

## Learning Objectives

- Describe successful strategies that can be used to improve the use of chest X-rays in pediatric intensive care units.
- Explain how to implement quarterly improvement reports to monitor progress and drive improvement work.

## Overview

While chest radiography in intensive care units (ICUs) is necessary for many reasons, repeat X-rays required because of poor image quality can result in unnecessary patient exposure to radiation as well as additional costs.

Upon review of our benchmark data, we determined that our utilization of chest X-rays in pediatric ICU patients was higher than expected.

As a result, we undertook a respiratory therapy (RT) co-led project that resulted in a reduction in chest X-ray use from above to below peers' average use within one year.

## SMART Aim

Problem/Issue: Our use of chest x-ray Mean Day per Case and Percent Utilization was above the peer benchmark.

SMART AIM/Goal: Decrease chest x-ray Mean Day per Case 5.2 use to 4.9 use, closer to peer benchmark of 4.2 by the end of FY 2022.

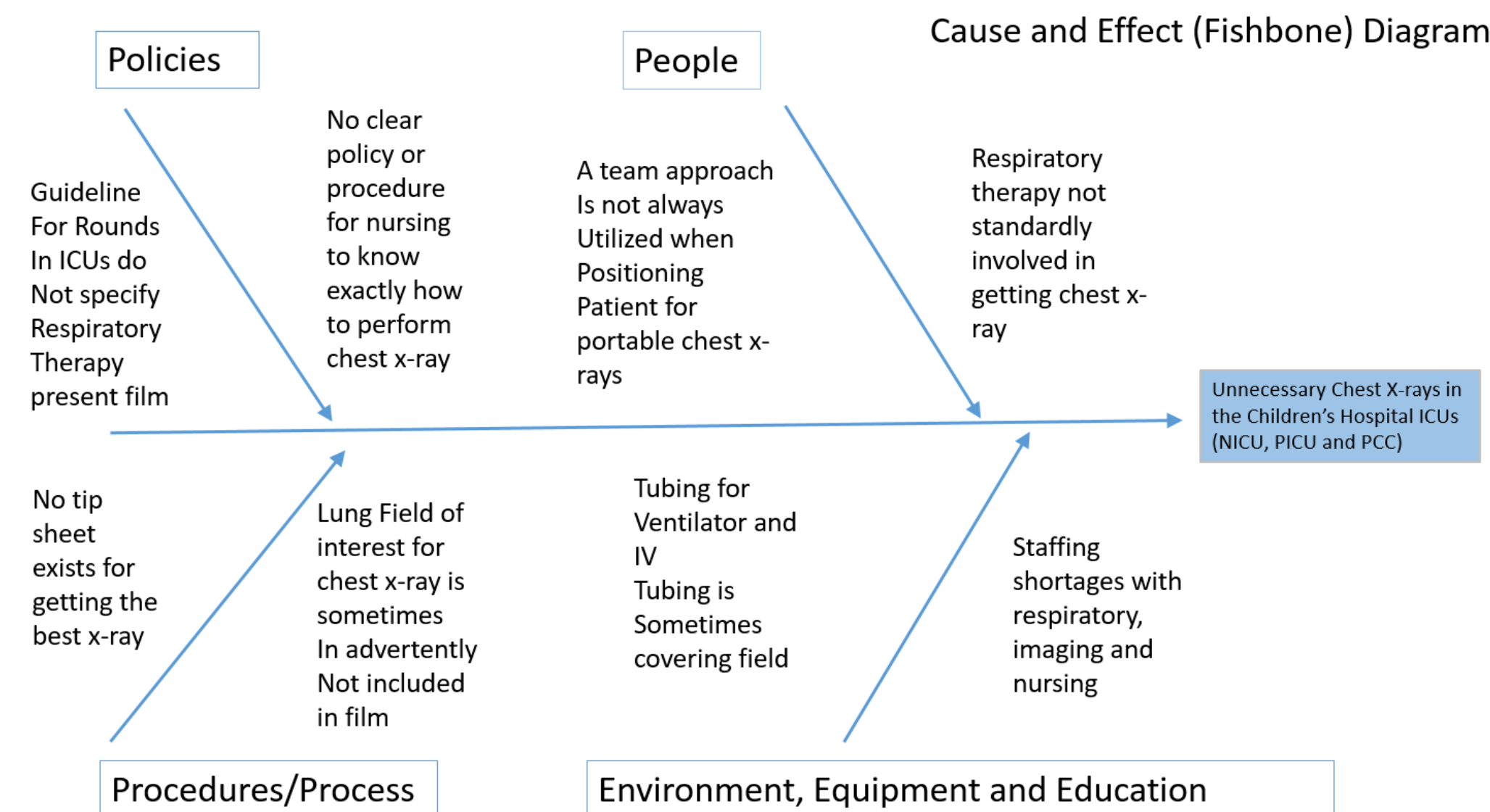
## Disclosure

No one in a position to control the content of this educational activity has relevant financial relationships with ineligible companies

## Methods: Cause and Effect Diagram, Key Driver Diagram,

Our quality improvement team utilized some of the tools that are helpful at the start of a project. These tools include:

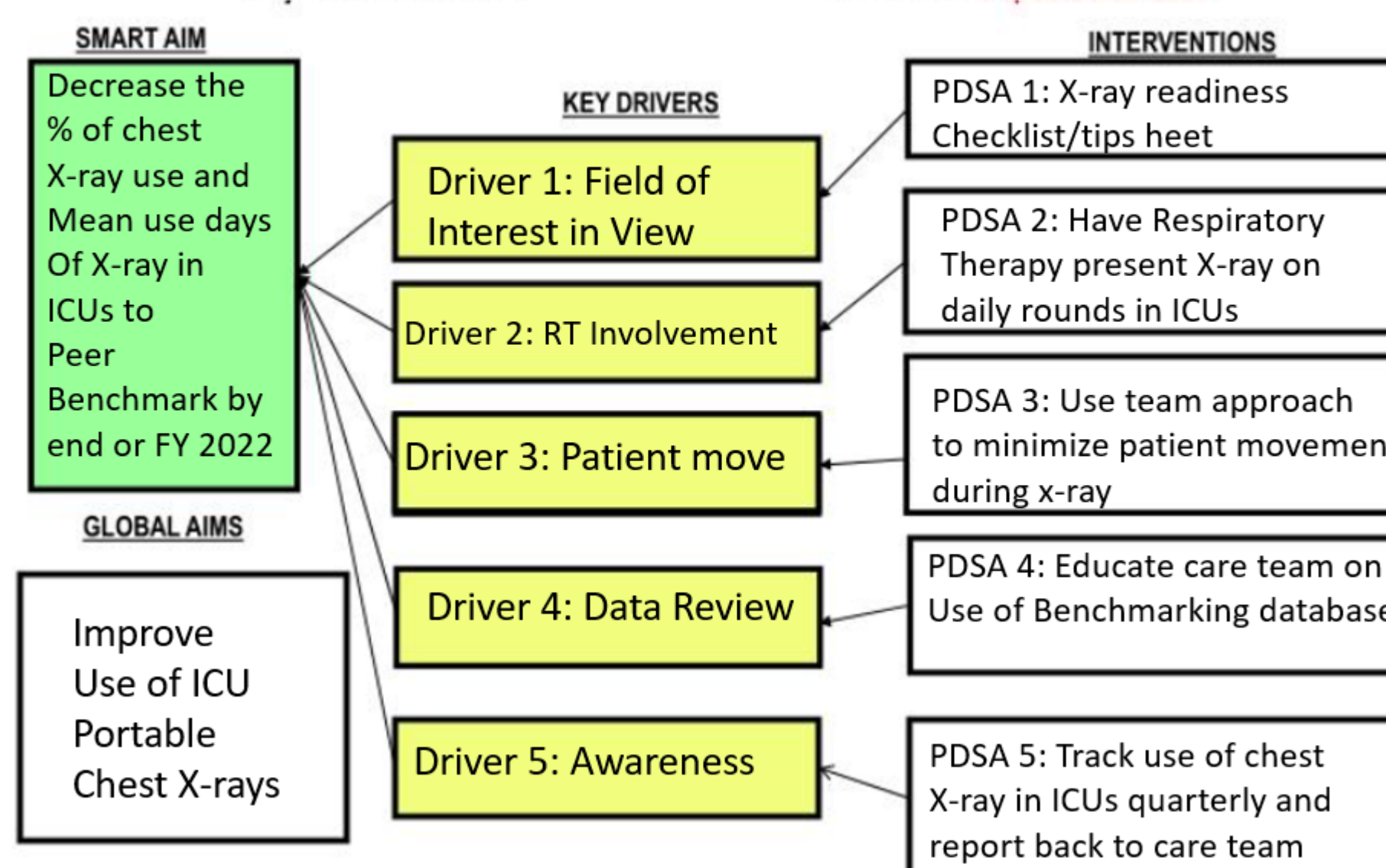
- Key Driver Diagram
- Cause and Effect Diagram also referred to as a Fishbone Diagram or an Ishikawa Diagram



<https://www.urmc.rochester.edu/childrens-hospital/respiratory-care.aspx>



## Chest X-ray Reduction In ICU Quality Improvement Project Key Driver Diagram KDD

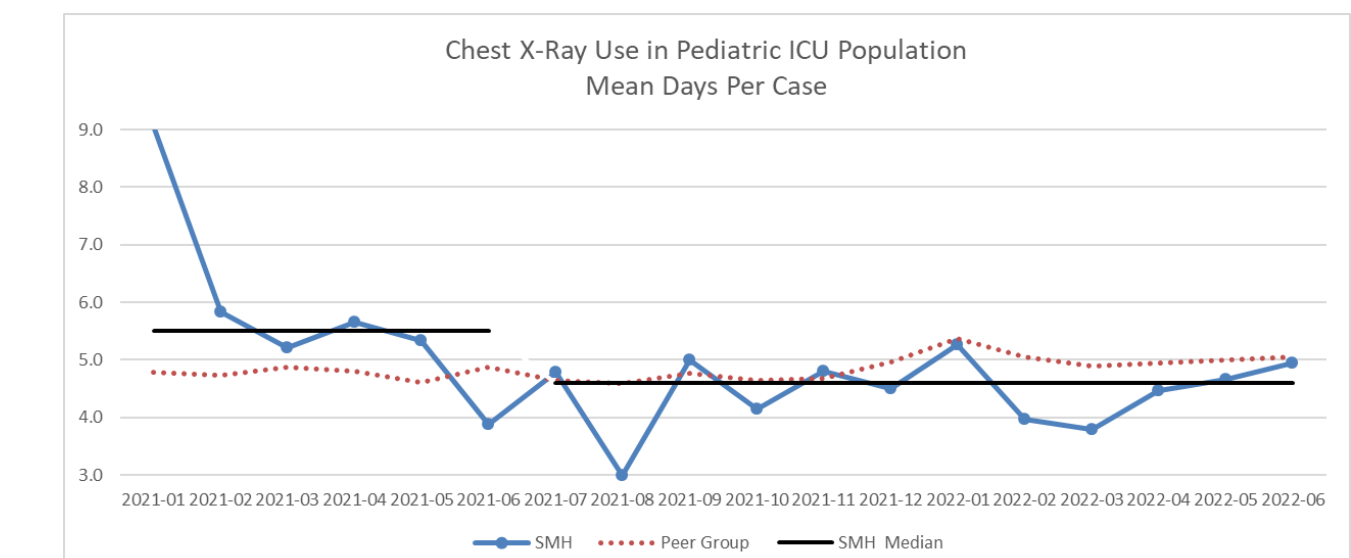


## Chest X-ray Readiness Tip Sheet

**Xray Readiness**

- Don't be in a rush, be sure that tube is flush.
- Don't be a dum dum, measure from the gum/sun/teeth!
- If you want it to be fine, be sure your patient is midline!
- Be sure tape or commercial tube holder is properly secured to patient's face. There is no tension on the ET tube.
- Remove anything that might cause artifact out of the xray view. Remove clothes, cooling blanket, positioners, reposition patient's hands, relocation of lines and ventilator circuit.
- Be sure all anatomical markers are visible.
- Neutral Position of Head:
  - The position of the ET is dependent on the position of the head, if the neck is flexed, the tip of the tube descends in the trachea.
  - The carina is usually projected over T5-T7 (it descends with increasing age).
  - In children, the trachea is shorter, and the optimum position for the tip of the ET is 3.5 cm above the carina.
  - When the carina cannot be measured visually due to technical factors the ideal position of ET is in the middle third of trachea at T2 to T4 level with the neck in neutral position.
    - Flexed: 3 cm (a 2 cm above carina appears lower on xray)
    - Neutral: 5 cm above carina
    - Extended: 7 cm (a 2 cm above carina appears higher on xray)

## Results



## Lessons Learned and Key Take Aways

- The comparative data allowed us to benchmark resource utilization against peer organizations
- Opportunities for improvement were identified by our RT and Imaging team
- Requiring a High Value Practice goal on all Departmental Quality Assurance and Performance Improvement (QAPI) plans helped garner organizational support for the effort and recognition for gains



# Cause and Effect (Fishbone) Diagram

Policies

Guideline For Rounds In ICUs do Not specify Respiratory Therapy present film

No clear policy or procedure for nursing to know exactly how to perform chest x-ray

People

A team approach Is not always Utilized when Positioning Patient for portable chest x-rays

Respiratory therapy not standardly involved in getting chest x-ray

Repeat Chest X-rays in the Children's Hospital ICUs (NICU, PICU and PCC)

No tip sheet exists for getting the best x-ray

Lung Field of interest for chest x-ray is sometimes Inadvertently Not included in film

Tubing for Ventilator and IV Tubing is Sometimes covering field

Staffing shortages with respiratory, imaging and nursing

Procedures/Process

Environment, Equipment and Education

# Chest X-ray Reduction In ICU Quality Improvement Project

## Key Driver Diagram KDD

