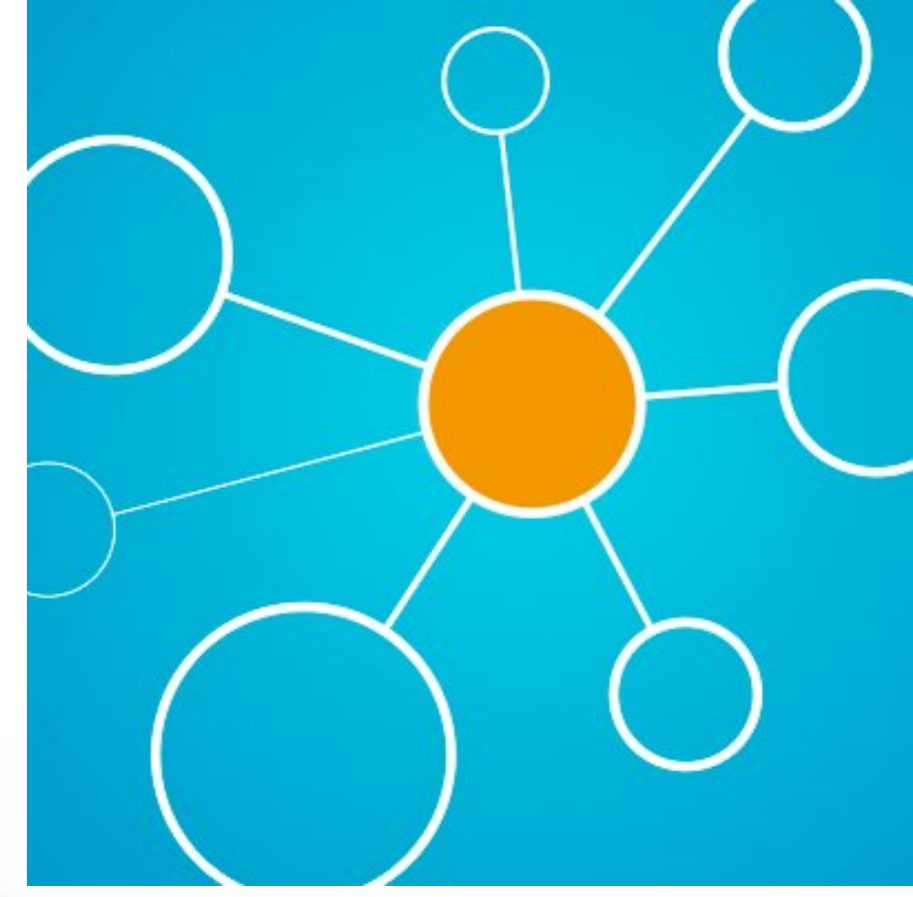# Improving CT cervical spine imaging in the Emergency Department

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Safety concern

- Only 30% of CT c-spines are performed within 1 hour of recognition of risk in Gloucestershire Hospitals
- NICE guidelines state all CT c-spines should take place within 1 hour
- 0.5% of the 2500 patients seen in Gloucestershire Emergency Departments seen each week receive a CT scan of their cervical spine

Aim

To increase percentage of CT scans of c-spine within 1 hour of clinician assign time to 50% by April 2017 without creating additional paperwork or requiring additional funding

Intervention – Medical Education

Week 15 – lunchtime teaching on NICE guidelines

Weeks 15 and 16 – CT c-spine "theme of the fortnight" posters in Gloucestershire ED's

Week 16 – Consultant led group and 1-1 teaching

Week 23 – continuing the improvement – induction teaching with new clinicians

Method

- Retrospective audit of 203 patients receiving CT cervical spine booked from Cheltenham General And Gloucestershire Royal emergency departments from November 2016 to February 2017. Patients were identified on PACS (imaging software) and timing, destination and breach data was collected from Patient First prior to December 2016 and Trackcare post December 2017

- Prospective data collection of 279 patients from February 2017 to May 2017 during intervention period took place in the same manner.

- A new patient data system, Trackcare, came into use in December 2016. New rotations of junior doctor took place in December 2016 and April 2017 (F1, F2, GP), and February 2017 (ACCS trainees)

- 1 hour to CT time was taken from "clinician assign" time to the time the CT was performed as a proxy for the time a risk would be identified

- 1-1 teaching was carried out by 3 consultant volunteers and was unstructured

- Lunchtime teaching took place at structured lunchtime handover meetings in protected teaching time

- 27 additional patients were removed from the audit due to incomplete data sets that would not allow robust analysis

Percentage CT c-spine within 1 hour of clinician assign time
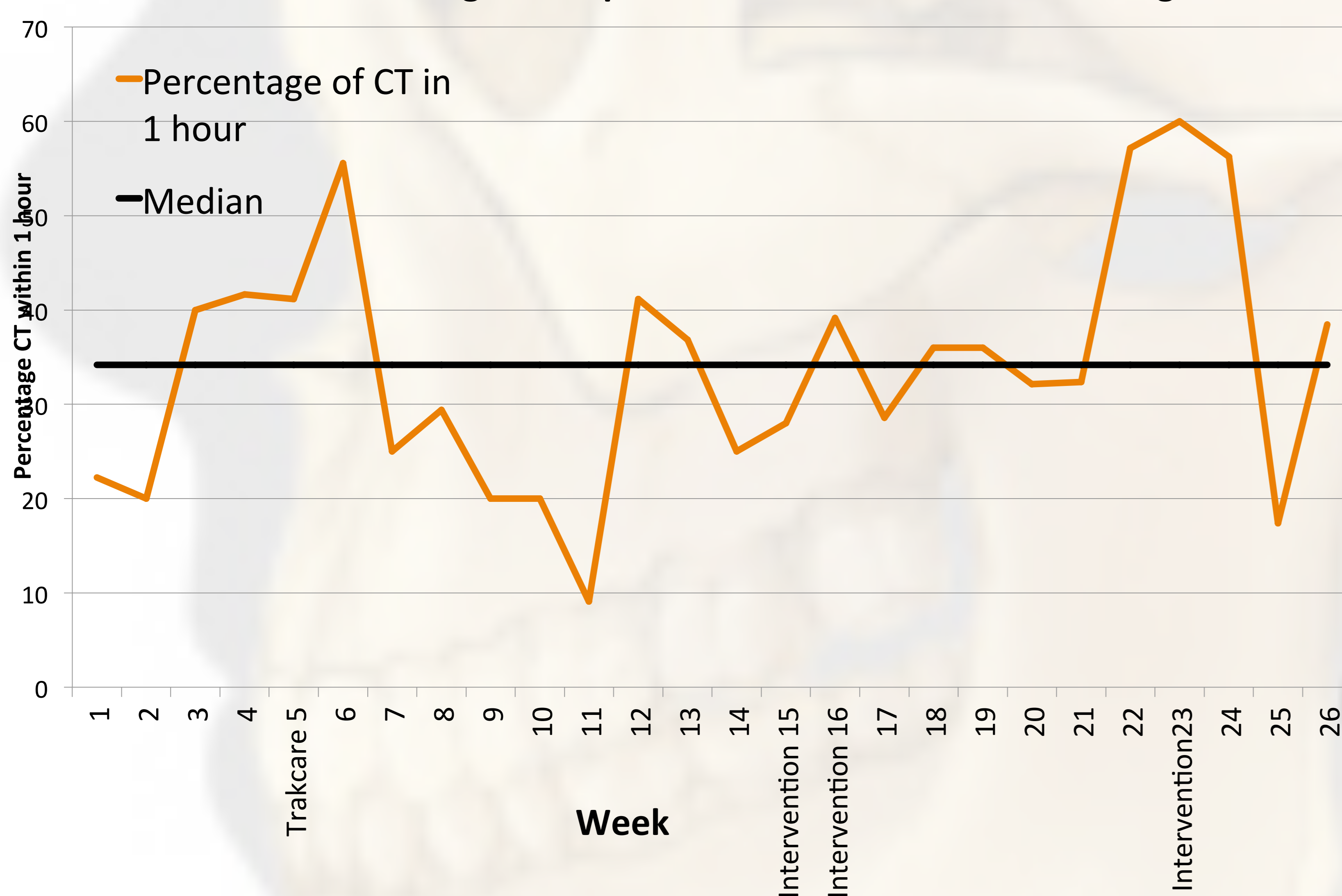
Percentage of total ED attendances by week receiving CT c-spine imaging
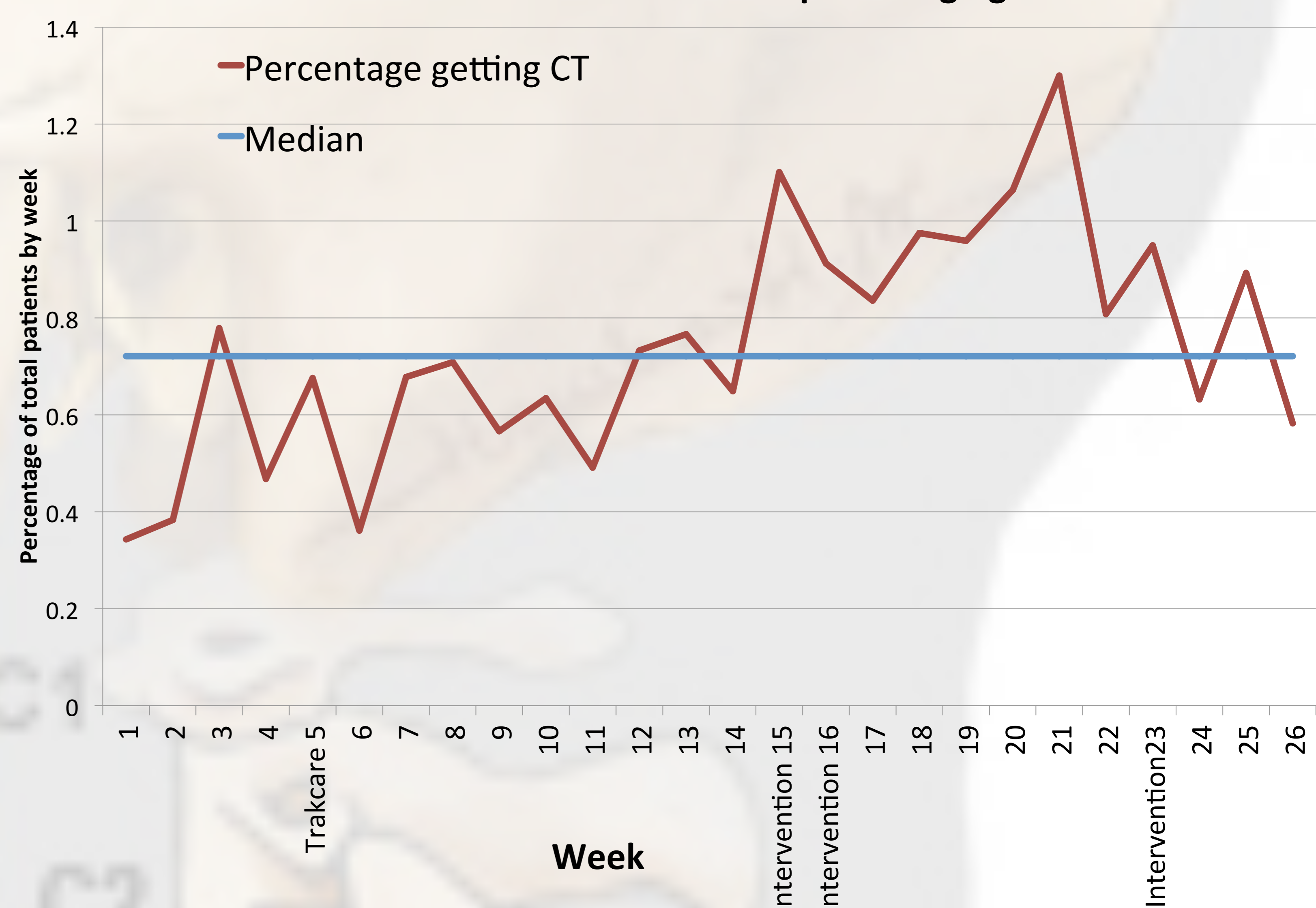
Primary Outcome,

- Non-significant change in percentage of CT spines within 1 hour of assessment (30.5% to 38.4%, 90.1 minutes to 83.4 minutes, (p=0.1453))

Secondary outcomes

- Significant increase in number of CT c-spine (mean 14.5 per week to 23.25 p=0.00026)
- Significant increase in number of CT c-spines within 1 hour (mean 4.5 per week to 8.75 p=0.0004)
- Significant increase in the proportion of patients receiving CT c-spine (0.58% pre-intervention to 0.92% post-intervention p=<0.0001 total ED attendances = 64936)
- No increase in number of non-indicated CT scans
- Significant increase in the number of 4 hour breaches 7.4 patients per week increased to 13.3 patients per week (p=0.0131)

Conclusion and next steps

- The interventions significantly increased the number and proportion of patients receiving appropriate imaging, and increased the number of patients receiving their CT scan within 1 hour of assessment.

- This improvement was made without any additional financial input, minimal time of clinician input into teaching and without generating unnecessary documentation

- Existing departmental education resources and processes such as "theme of the fortnight", consultant "shop-floor" teaching and lunchtime teaching are robust methods of enacting change

- The cost associated with this was a significant increase in the number of patients going beyond the 4 hour breach target

- Future improvements should focus on consolidation of this process, and alternative improvements such as improved triage to reduce time to CT booking in appropriate patients

References
- NICE Investigation for injuries to the cervical spine in patients with head injury December 2016
- Perla R et al, "The run chart: a simple analytical tool for learning from variation in healthcare processes" BMJ Qual Saf 2011;20:46e51
- Graphpad scentific software – statistical analysis
- Microsoft powerpoint and excel
- Background image courtesy of Mayfied Clinic