):
  - 2,922 (3%) recommended for treatment HOWEVER:
    - 1,021 already coded with DXA scan (35%)
    - 647 already on bone sparing therapy (22%)
  - 33,697 (36%) recommended for consideration for DXA scan:
    - 4,700 (14%) already coded with DXA scan
- If NOGG guidelines and FRAX CG 146 were to be fully implemented a high number of patients would be recommended for further intervention
- Key for project > focus on MANAGEABLE COHORTS!!
Attend2: Fracture – Project Findings

Analysis of osteoporosis and hip fracture prevalence with respect to number of identified clinical risk factors (n = 101,147):

- Number of patients:
  - 0 risk factors: 44,416 (2%)
  - 1 risk factor: 38,670 (5%)
  - 2 risk factors: 14,344 (8%)
  - 3 risk factors: 3,187 (13%)
  - 4 risk factors: 486 (6%)
  - 5 or more risk factors: 44 (9%)

- Prevalence of osteoporosis and hip fracture:
  - Osteoporosis prevalence:
    - 0 risk factors: 0%
    - 1 risk factor: 2%
    - 2 risk factors: 4%
    - 3 risk factors: 8%
    - 4 risk factors: 13%
    - 5 or more risk factors: 22%
  - Hip fracture prevalence:
    - 0 risk factors: 0%
    - 1 risk factor: 25%
    - 2 risk factors: 9%
    - 3 risk factors: 6%
    - 4 risk factors: 4%
    - 5 or more risk factors: 5%
Hip fracture in 1\textsuperscript{st} degree relative

- Classified as a “strong” risk factor for major osteoporotic fracture (Similar to that of prior fragility fracture!)

- Prevalence across 101,147 assessed = 0.2% (n=241)

- 49% recommended for treatment (only 26% on current bone sparing agent)
- 46% recommended for assessment of BMD
- Overall 61% above intervention threshold
- Prevalence (0.2%) vs. hip fracture prevalence (1.7%) suggests under reporting (secondary audit benefit)
Attend2: Fracture – All identified patients

**Total assessed (101,147)**

- **Existing osteoporosis** 4,308 (4.3%)
- **History of DXA** 8,265 (8.2%)
- **Receiving bone sparing therapy** 4,001 (4%)
- **History of hip fracture** 1,708 (1.7%)
- **History of coded fragility fracture** 2,020 (2.0%)
- **History of wrist, hip, vertebral fracture** 8,253 (8.2%)

**6,797 (6.7%) patients were identified in high risk cohorts (cohorts 1-3)**

- **Cohort 1 – High Risk (NOGG recommends treat**
  - **2,922 (43% of workload)**

- **Cohort 2 – Secondary prevention falling above intervention threshold (following fracture risk assessment**
  - **3,278 (48% of workload)**

- **Cohort 3 – Primary prevention falling above the intervention threshold following fracture risk assessment**
  - **597 (9% of workload)**
101,147 patients were stratified across 30* primary care sites with a total registered population of 233,801.

6,797 (6.7%) patients were identified in high risk cohorts (cohorts 1-3).

Osteoporosis prevalence in cohorts 1-3 was 21.7% vs. 4.3% across all assessed patients.

899 (46%) of 1949 patients in high risk cohorts 1 – 3 with a coded DXA assessment 46% (899) had a recorded diagnosis of osteoporosis.

From the above model, we can assume that 46% of the 4,026 high priority patients will have undiagnosed osteoporosis.

4,026

59.2% of the patients from high risk cohorts required priority management defined as having no previous history of osteoporosis, previous DEXA assessment or current bone sparing therapy.

1,429 interventions

Of 2,329 patients recommended for bone health assessment in cohorts 1 – 3 (across 20 sites) [Interface to follow up outcomes and assess QI]

Projected impact on osteoporosis management across active sites

*20 sites completed to date
Attend2: Fracture – Cost Impact Modelling

If we look at projected hip fractures within the cohort recommended for treatment with a bone sparing therapy (NOGG)

- The cost of a hip fracture in the first 2 years is estimated to be £16,302
- This does not include all of the social care costs for the 50% of patients who do NOT return to independent living

Using the FRAX 10 year probability of hip fracture we would expect 147 hip fractures in this cohort of patients over a 10 year period

- Relative reduction in hip fracture incidence following 4 years bone sparing therapy (Cochrane 2008)*

- 40%

- 59 Hip fractures avoided

- £2,400,000 Direct 2 year hospital costs for hip fractured sustained in the group recommended for treatment (NOGG recommendation)

- £2922 Patients

- 1500 patients identified as having no documented DEXA scan or current bone sparing therapy

- 9.8%

- £960,000 Direct saving in acute hip fracture costs based on 59 prevented hip fractures @ £16,302

- £60,900 Cost of 4 year treatment with alendronic acid (£0.78/month) in 1500 patients

59 year old female
4 FRAX CRFs
Previous fracture
Corticosteroid history
Alcohol > 3 unit/day
Secondary osteoporosis (chronic pancreatitis)
Non FRAX CRFs (asthma/copd, falls)

10 year risk of major osteoporotic fracture 27%
10 year risk hip fracture 8.5%

No prior history of DEXA or previous bone health review – RECOMMEND ACTION
Attend2: Fracture – Case Study 2

- 57 year old female
- 4 FRAX CRFs
- BMI 18.4
- Current Smoker
- Alcohol > 3 unit/day
- Secondary osteoporosis (early menopause)
- Non FRAX CRFs (asthma/copd, T2 diabetes)
- No Fractures (yet)

- 10 year risk of major osteoporotic fracture 11%
- 10 year risk hip fracture 4.5%

No prior history of DEXA or previous bone health review – RECOMMEND ACTION
To Support the Proactive Review of Current Prescribing and Identification of GAPs in Care

- **Patients on Existing Therapy:** review of patients currently receiving treatment to support ongoing safety and efficacy

**Cohorts for Review Include:**
- Patients sustaining a fracture whilst on treatment
- Patients identified with poor compliance on treatment
- Patients treated for >5yrs with BSA (assess ongoing need)
To Support the Proactive Review of Current Prescribing and Identification of GAPs in Care

- **PRESQIPP workstream:** recommends review of prescribing of treatment breaks where appropriate for patients with > 5 years treatment within bone sparing agents
- **PRESQIPP workstream:** review and discontinue patients on bone sparing therapies at low risk of fracture
- **NOGG guidance:** Need for continuation should be reviewed at regular intervals
- **NOGG guidance:** continue treatment in individuals at high risk (aged over 75, previous hip or vertebral fracture, regular po steroid)
BSA: Current Prescribing

Review process (proposed)

All patients receiving treatment with bone sparing therapy (bisphosphonate)

5 years or more treatment with bone sparing therapy (bisphosphonate)

Recurrent fractures +/- vertebral fractures

Risk assessment +/- BMD at 3-5 years

Above NOGG intervention threshold OR hip BMD T-score ≤ -2.5

Check adherence
Exclude 2ry causes
Re-evaluate Rx choice
Continue treatment

Below NOGG intervention threshold AND hip BMD T-score > -2.5

Consider drug ‘holiday’
Repeat risk assessment +/- BMD in 1.5 - 3 years

LOW risk

Electronic surveillance of prescribing and fracture risk assessment

No fracture

Decision tree:

- **HIGH RISK**
  - Consider continuation:
    - Age > 75 years
    - Previous hip fracture
    - Oral corticosteroids

- **LOW risk**
  - Risk assessment +/- BMD at 3-5 years
4001 patients across reviewed sites receiving bone sparing therapy

15% Less than 80% adherence (electronic prescribing surveillance)

891 Low Risk (Reassure) REVIEW TREATMENT

348 With history of DXA
233 With DXA and coded osteoporosis
182 Osteoporosis (no DXA)
118 Over 75 with history of fracture
212 Receiving current oral corticosteroid

Further cohorts identified for:
- Evaluation of indication
- Consideration for DXA
- Time on treatment analysis
- Fracture on treatment analysis
- Cost effective prescribing
For further enquiries please contact Helen Ridley at h.ridley@ahsn-nenc.org.uk