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Vertebral Fracture Identification & Management Pathways

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Clinical Lead Quality Improvement Royal Osteoporosis Society

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Vertebral fracture identification

Learning outcomes

- Understand the importance of vertebral fracture in onward outcomes for patients
- Understand challenges in identifying vertebral fracture in imaging
- Deciphering the radiology report
- Best practice for secondary fracture prevention

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Summary

- The trouble with vertebral factures:
- Associated with increased mortality, morbidity, and costs of healthcare and treatment
- Increase risk of subsequent fracture
- Identification is problematic and suboptimal-
- Opportunities missed

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Why?

- **only 30% come to medical attention**
- Only a minority result from falls
- Often asymptomatic
- Symptoms often attributed to other causes by patients and healthcare professionals
- Routine imaging is discouraged for ‘back pain’

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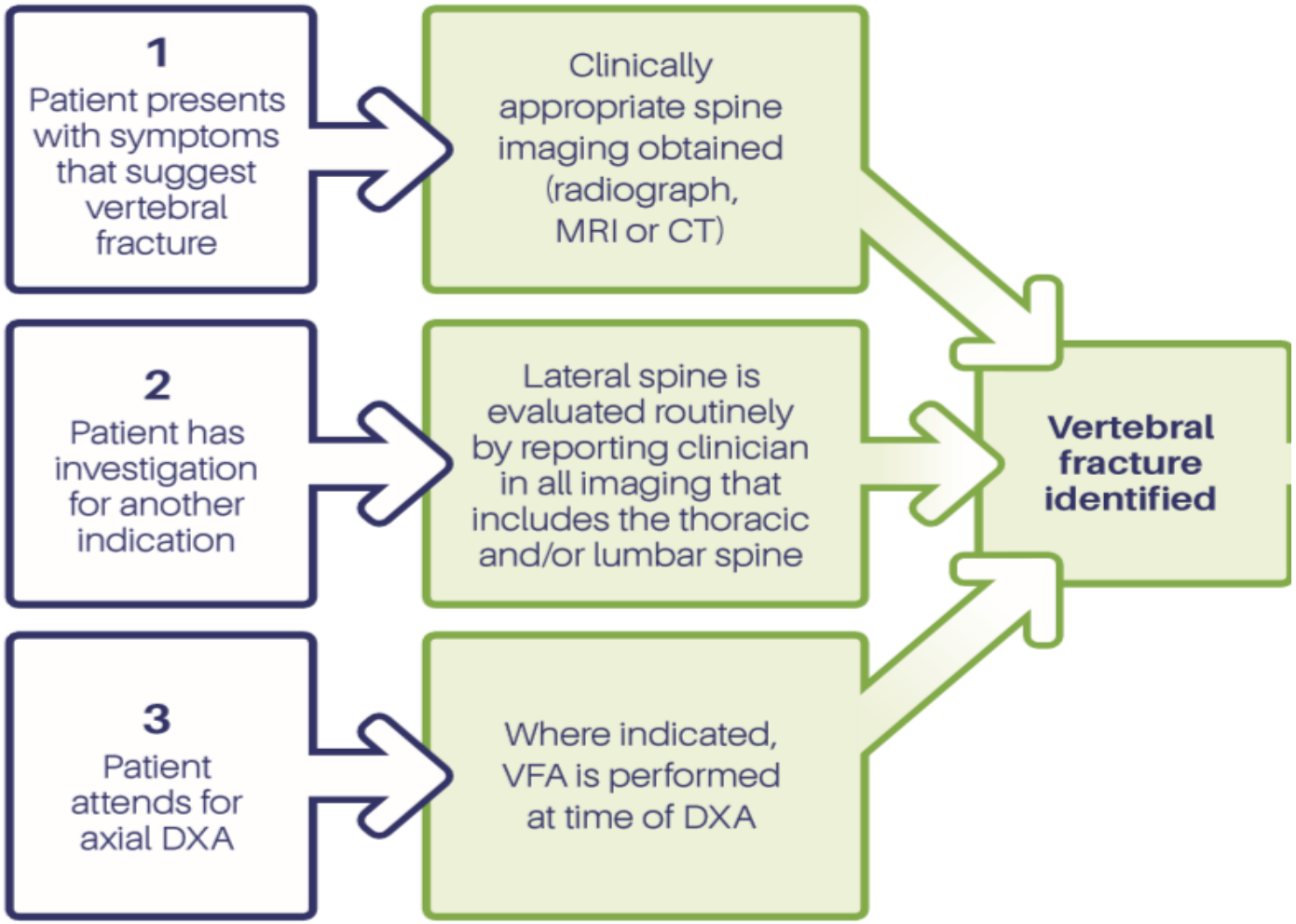
Vertebral fracture identification pathway



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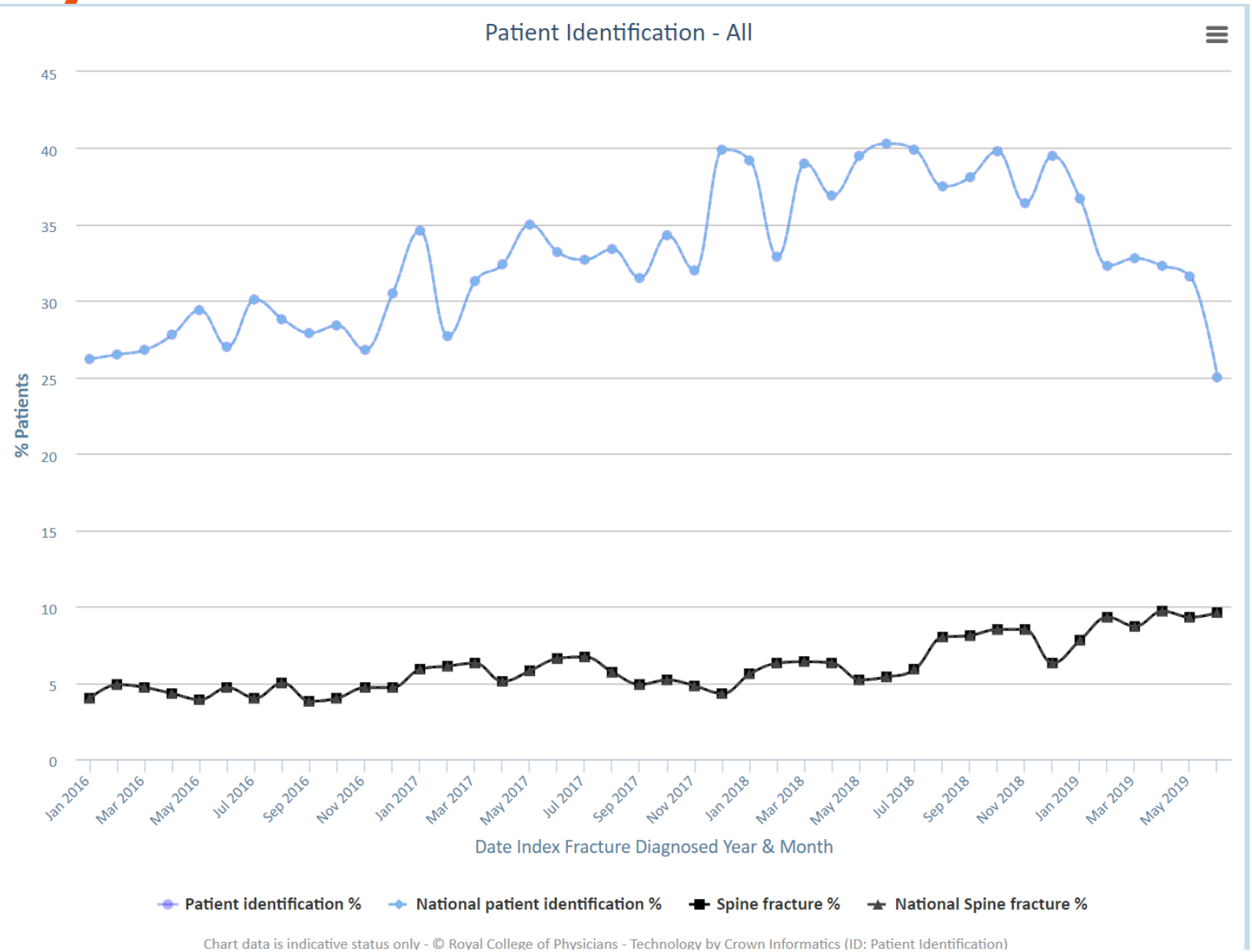
Gap analysis



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Challenge to Opportunity

- Secondary fracture prevention works…
  - Fracture Liaison/ investigation, treatment and follow-up- prevents further fracture

Glasgow FLS 2000-2010

Patients with fragility fracture assessed	50,000
Hip fracture rates	-7.3%
England hip fracture rates	+ 17%

Effective Secondary Prevention of Fragility Fractures: Clinical Standards for Fracture Liaison Services: National Osteoporosis Society 2015

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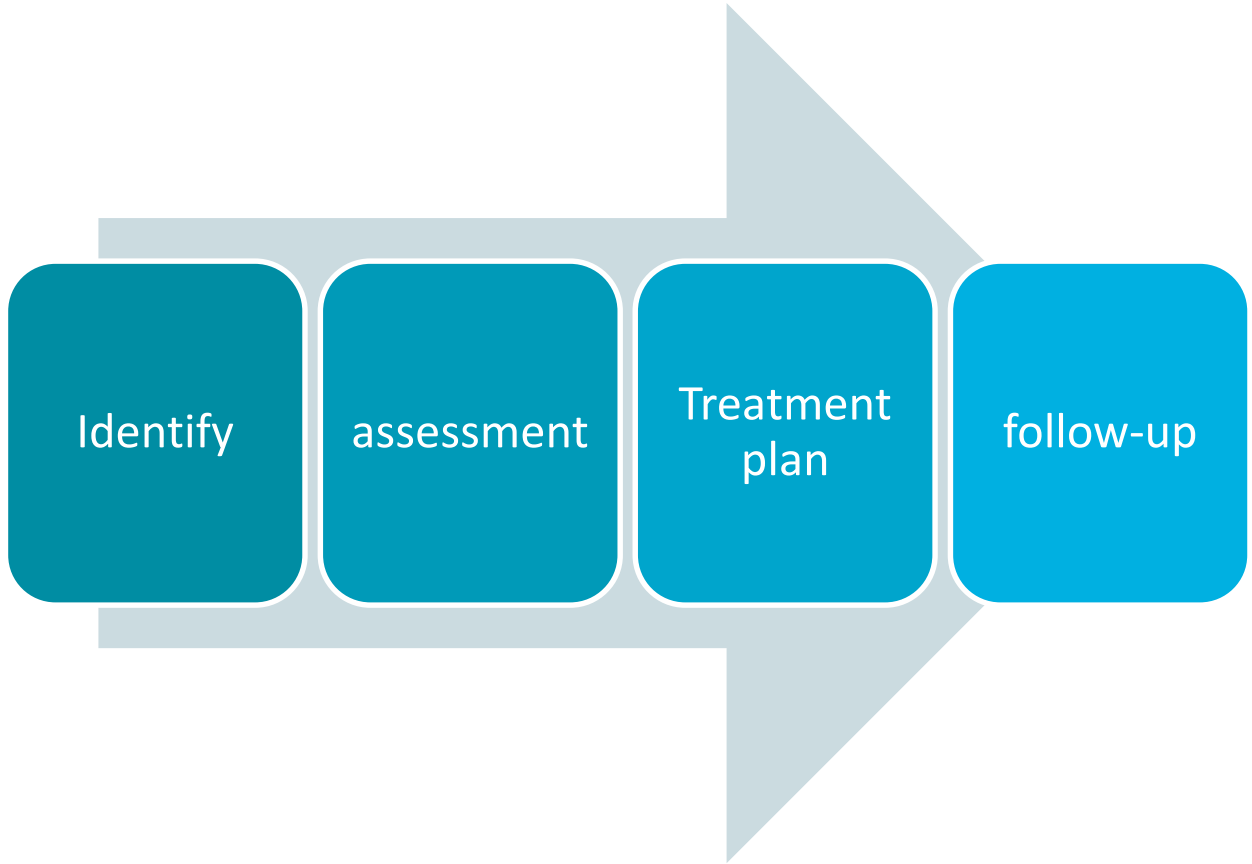
Secondary fracture prevention -functions of an FLS service

- Identify people with fragility fractures
- Investigate causes and risks (osteoporosis, fracture and falls)
- Intervene- treatment and management plan
- Follow up



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Secondary fracture prevention -functio vice

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- J , fracture a falls)
- Intervene- treatment and management plan
- Follow up

QUALITY

follow-up

Integration & communication

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Challenges and opportunities

- **Opportunities to find the 70%**
  - **In diagnostic imaging**
    - Clinical importance of VF poorly understood
    - Imaging for other indications not routinely scrutinised for incidental vertebral findings
    - Reporting terminology for VF ambiguous
    - Lack of pathways for further assessment

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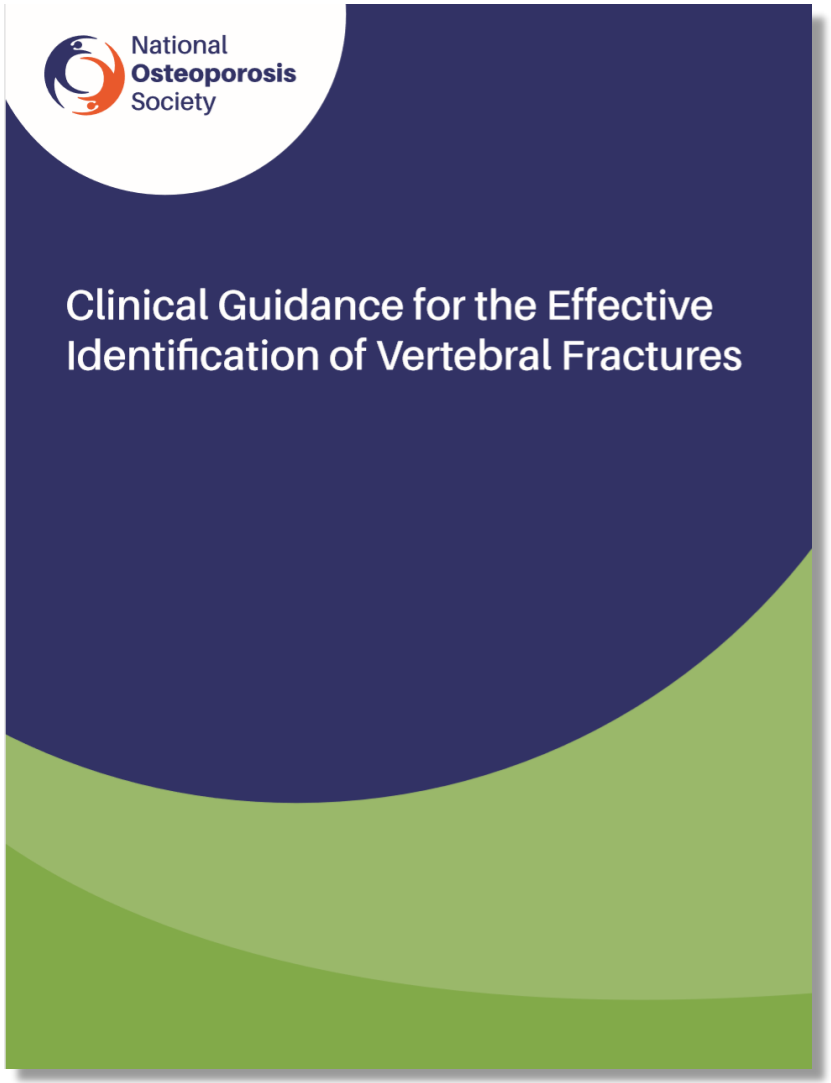
Clinical guidance for the effective identification of vertebral fractures



Endorsed by:

SCoR
THE SOCIETY & COLLEGE OF RADIOGRAPHERS
The Society of Radiographers

B.S.S.R.
British Society of Skeletal Radiologists

IOF
International Osteoporosis Foundation
International Osteoporosis Foundation

RCR
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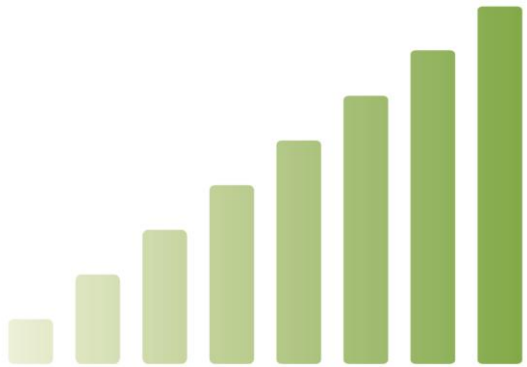
Every vertebral fracture accounts for

14 additional GP visits

in the year after fracture[16]



Vertebral fractures are associated with an

8-fold increase in age-adjusted mortality[17]

The 5 IQ approach to quality in fracture prevention

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The Guidance

- Seek vertebral fractures apparent on any imaging that includes the thoracic and/or lumbar spine
- Report vertebral fractures clearly and unambiguously
- Alert the referring clinician to the need for further assessment of fracture risk, via FLS where available

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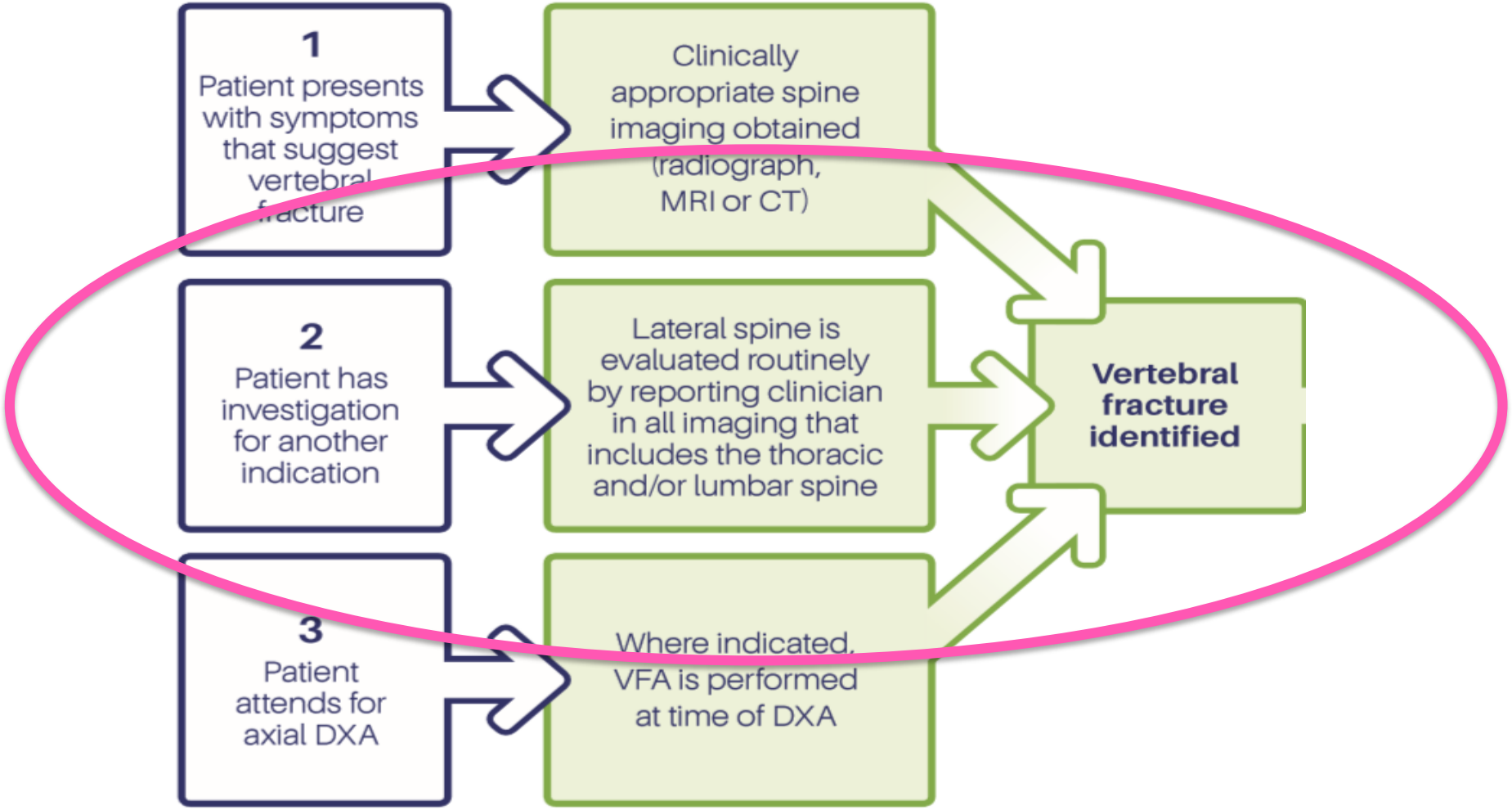
Finding Vertebral fractures via imaging reports



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The Guidance: Seek VFx

6. When there are imaging findings that constitute a medical emergency or a significant unexpected finding, reporters should comply with local mechanisms to alert referrers.

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The Guidance: Seek VFx

Q1. RCR Reporting standard 6: Are incidental vertebral fractures a significant unexpected finding?

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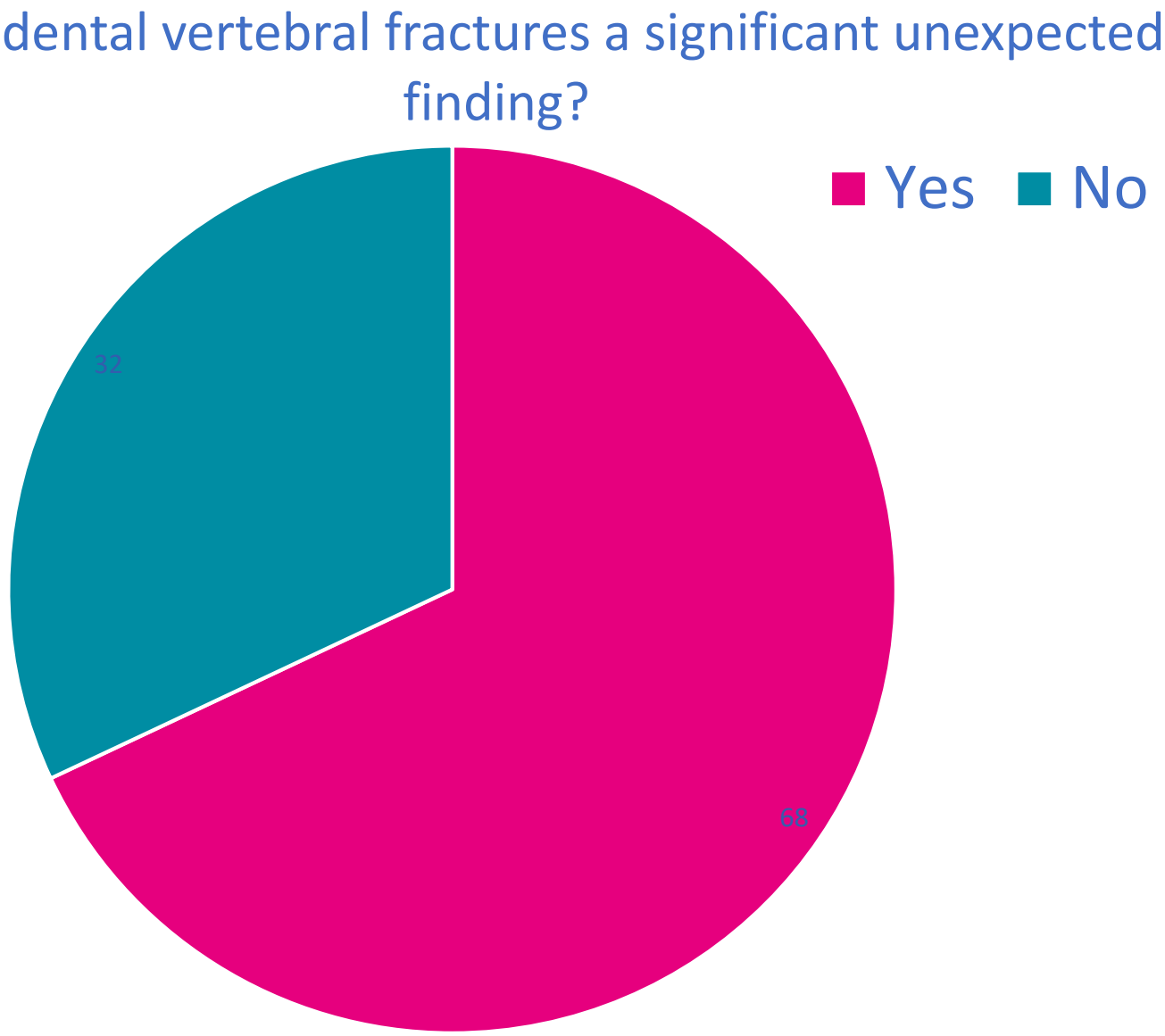
The Guidance: Seek VFx



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Challenges and Opportunities

- Clinical importance poorly understood

'We do not routinely report wedge fractures as incidental or alert findings because they won't be treated'

'Osteoporosis (and fracture) is a normal aging process'

'I report on the primary question asked in the referral'

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The Guidance: Report VFx

Report vertebral fractures clearly and unambiguously

- Comment on the spine
- Describe vertebral bodies as:
  - **Vertebral fracture**
  - Non fracture deformity
  - Normal

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The Guidance: Alert

Alert the referring clinician the need for further assessment

- Use of failsafe alert system
- Agreed protocol and pathway

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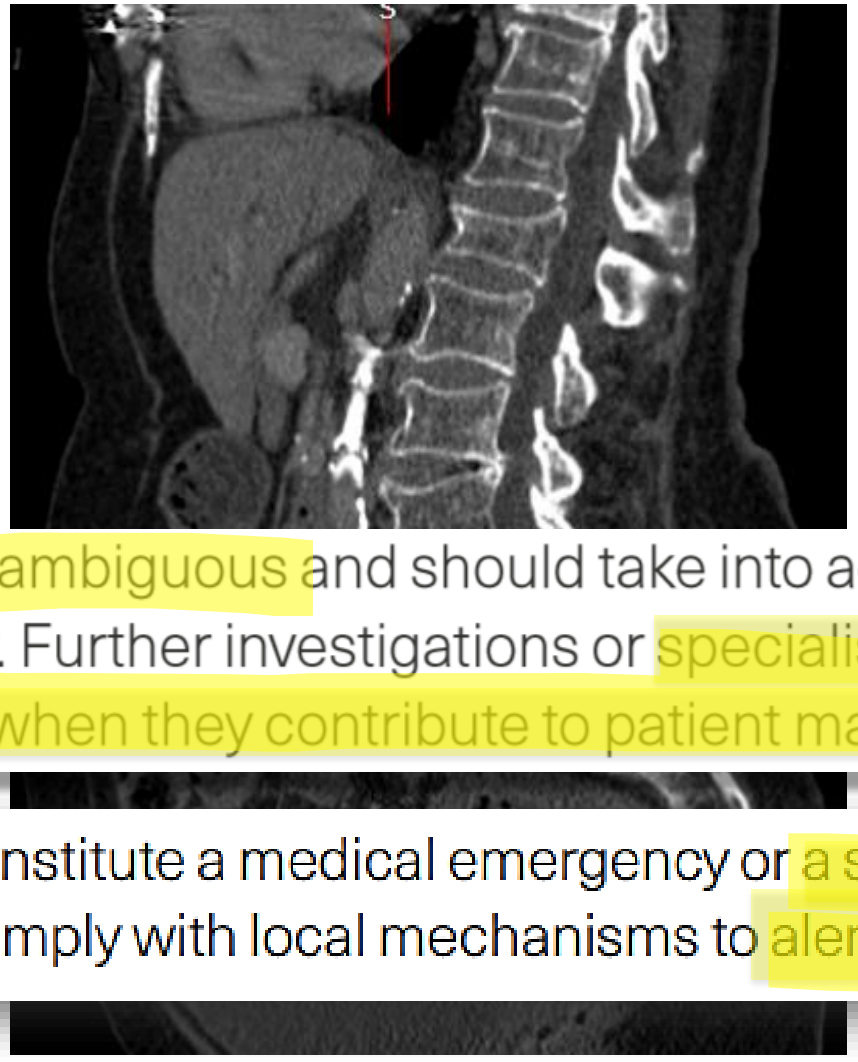
The Guidance: Seek VFx

www.rcr.ac.uk

Clinical Radiology
The Royal College of Radiologists

Standards for interpretation and reporting of imaging investigations
Second edition



2. The wording of the report should be unambiguous and should take into account the professional background of the referrer. Further investigations or specialist referral should be suggested within the report when they contribute to patient management.

6. When there are imaging findings that constitute a medical emergency or a significant unexpected finding, reporters should comply with local mechanisms to alert referrers.

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Opportunities- terminology

- Calling fractures ‘fractures’ 122 scan reports

Terms used	n.	% using the ‘F’ word
Vertebral collapse/osteoporotic collapse/collapse	6	
Osteoporotic wedge fracture/wedge fracture/anterior wedging	3	37.5%
End plate depression/end plate fracture/ inferior end plate deformity	4	% explicitly using the term ‘vertebral fracture’
Osteoporotic crush/crush	2	10.5%
Compression fracture	1	
Loss of vertebral height	1	
Fracture	2	

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Audit: Alerting referrer to significant finding of vertebral fracture

	Identified at audit	Reported
Patients with vertebral fracture	21% (n.17)	11.5% (n10)
Patients referred onwards	n/a	0

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Finding Vertebral fractures via imaging reports

Terry 77 years:
Nov 2014- CT CAP
'weight loss ? Upper abdominal mass

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Finding Vertebral fractures via imaging reports

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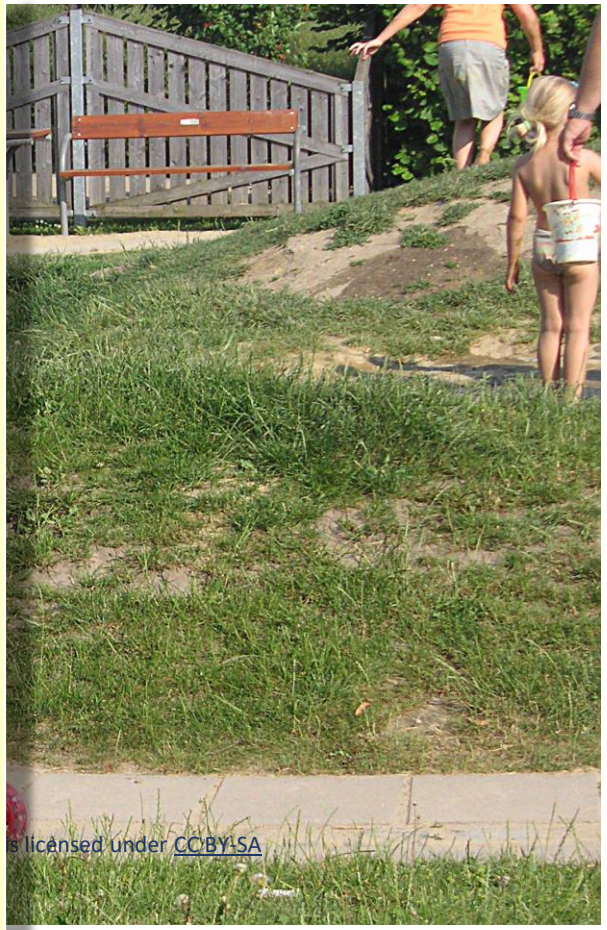
'The bones are generally osteopenic with vertebral collapse noted in the mid thoracic region, no evidence of bone destruction'



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Opportunities- Impact case study

Nov 2014- CT CAP ‘weight loss ? Upper abdominal mass

‘The bones are generally osteopenic with vertebral collapse noted in the mid thoracic region, no evidence of bone destruction’

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Opportunities- Impact case study

Nov 2014- CT CAP 'weight loss ?
Upper abdominal mass

'The bones are generally osteopenic with vertebral collapse noted in the mid thoracic region, no evidence of bone destruction'

June 2016- ED admission fall at home comminuted intertrochanteric fracture

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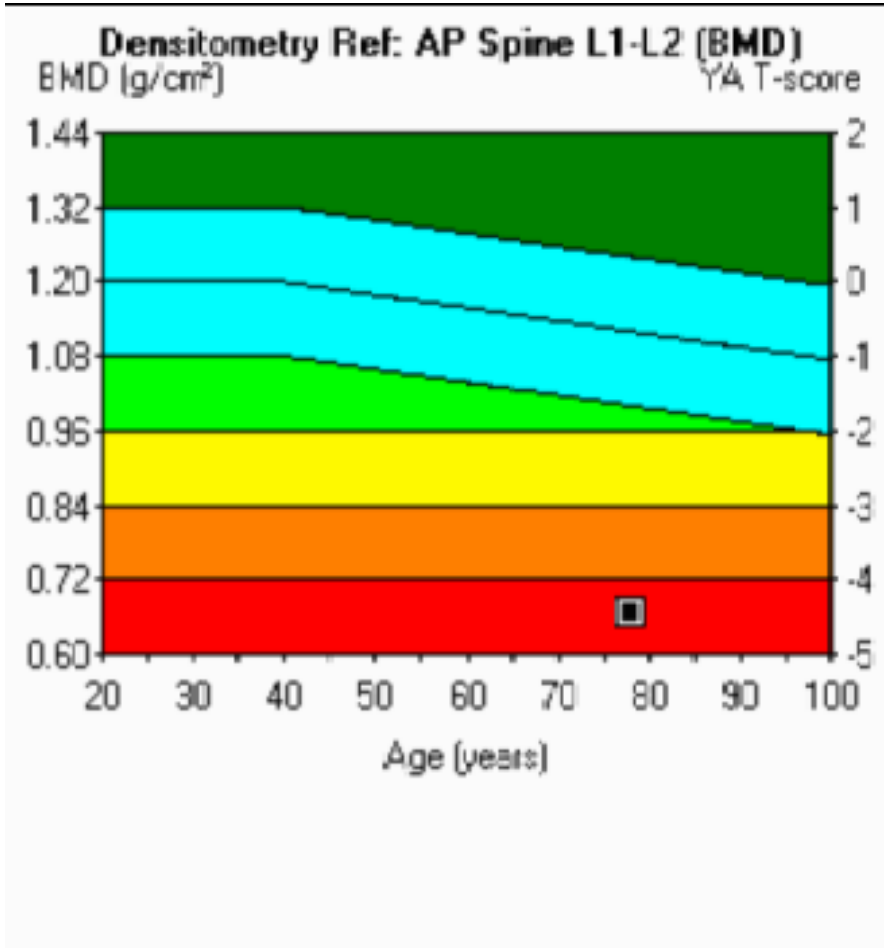
Opportunities- Impact case study



Nov 2014- CT CAP 'weight loss ? Upper abdominal mass

'The bones are generally osteopenic with vertebral collapse noted in the mid thoracic region, no evidence of bone destruction'

June 2016- ED admission fall at home: comminuted intertrochanteric fracture

August 2016- DXA scan: osteoporosis

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Opp logy

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Fracture	

Engagement with Radiology:

-**ask** questions 'does *end plate depression* mean it could be an osteoporotic fracture?'

-**suggest** a short code to help identify VFx in imaging reports. 'Could you end reports with VFx with '*Fragility fracture needs investigating*' so we can know about these?'

-**share** evidence and give examples

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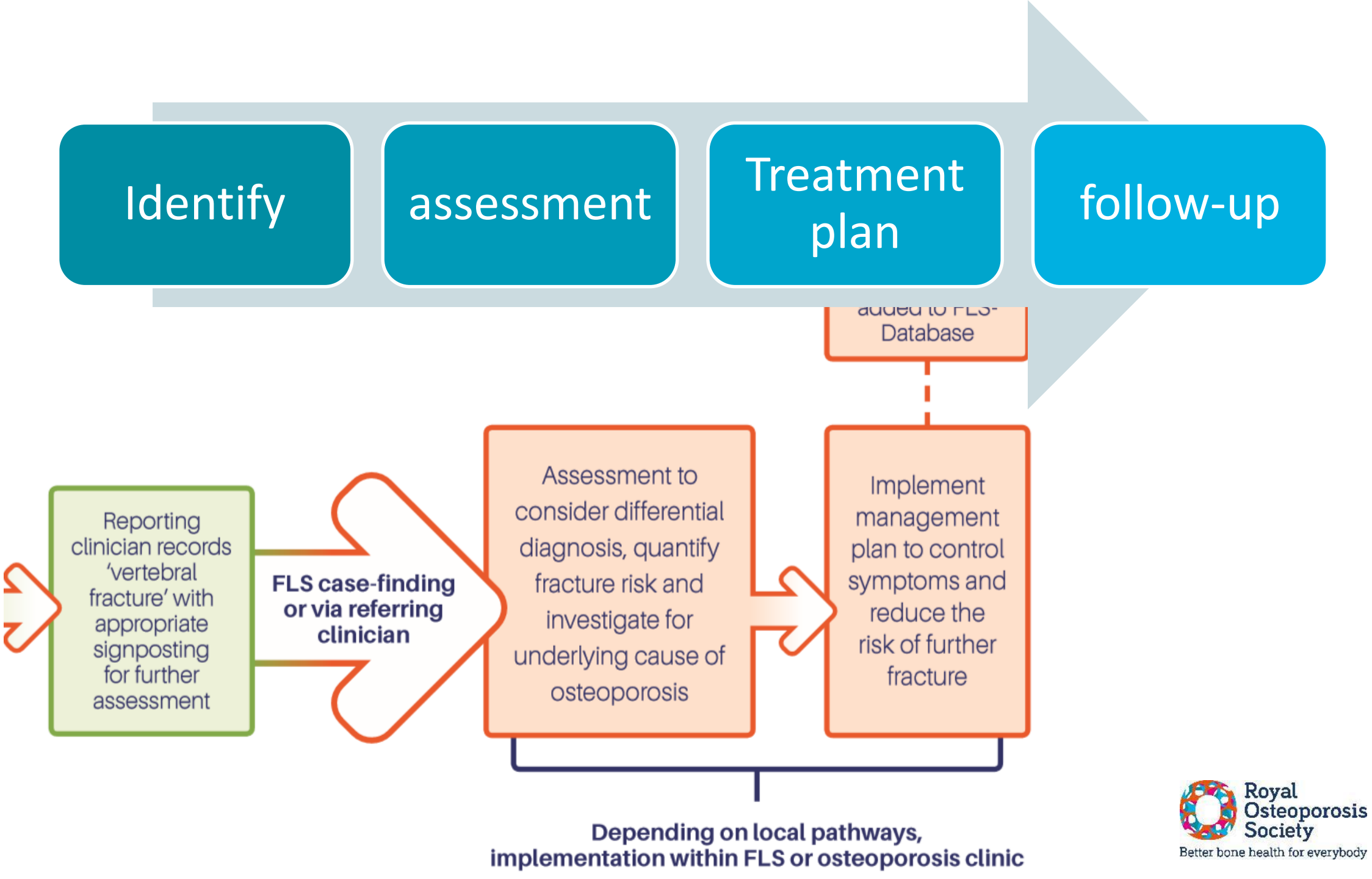

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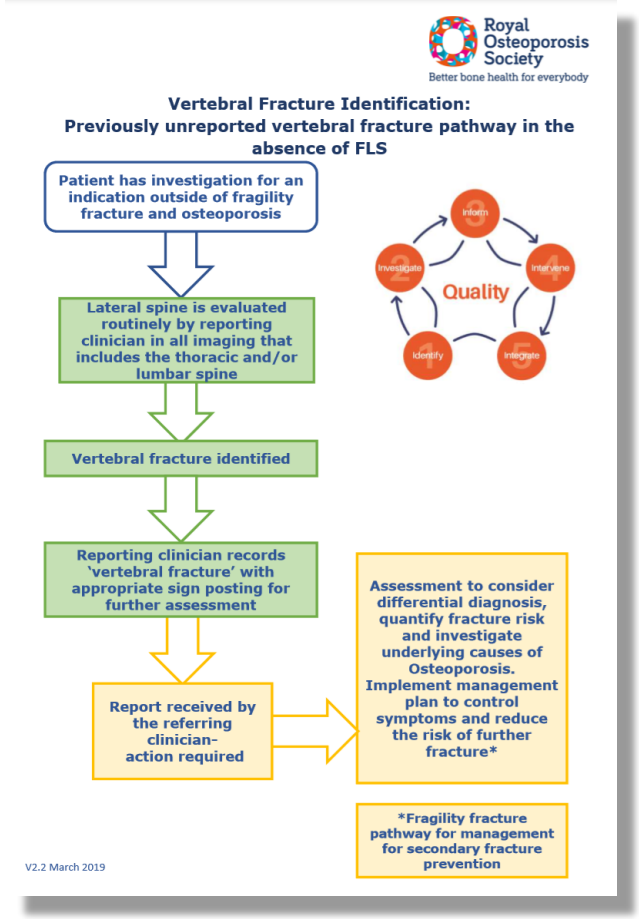
Vertebral fracture pathway design



Imaging for an unrelated indication

Vertebral fracture identified

Reported as 'vertebral fracture and alerted to the referrer

Referrer takes action

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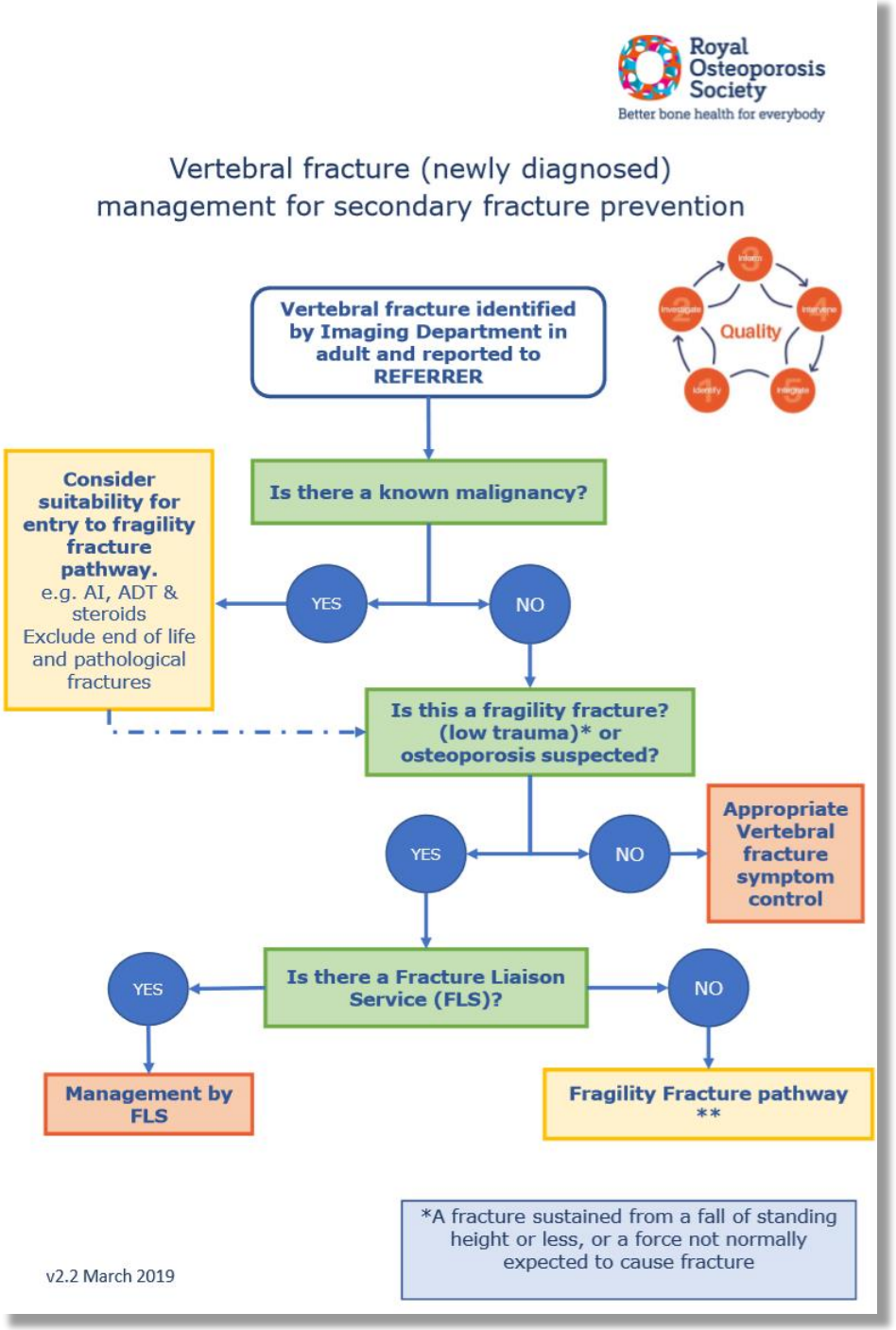
Decision tree



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ROS Incidental VFx -> FLS demand model

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This demand model will predict the estimated number of new referrals to FLS from the incidental finding of vertebral fracture, from diagnostic imaging tests and scans, in people aged over 50 years.

The output relies on data collection from diagnostic imaging tests such as computerised tomography (CT) and magnetic resonance imaging (MRI) scans and includes the referral source, type of fracture and a review of the imaging used for data collection.

This model is informed by the vertebral fracture management for secondary fracture prevention pathway

Instructions	
1. Review the audit criteria (tab 2	
2. Collect audit data up to 200 scans (tab 3)	Enter data as 1 for yes 0 for no. Do not enter any further character.
	Do not add or remove lines the model will count data entries automaticall
	Do not add data to the colums shaded blue. These complete automatically
3. Review the audit summary report (tab 4)	This will be automatically populated from the audit data collection sheet in tab 3
4. Review the demand model (tab 5)	**Do not add data to the table manually**
5. Enter the number or scans audited into the orange box	This will calculate the estimated number of new referrals to FLS *based on data entered into the data collection sheet*. Excluding those with metastatic and traumatic factures as absolute numbers.
6. Enter the number of scans performed at your centre *per week* into the orange box (eg. CT scans if this is the source of identificaiton of vertebral fractures)	This will calculate the estimated number of new referrals to FLS ***per week*** using a proportion of expected malignant and traumatic fractures derived from absolute nubmbers in the data entry.
	To estimate monthly or annual demand enter the relevent number of

Be aware that data collection informs the output and this may be biassed depending on the individual departments sessional booking of CT scan lists. For example if data is collected from a dedicated oncology session this will bias the ouput.

This model also may be biassed as data collection is from those aged 50 and over however younger patients are also included in the weekly and annual number of scans peformed at a centre.

Vertebral fracture demand modelling: Audit criteria

A retrospective audit evaluating the proportion of incidentially found vertebral fractures in CT chet abdomen and pelvis studies to include referral source. Supporting demand modelling through vertebral fracture management decision tree.

1. Up to 200 consecutively acquired CT CAP in people aged 50 and over. 150-200 data entries are recommended	Data from peviously collected vertebral fracture prevelance or reporting audit may be used to inform these
2. Sagittal views of the spine (MPR) are assessed, by a clinican with experience of interpreting spine images, for the presence of moderate and severe vertebral fractures	
3. Vertebral fractures are defined using either semi-quantitave morphometry (Genant et al) or the algorithm-based quantitive (ABQ) (Jiang et al) method (sheet 4)	
4. Referral source/type is recorded (onocology staging/trauma)	
5. Vertebral fracture type is recorded (metastatic/pathalogical/traumatic)	
6. History of FLS/secondary fracture prevention/osteoporosis referral is recorded	
7. Demand model indicates the expected number of new FLS assesments per n. CT scan input.	

This audit could be applied to all imaging.

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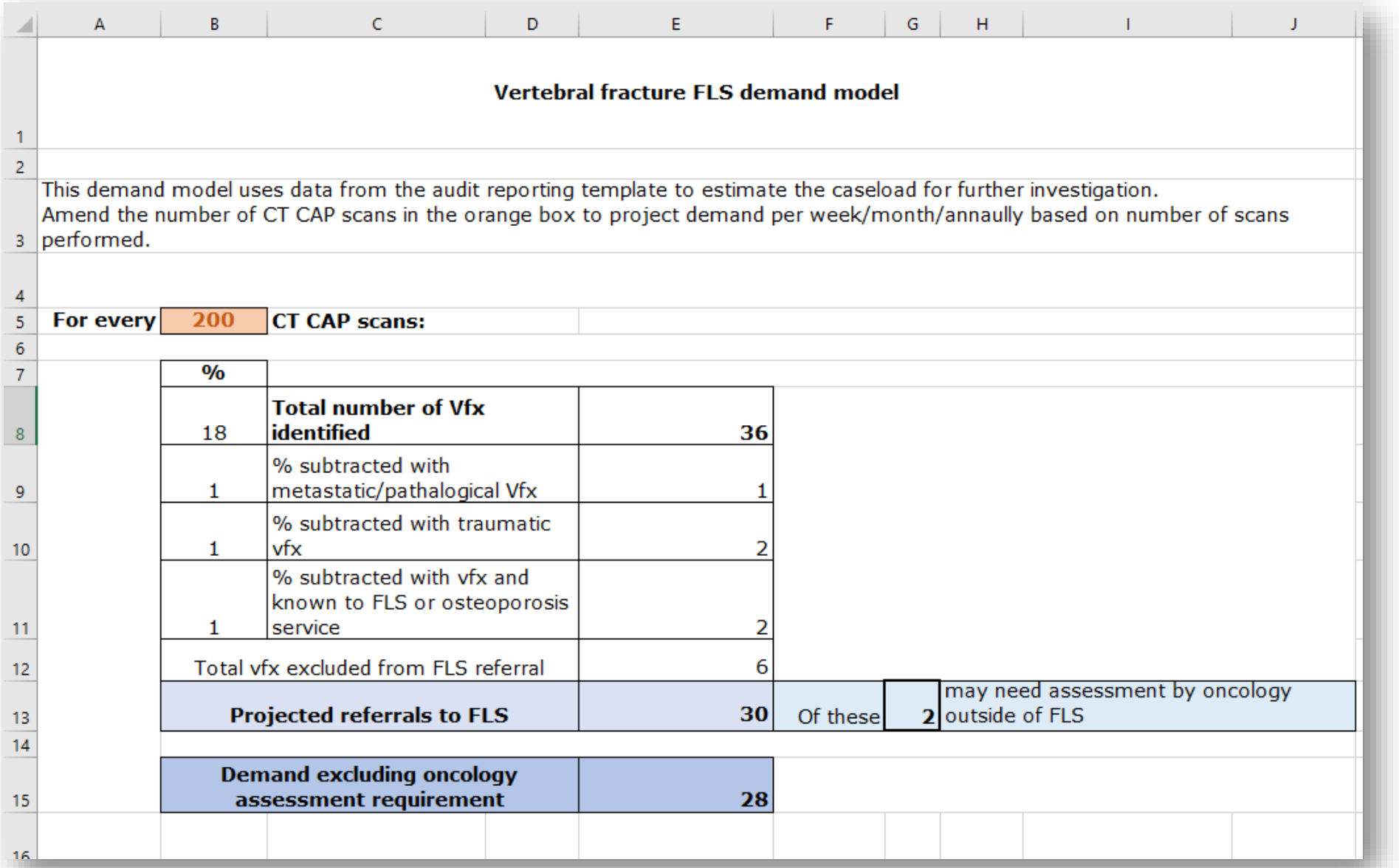
Demand modelling



Vertebral fracture FLS demand model

This demand model uses data from the audit reporting template to estimate the caseload for further investigation.
Amend the number of CT CAP scans in the orange box to project demand per week/month/annaully based on number of scans performed.

For every 200 **CT CAP scans:**

%		
18	**Total number of Vfx identified**	**36**
1	% subtracted with metastatic/pathalogical Vfx	1
1	% subtracted with traumatic vfx	2
1	% subtracted with vfx and known to FLS or osteoporosis service	2
Total vfx excluded from FLS referral		6
Projected referrals to FLS		**30**
Demand excluding oncology assessment requirement		**28**

Of these **2** may need assessment by oncology outside of FLS

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Demand modelling

very	200	CT CAP scans:				
	%					
	18	**Total number of Vfx identified**	**36**			
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	1	% subtracted with vfx and known to FLS or osteoporosis service	2			
		Total vfx excluded from FLS referral	6			
		Projected referrals to FLS	**30**	Of these	**2**	may need assessment by oncology outside of FLS
		Demand excluding oncology assessment requirement	**28**			

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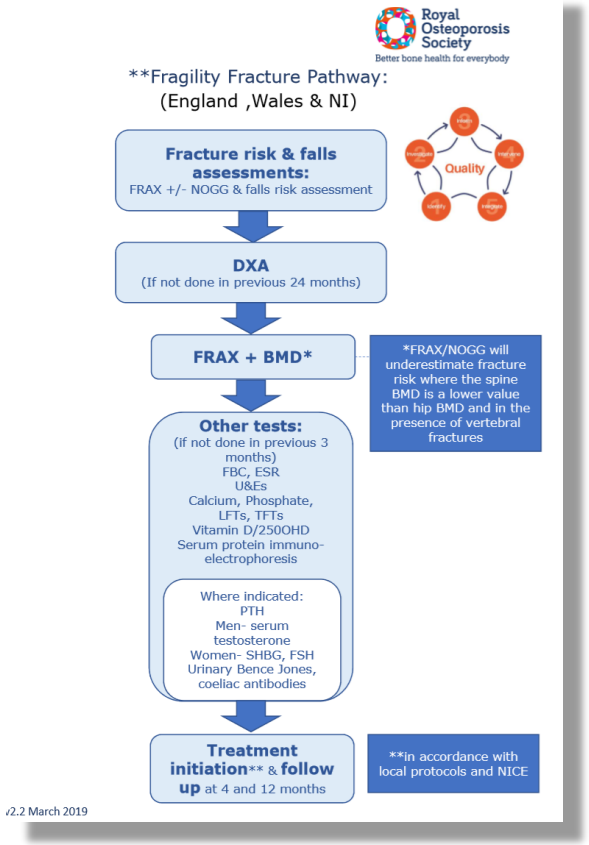
Secondary fracture prevention



Assessments
- Fracture risk (FRAX Qfracture)
- Falls

DXA
- Where appropriate
- If note done in 24 months previous

FRAX + BMD
- FRAX/NOGG guidance

Other tests
- Bloods/ biochemistry

Management
- NICE 1st or 2nd line TREATMENT
- Follow-up 4 months & 12 months (+ 3 year Zoledronic Acid & 5 Year alendronate)

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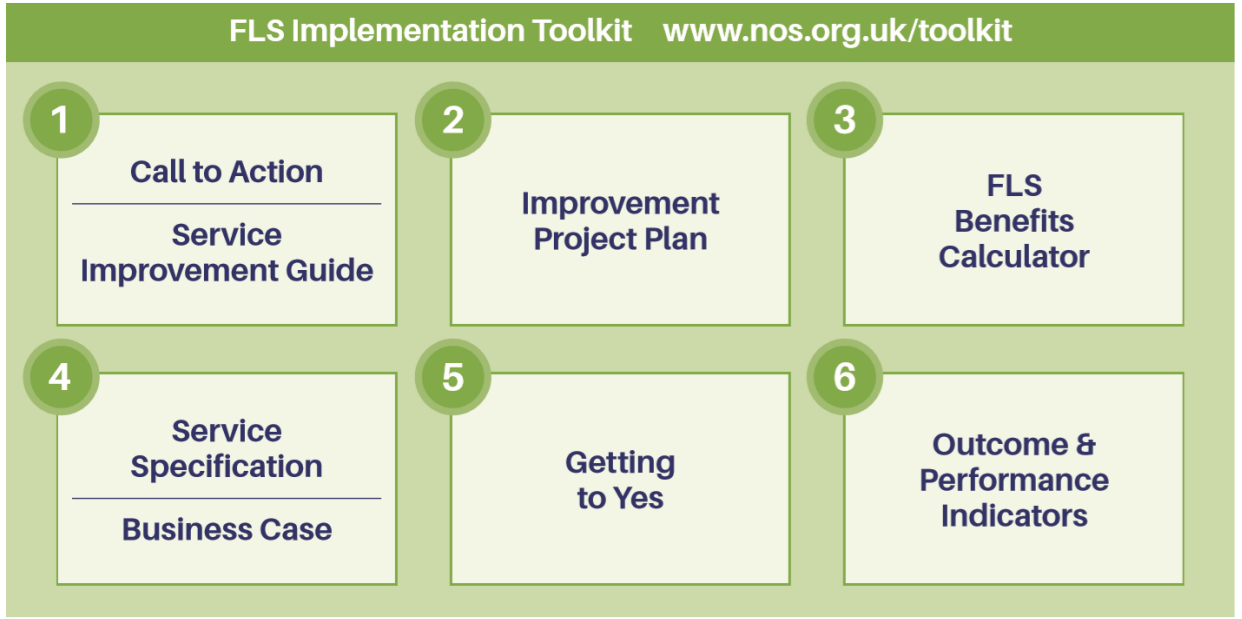
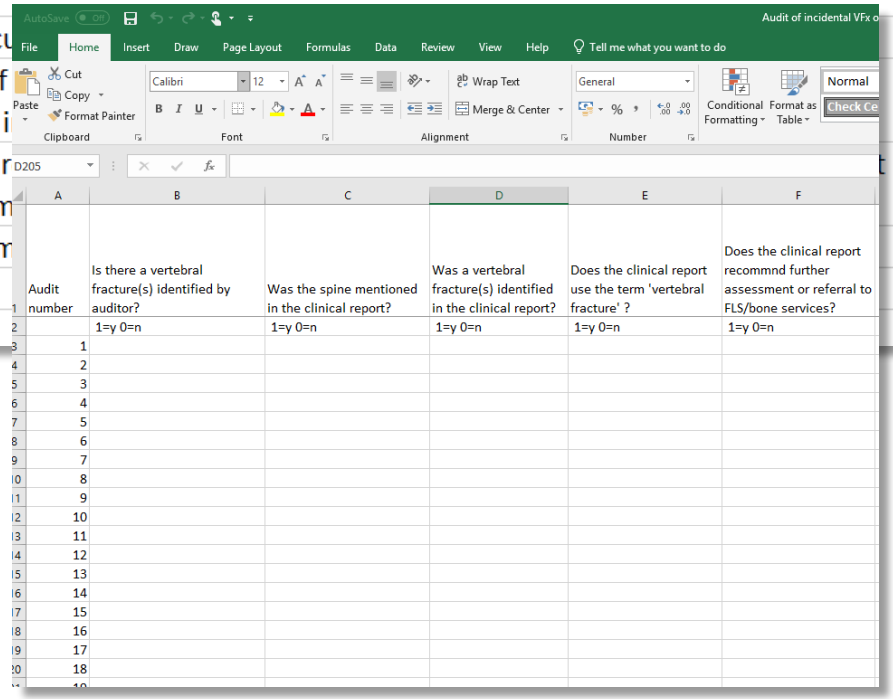
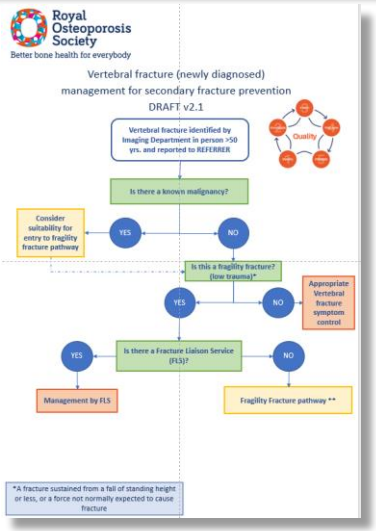
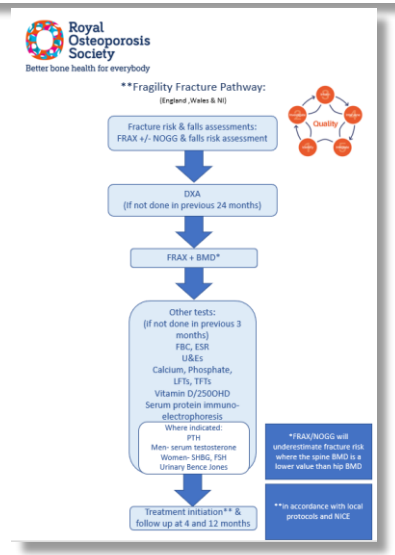
Supporting services









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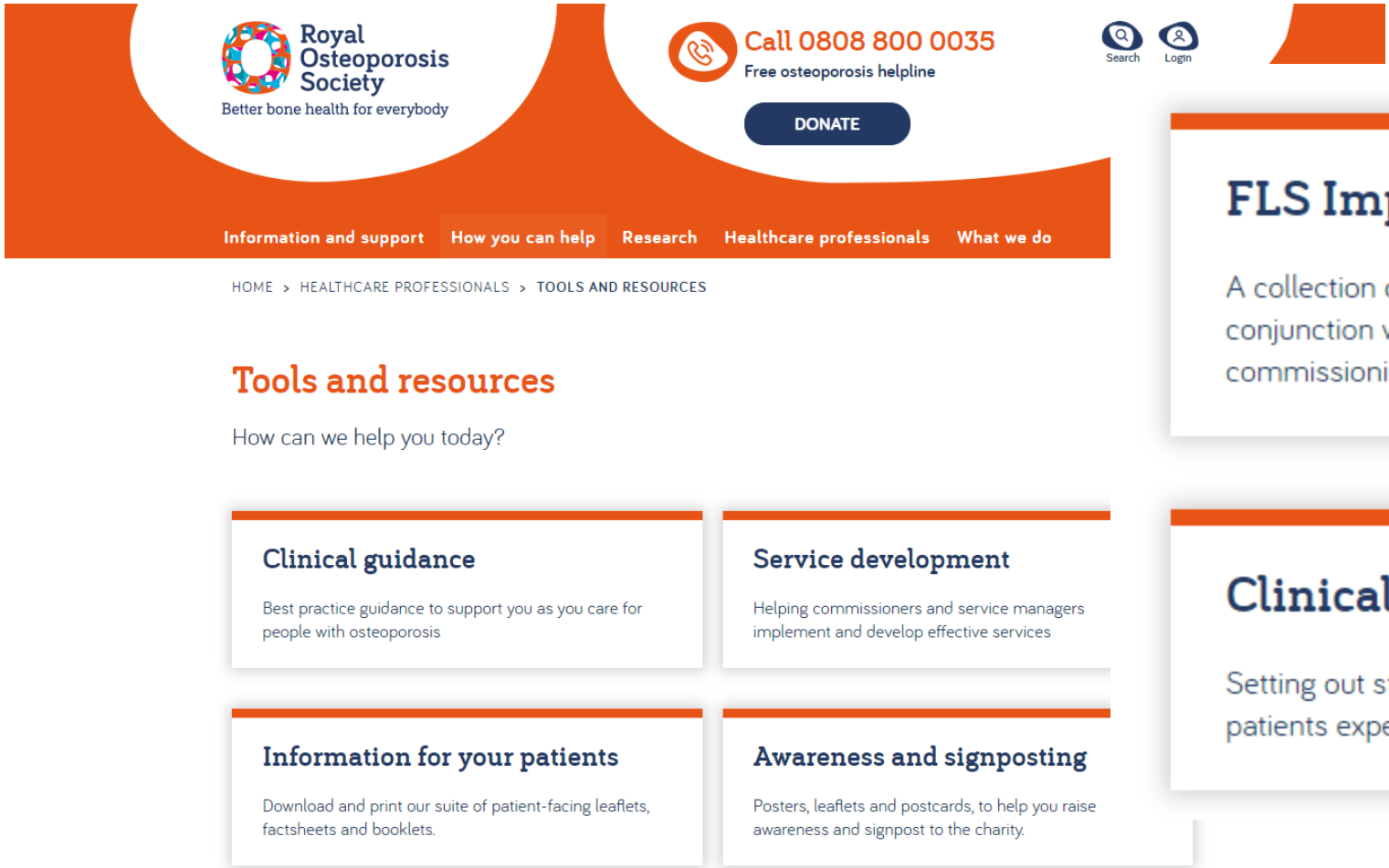
Support

Royal Osteoporosis Society Guidance:



FLS Implementation Toolkit

A collection of tools and resources developed in conjunction with partners in the NHS to aid the commissioning of fracture liaison services

Clinical Standards for FLS

Setting out standards for care that professionals and patients expect

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Education

Fracture Prevention Practitioner Training

Online course - Deliver excellent healthcare to people with or at risk of osteoporosis and fragility fractures.

Bone Densitometry Foundation course

Online course - Gain a foundation in osteoporosis and dual energy x-ray absorptiometry (DXA).

Osteoporosis Resources for Primary Care

Online resources - To support you in the identification, assessment and management of osteoporosis in primary care.

RCGP Osteoporosis e-Learning Module

Online course - For GPs to develop their knowledge around the diagnosis and management of patients with osteoporosis

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Engagement with Radiology:

- **DO NOT point fingers**
- **DO:**
  - **Ask questions-** clinical and process
  - **Share data-** audit evidence
  - **Share your 'problem'**
  - **Give examples-** case studies
  - **Make suggestions-** that will help your service-it might help theirs
- **Build relationships**

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"It's a sad thing, but I really do believe that if the fracture I suffered in my spine had been spotted earlier than it was, I would have been spared a great deal of pain and suffering.

Believe me when I say, living with these fractures is a nightmare that never goes away."

Christine Sharp

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Summary

- **Seek**- vertebral fractures
- **Decipher Radiology Reports-**

  'is this a vertebral fracture'
- **Implement secondary fracture prevention**
- **Support and collaborate**

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Supporting You

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