



## Background

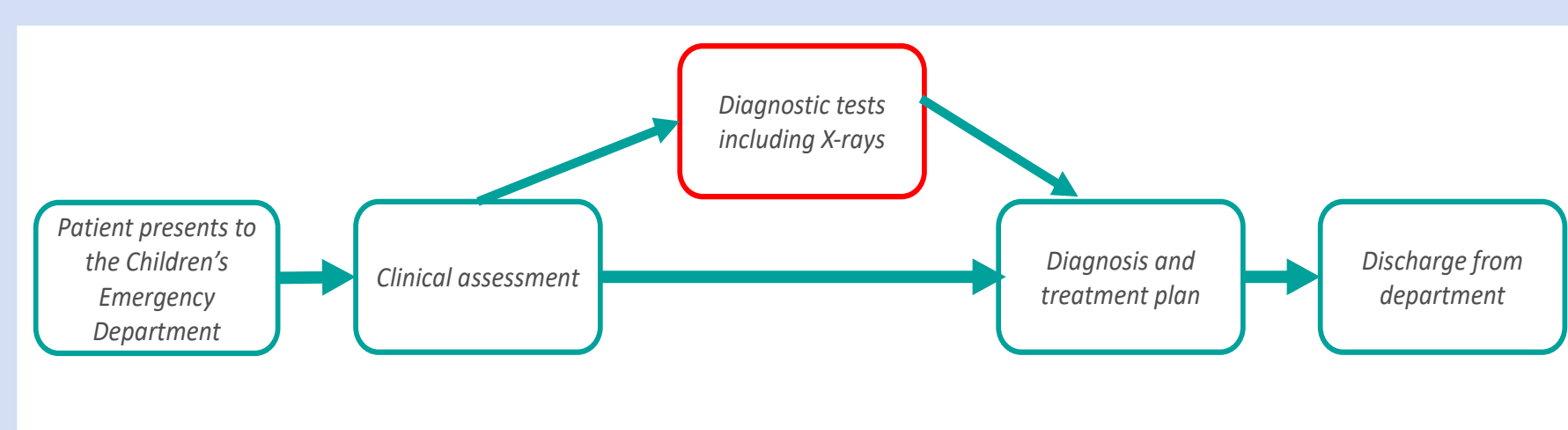
With increasing pressures on our Children's Emergency Departments (CED), we constantly strive to improve efficiency whilst optimising patient care and safety. Unnecessary tests contribute to departmental crowding and impact patient safety.

## Problem Statement

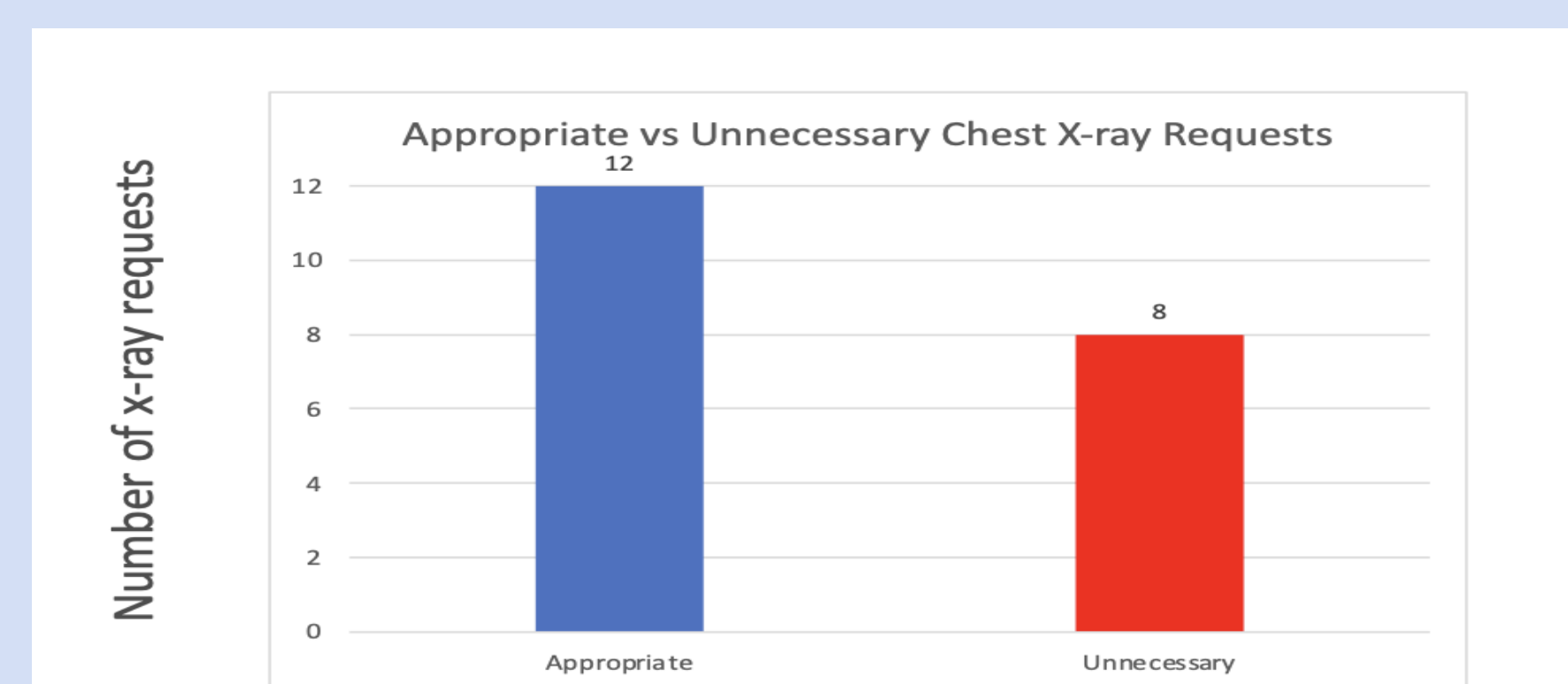
We subject children to unnecessary X-rays causing them **harm** and **costing money**. They're exposed to damaging radiation and stay longer, placing **extra burdens** on the child, family and NHS.

## Diagnostics

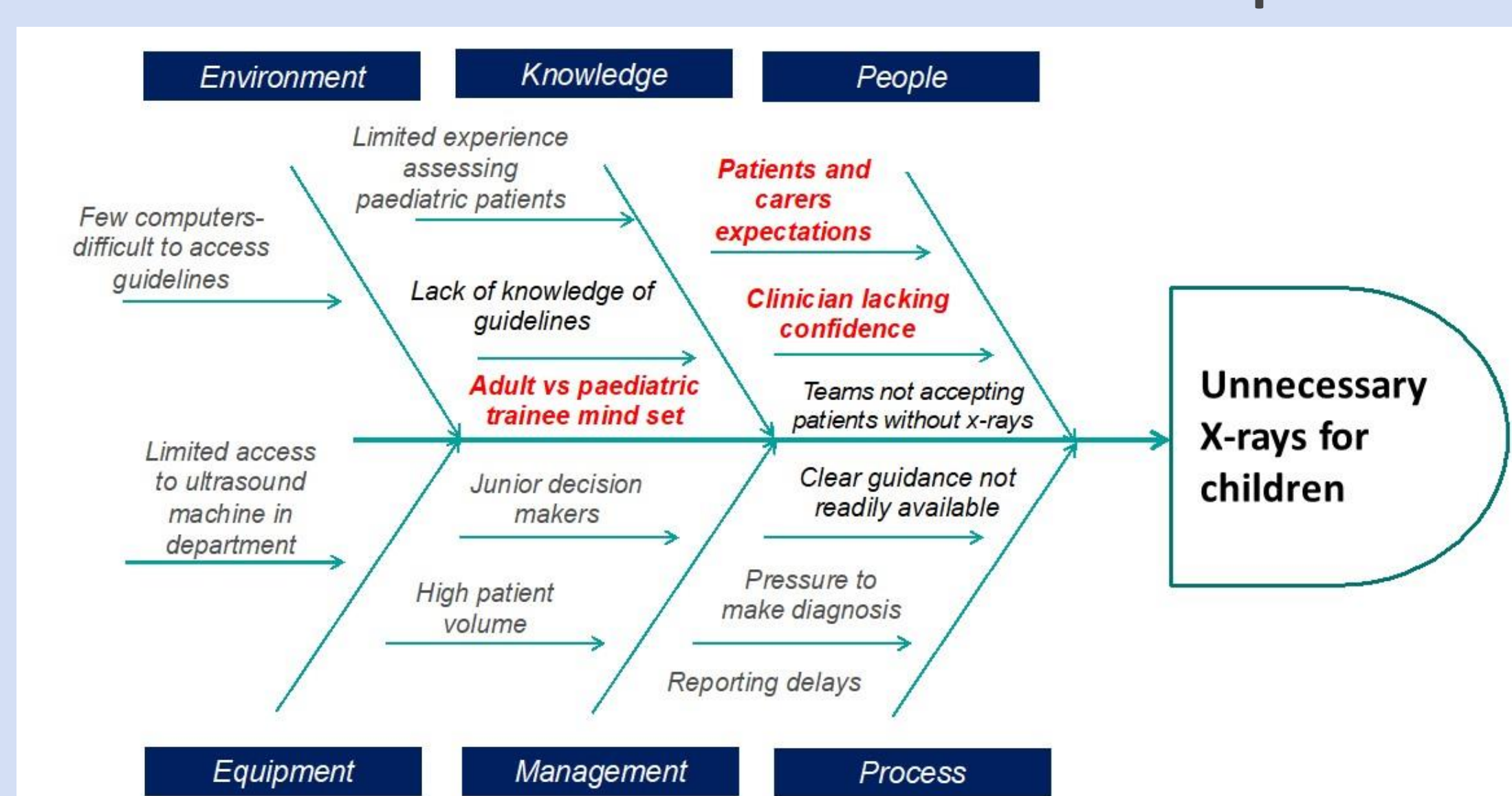
### Process map



### How appropriate were requests at baseline?



### Fishbone: Which factors contribute to this problem?



## Aim & Measurements

**Aim:** Reduce unnecessary chest X-rays for children in our CED from 1 in 2 to less than 1 in 5

**Chosen measure:** Appropriate versus unnecessary chest X-rays in children presenting to our CED based on national or local chest X-ray guidance

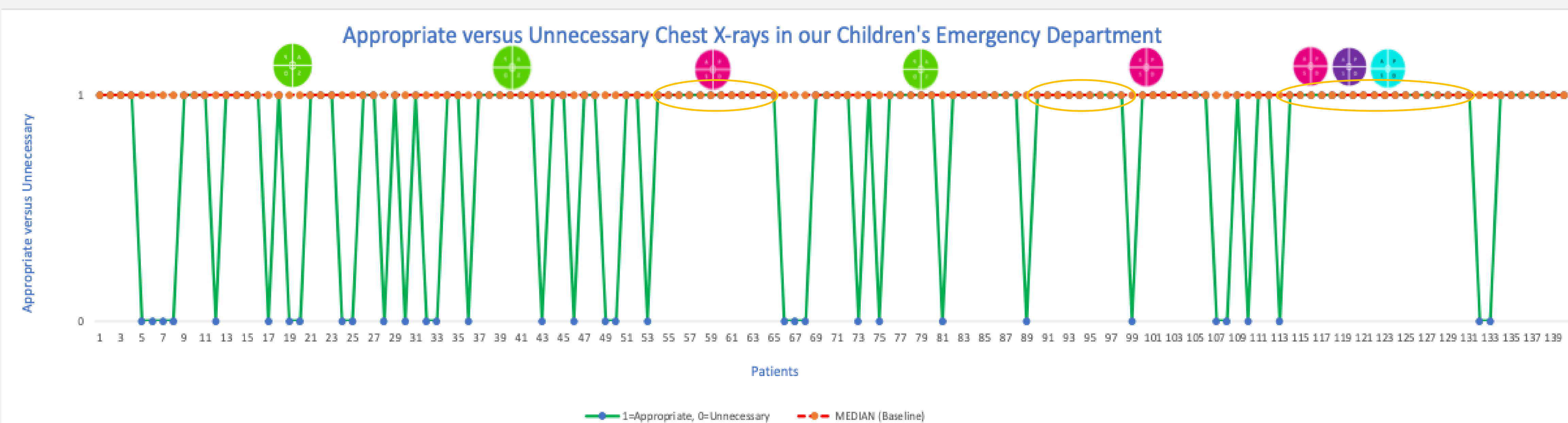
**Inclusions:** All children and young people seen in our CED who undergo a chest X-ray

**Exclusions:** None

## PDSA cycles

| PDSA | PLAN                                                                                                                                                                             | DO                                                                                                                                                                                                                     | STUDY                                                                                                                                                                                       | ACT                                                                                                                                                                                                                                                      | PDSA | PLAN                                                                                                               | DO                                                                                                                                                                                                                                                              | STUDY                                                                                                                                                                     | ACT                                                                                                                                                                                               |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.0  | Development of a survey to help me understand in which scenarios clinicians feel that a chest x-ray is warranted, to establish a consensus to base further interventions around. | Survey created on google forms<br>Link sent via email to all consultants in department (13)<br>6 responses<br>Many comments in the additional comments section, difficult to ascertain which question they related to. | More varied responses than expected<br>Not full consensus on national guidance<br>Survey design needs adjusting                                                                             | <ul style="list-style-type: none"> <li>Add the option to select 'other' and a 'comments' section to survey questions</li> <li>Another question added to survey around fever no focus</li> <li>Send survey to all clinicians requesting x-rays</li> </ul> | 3.0  | Departmental teaching at monthly departmental review meeting (Packed lunch)                                        | Storyboard presented and teaching delivered on all learning points covered so far in QI project<br>Attendees included senior nursing staff, consultants and junior doctors.                                                                                     | Good feedback from session from colleagues                                                                                                                                | <ul style="list-style-type: none"> <li>Consultant asked if all the key points of teaching session could be shared in weekly newsletter</li> </ul>                                                 |
| 1.1  | Updated consensus survey and sent to everyone who requests x-rays in the department via email                                                                                    | Sent to over 30 clinicians via email One response.                                                                                                                                                                     | I presume this is due to a degree of survey fatigue and high volume of emails. Need another way to reach people                                                                             | <ul style="list-style-type: none"> <li>Introduced department to the project via our Education and Info group and shared survey</li> </ul>                                                                                                                | 4.0  | Chest X-ray game 'To request or not to request' was developed based on cases I had reviewed during data collection | Prototype of game trialed on 3 colleagues<br>Each card has case on one side of the card. The player is asked to divide cases into yes and no columns. When they flip card they see if they are correct and the national guidance is explained under the answer. | Feedback gathered on the wording of questions within the game                                                                                                             | <ul style="list-style-type: none"> <li>Some questions edited</li> </ul>                                                                                                                           |
| 1.2  | A brief overview of aim and rationale for project shared with the departmental MDT via Whatsapp. Link to survey also shared.                                                     | Whatsapp group has 175 members<br>3 additional responses to the survey                                                                                                                                                 | The 3 areas of consensus were: Pneumonia/Bronchiolitis/Wheeze. Raised awareness of project in the department; Discussions heard around whether X-rays being requested were necessary or not | <ul style="list-style-type: none"> <li>Use three areas of consensus from survey results to develop education bulletin to share with team</li> <li>Abandon survey</li> </ul>                                                                              | 4.1  | To request or not to request game launched                                                                         | Members of the team invited to play<br>A leaderboard created with names and their scores on the board                                                                                                                                                           | Team enthusiastic to play<br>Lots of debate and healthy competition around the game<br>11 team members have played so far                                                 | <ul style="list-style-type: none"> <li>Continue to play with team members who request x-rays</li> <li>Could be used at inductions to help inform new starters about national guidance.</li> </ul> |
| 2.0  | Baseline data to be shared with department via email and in weekly newsletter in addition to learning around the three areas of consensus                                        | Infographic created to highlight national guidance on correct use of chest X-rays<br>Review requests for unnecessary X-rays.                                                                                           | Data collection to monitor progress<br>Themes identified.                                                                                                                                   | <ul style="list-style-type: none"> <li>Use themes to select 'Problem of the week'</li> </ul>                                                                                                                                                             | 5.0  | Share progress of project with the team through the weekly newsletter                                              | Update included a run chart to demonstrate the team's success. Problem area of the week learning point also shared in addition to sharing who was top of the 'X-ray games' leaderboard                                                                          | Data still to be collected<br>Anecdotal evidence from nurses that they feel the project is working one colleagues stated "we are taking way less patients for x-ray now!" | <ul style="list-style-type: none"> <li>Further PDSA cycles to come</li> </ul>                                                                                                                     |
| 2.1  | Education bulletin to be developed based on main problem area of the week: Community acquired pneumonia                                                                          | Education bulletin on community acquired pneumonia shared in weekly newsletter<br>Review requests for unnecessary X-rays.                                                                                              | Data collection to monitor progress<br>New 'Problem of the week identified'                                                                                                                 | <ul style="list-style-type: none"> <li>New theme selected for next 'Problem of the week'</li> <li>Data shared with the team</li> </ul>                                                                                                                   |      |                                                                                                                    |                                                                                                                                                                                                                                                                 |                                                                                                                                                                           |                                                                                                                                                                                                   |
| 2.2  | Education bulletin developed based on: fever with no focus                                                                                                                       | Education bulletin shared via weekly newsletter<br>Review requests for unnecessary X-rays.                                                                                                                             | Data collection to monitor progress<br>Information in weekly newsletter not reaching all team members                                                                                       | <ul style="list-style-type: none"> <li>Share data with team</li> </ul>                                                                                                                                                                                   |      |                                                                                                                    |                                                                                                                                                                                                                                                                 |                                                                                                                                                                           |                                                                                                                                                                                                   |

## Run Chart



## Conclusion

The frequency of unnecessary chest X-rays being performed **reduced significantly** (> 6 data points on the baseline median) with the improvement being sustained for longer periods of over the duration of the project.

In the last data sample, **9/10** chest X-rays requested were in keeping with national guidance. Thus we have met our initial aim of reducing unnecessary chest x-rays to less than 1 in 5 (2 in 10).

However, the interventions thus far may not be sufficient to sustain the change over longer periods of time and will not avoid all unnecessary x-rays. Further PDSA cycles are therefore planned to achieve lasting change within the department.

