

RICKETS DUE TO DIETARY CALCIUM DEFICIENCY IN MANCHESTER

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Abstract

BACKGROUND & AIMS: Rickets is a childhood condition resulting from impaired mineralisation of the growth plate, resulting in bony deformities. A retrospective survey was undertaken to identify causes of rickets in children treated at the Royal Manchester Children's Hospital from 2009 to 2014.

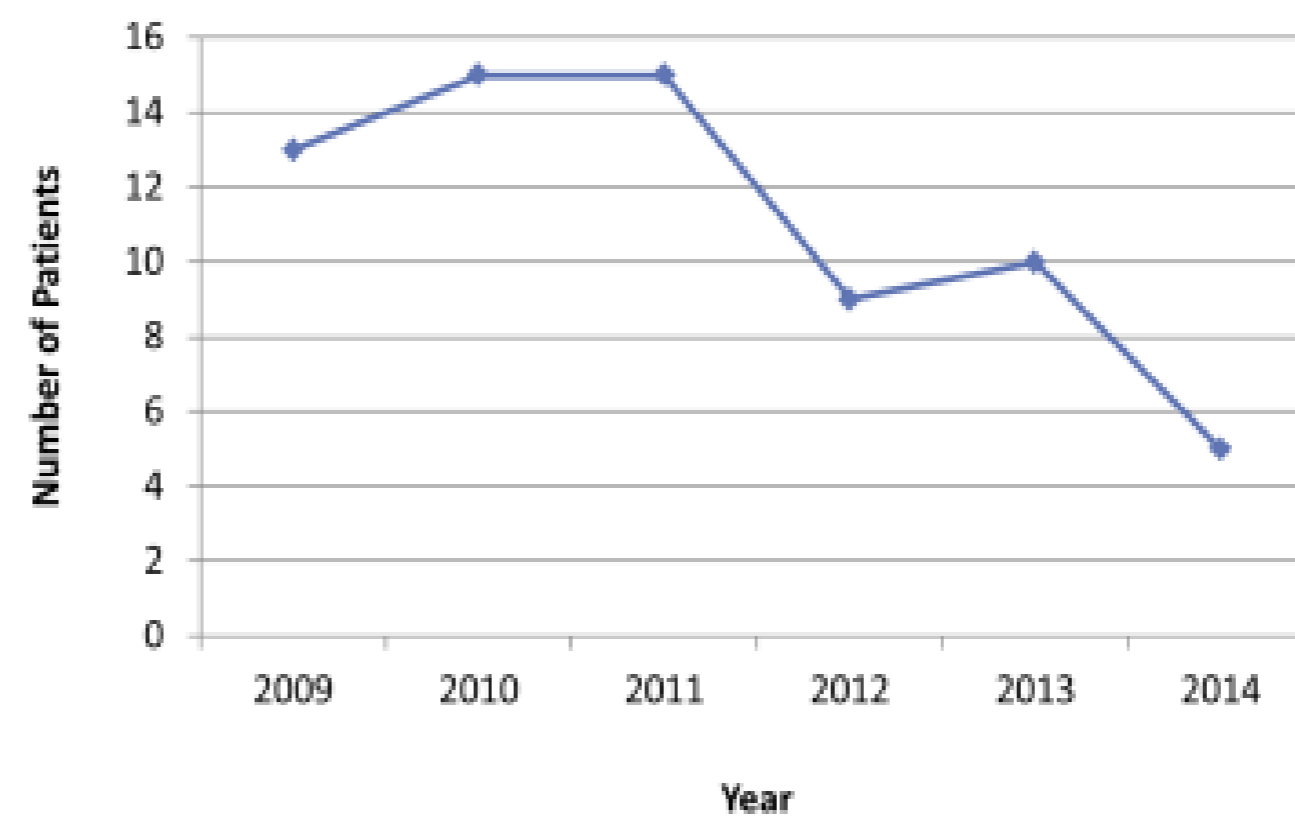
METHODS: Cases of rickets were identified through a search of all paediatric radiology reports containing the words 'Rickets' or 'Osteomalacia' and confirmed with reference to relevant biochemical tests. Those with serum 25OHD concentrations <25nmol/L were classified as vitamin D deficiency rickets and those with 25OHD >50nmol/L and a history of inadequate dietary calcium intake as calcium deficiency rickets.

RESULTS: Eighty cases of rickets were identified of which 69 patients had nutritional rickets. Four* children had rickets due to dietary calcium deficiency and the rest of the cases of nutritional rickets were primarily due to vitamin D deficiency. Three of the cases with calcium deficiency rickets had cow's milk protein allergy and the 4th disliked and avoided dairy products. The relevant biochemical data are shown in the table below.

CONCLUSIONS: Rickets due to dietary calcium deficiency has been reported in South Africa, Northern Nigeria, Bangladesh and parts of India. Whilst vitamin D was the commonest cause of nutritional rickets in our survey, we also identified 4 cases of rickets due to dietary calcium deficiency. This survey highlights the importance of providing adequate calcium intake, particularly in children with food allergies/intolerances.

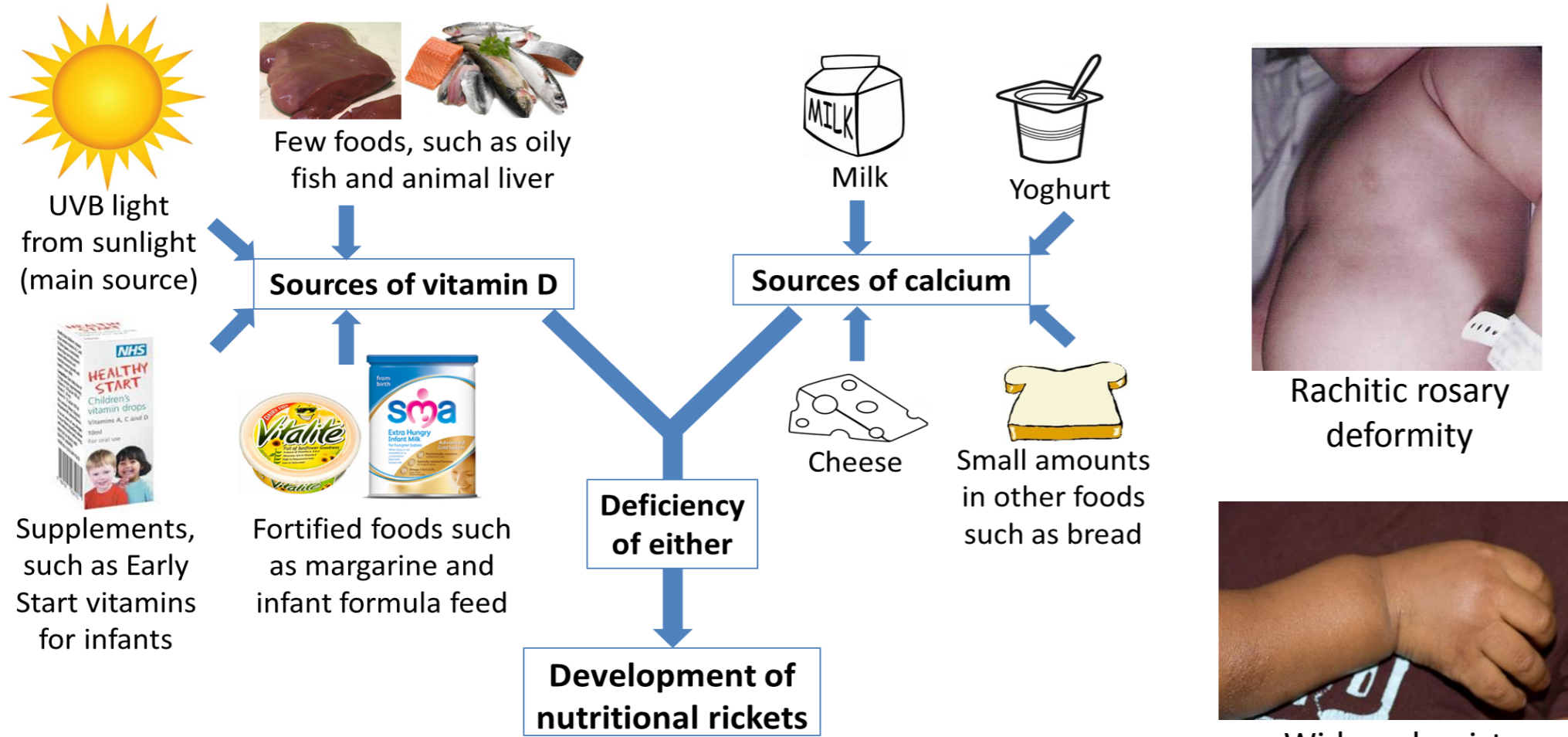
*On further review of patient data after the abstract was submitted, there were 2 cases of calcium deficiency rickets, not 4.

Number of cases of rickets over time



This survey found the number of cases of nutritional rickets to be decreasing over the 6 years. This is in contrast to that found by Goldacre et al¹.

Background



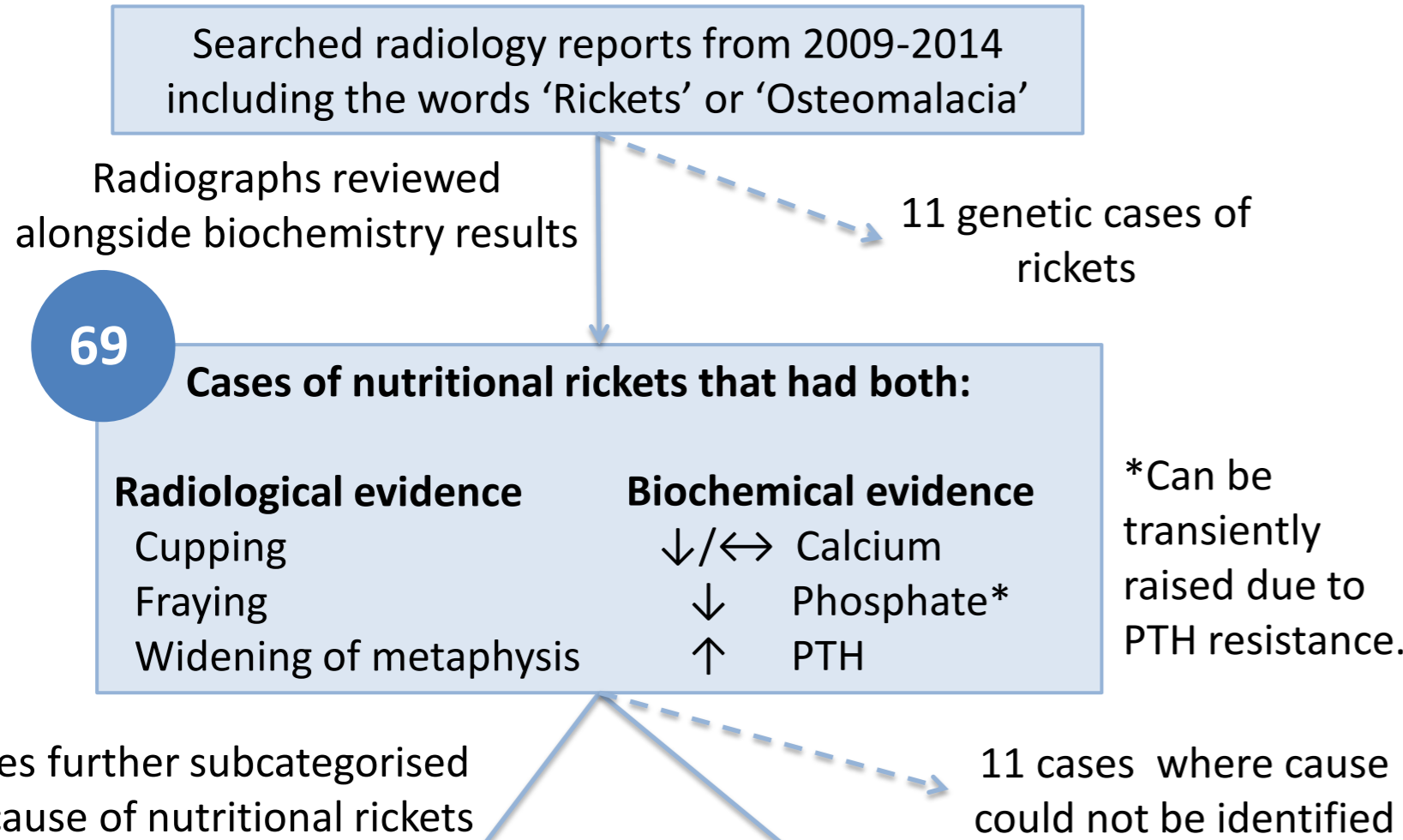
Rickets is a childhood condition characterised by impaired mineralisation of the growth plate and osteoid. This causes characteristic bony deformities in toddlers, as shown by the images on the left.

The most common cause of rickets is due to vitamin D deficiency. It can also sometimes occur due to calcium deficiency although this has mainly only been reported in developing countries. Recently, Goldacre et al¹ found that the number of cases of rickets are increasing and are currently the highest they have been for 5 decades.

Aims

- Determine how the number of cases of rickets seen at Royal Manchester Children's Hospital (RMCH) varied from 2009 to 2014
- Identify the cause for these cases
- Determine how many of the cases required admission

Methods



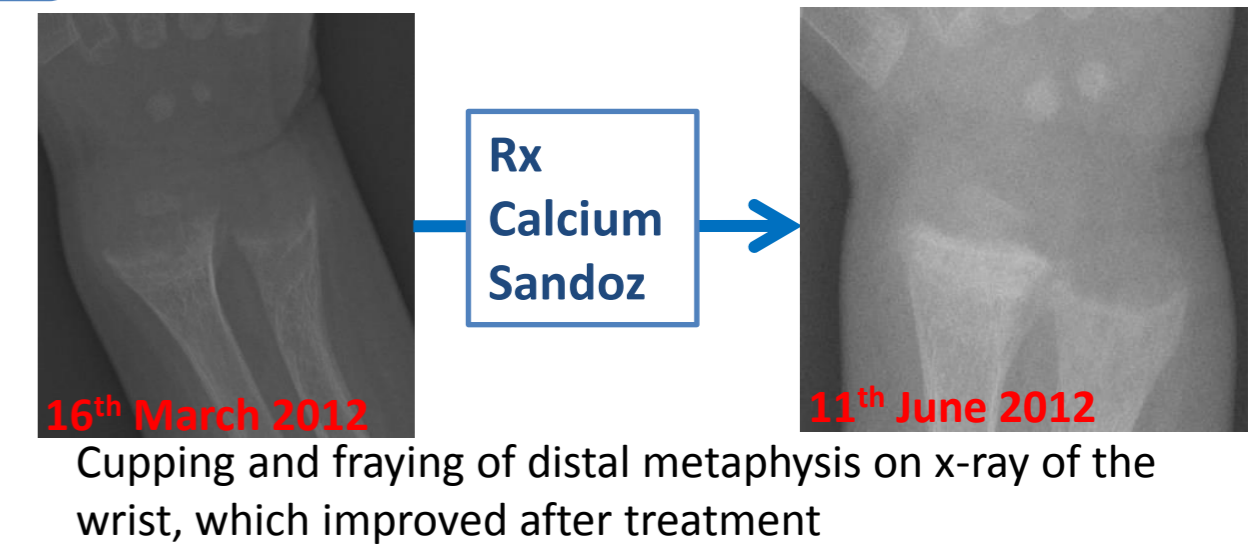
Cause of rickets

- 56 Cases of vitamin D deficiency rickets
25-Hydroxyvitamin D < 25 nmol/L
- 2 Cases of calcium deficiency rickets
25-Hydroxyvitamin D > 50 nmol/L
Diet poor in calcium

Ca deficiency case 1

25 month old Sudanese boy

- Presented with delayed walking
- Had allergies to cows milk, fish, egg
- Management:
 - Dalavit 0.6mls OD
 - Calcium (failed to take)
- Diet:
 - Breastfed since birth
 - Refused to drink soya milk
 - Weaning on rice, pasta, potatoes, chicken
- Florid rickets on examination

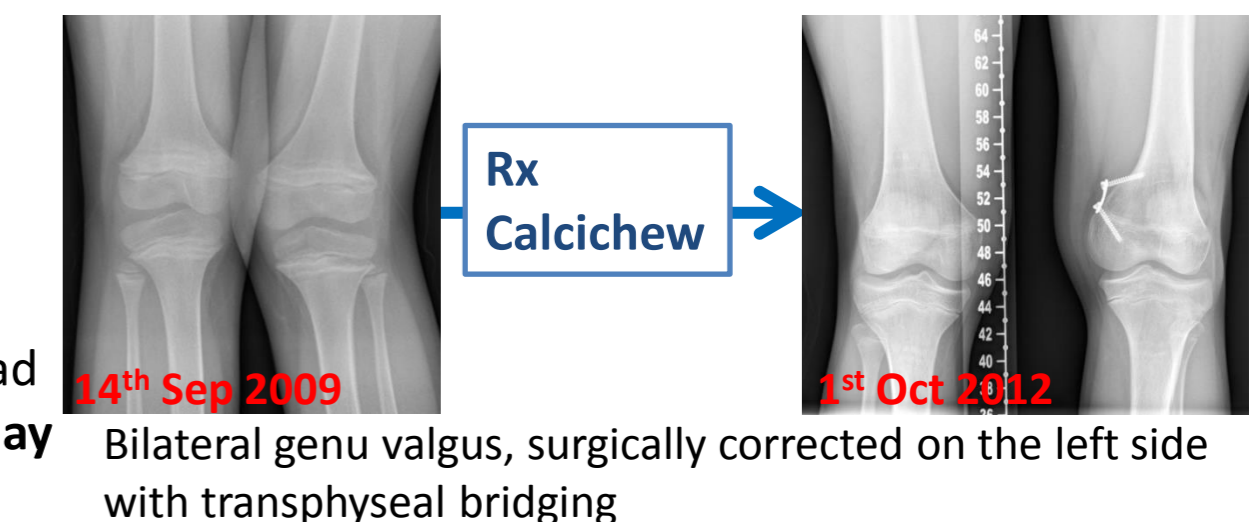


	Case 1	Case 2
Corr Calcium (2.2-2.7 mmol/L)	2.39 → 2.51	1.97 → 2.41
Phosphate (1.05-1.95 mmol/L)	0.79 → 1.50	0.79 → 0.89
ALP (60-300 U/L)	1301 → 180	1898 → 251
PTH (10-60 pg/ml)	465 → 19	865 → 31
25(OH)D (50-70 nmol/L)	70.6 → 78.6	139 → 39.1

Ca deficiency case 2

11 year old African boy

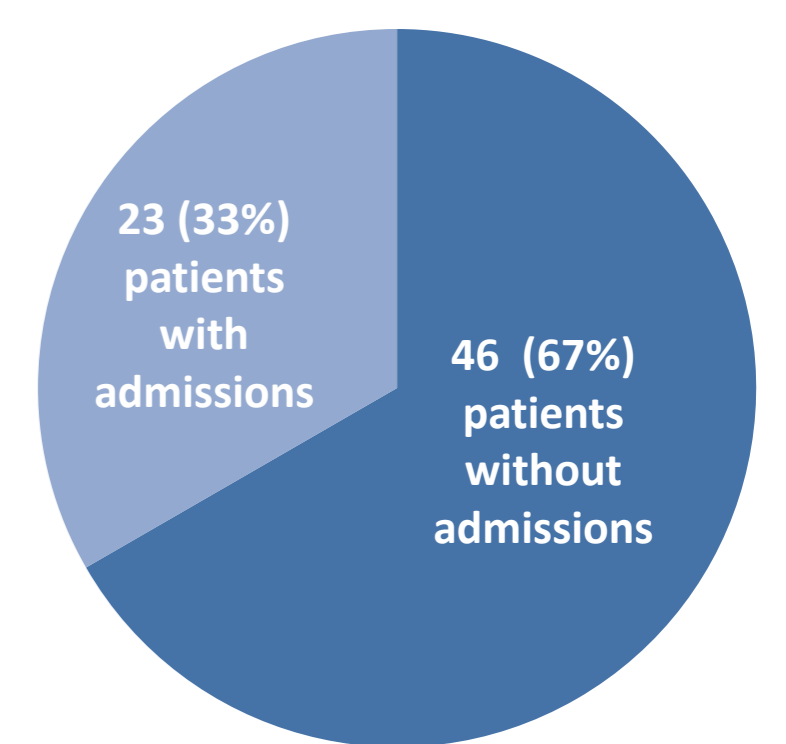
- Presented with bilateral genu-valgus
- Has focal seizures
- Management:
 - Carbamazepine 100mgs BD
 - Not on any supplements
- Diet:
 - No milk/ yoghurt/ cheese, 2 slices bread
- = Estimated calcium intake <200mgs/day (1/5 of his RDA!)**



Cases requiring admission

A third of patients with nutritional rickets were admitted for complications or comorbidities of their rickets and/or vitamin D, totalling at 123 days of admission.

- Causes include:
- 8 Seizures
 - 4 Fractures
 - 2 Tetany
 - 2 Surgeries to correct deformities
 - 1 Dilated cardiomyopathy (37 days of admission)
 - 1 Elective procedure cancelled due to rickets



Conclusions & Recommendations

- The number of cases of nutritional rickets at RMCH have been decreasing since 2009.
- Vitamin D deficiency remains the most common cause of rickets.
 - Prevention via provision of vitamin D supplements is vital
- Rickets due to dietary calcium deficiency exists in the UK.
 - Calcium supplements are important
- Rickets & associated conditions are an important cause of hospital admissions.

Reference

- Goldacre M, Hall N, Yeates DG. Hospitalisation for children with rickets in England: a historical perspective. *The Lancet* 2014; 383(9917):597-8.

Please note

There were 2 patients with calcium deficiency rickets, not 4 as stated in the previous abstract. This is on further review of the patient notes.