Enhancing Timeliness of STAT Portable Radiographs in the Pediatric Intensive Care Unit

Children's Hospital of Philadelphia

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Background

High-priority radiology exams are essential for addressing urgent patient needs in the PICU.

Timely and precise portable radiographs are crucial for guiding clinical decisions and optimizing patient outcomes.

Misclassification of STAT orders can overwhelm the system, leading to delays in care and increased stress on X-ray technologists.

STAT orders should be swiftly addressed as they involve urgent conditions requiring immediate intervention.

SMART GOAL

By July 2024, increase the percentage of portable x-ray exams with a response time (exam order to exam begun) within 30 minutes from 55% to 80% and the volume of appropriate STAT priority exams from 38% to 80%.

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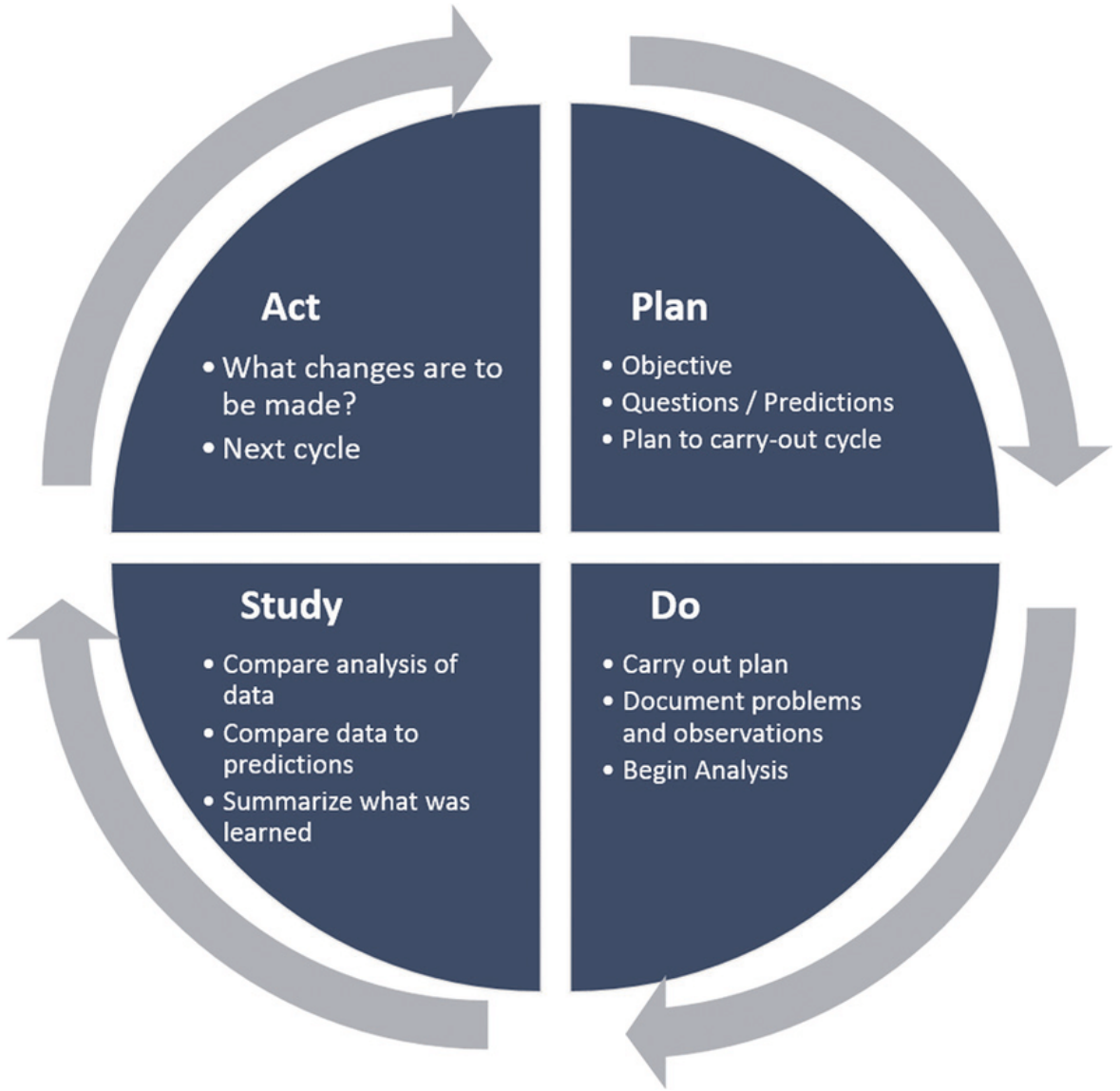
Methods

- Setting: Pediatric Intensive Care units at Children's Hospital of Philadelphia
- *Realizing Improvement Through Team Empowerment* (*RITE*) *methodology*
  - PDSA framework
- Multidisciplinary Team-based approach



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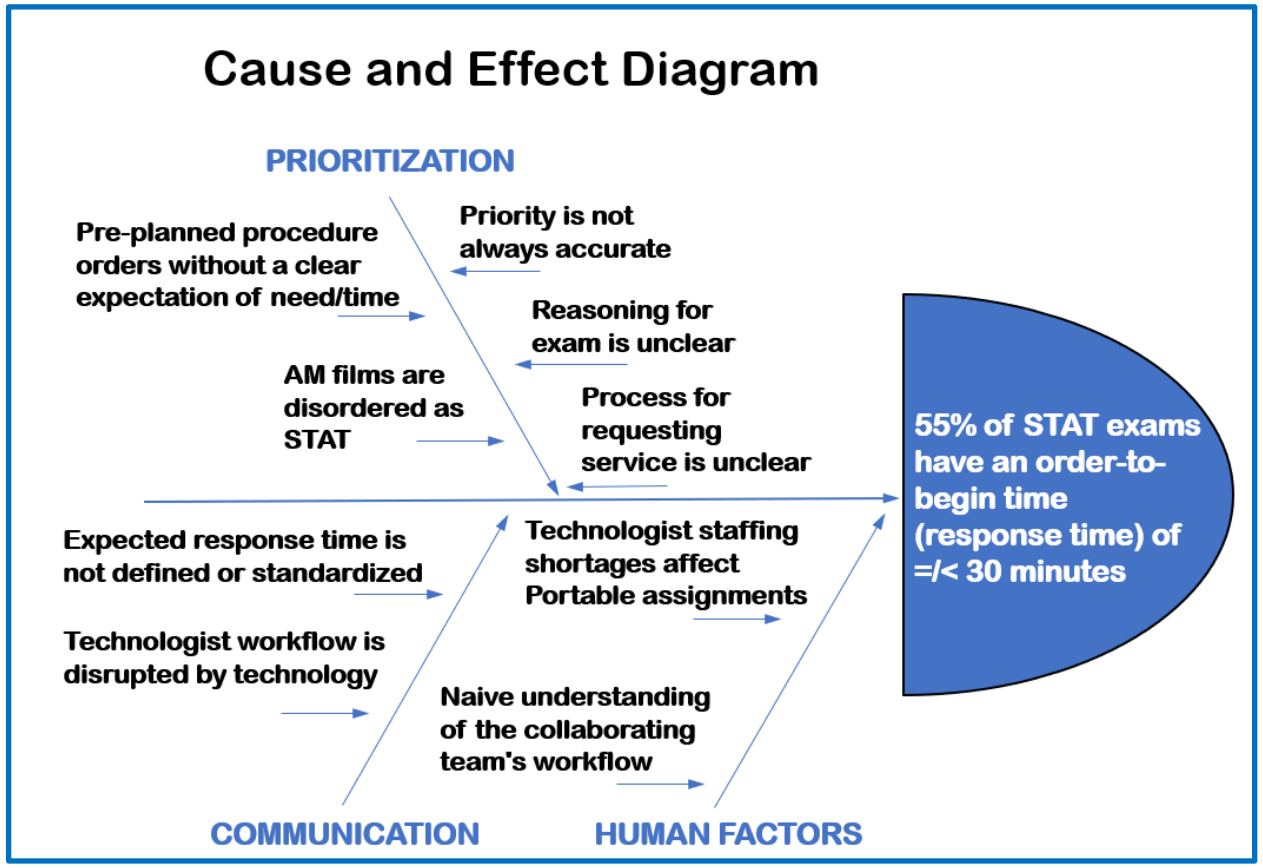
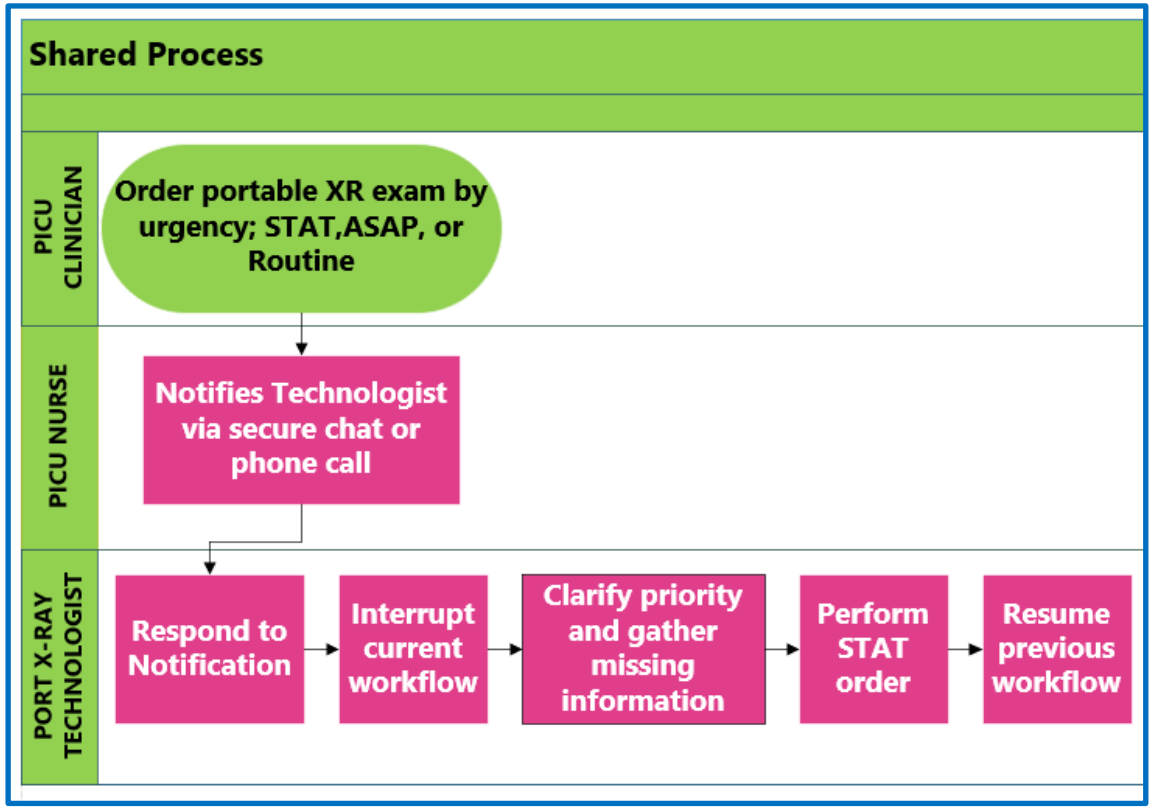
Analysis



Baseline Process Map



Key Drivers

Root Causes - Clinical Priority Criteria

- It is difficult to discern which symptoms are appropriate for STAT
- Non stat criteria are frequently ordered STAT.
- STAT priority is being used for personal workflow management

Root Causes - Response Time

- The communication process for requesting/providing service is unclear
- The prioritization and timing of completing orders is unclear
- The clinical appropriateness for STAT orders is unclear
- Safety reporting is contributing to the dismantling of a collaborative culture

Key Drivers

Clinical Priority Criteria

Create and use a standard criteria for STAT & ASAP orders

Clear communication of urgency in reason for exam

Response Time

Create a structured communication process between nursing and technologists

Clear and consistent method for completing orders

Develop a staffing model that supports timely completion of orders

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Interventions

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Key Drivers	Interventions
Create and use a standard criteria for STAT & ASAP orders	Edit order sets with correct priority
Clear communication of urgency in reason for exam	Ordering clinicians use list of criteria to determine priority

PICU XR Priority Pilot				
Priority	Support Devices	Resp/Cardiac	Abdomen	Other
STAT (30 min)	▪ Support device, new in sterile field ▪ Support device, unstable in airway or large vessels ▪ New ETT	▪ Pneumothorax new or unstable ▪ Resp distress, severe ▪ Hemoptysis new or unstable	▪ Vomiting, bilious ▪ Pneumoperitoneum unstable or new ▪ Bowel ischemia/NEC concern	▪ s/p Cardiac arrest ▪ s/p OR ▪ s/p Outside transfer, intubated ▪ concern for foreign body
ASAP (1 hr)	▪ Support device, adjusted ▪ New sump ▪ Intracranial shunt concern	▪ Pneumothorax or air leak, known ▪ Resp distress, moderate ▪ Tachycardia ▪ New fever	▪ Vomiting, non-bilious ▪ Abdominal distention otherwise stable	▪ s/p Bronchoscopy ▪ s/p Outside transfer, non-intubated ▪ Fracture, suspected
All other indications should be ordered as "ROUTINE"				
				Version 5

- Guide the priority of imaging needs
- Standard language clearly communicates what is needed and why
- Daily morning films are ROUTINE
- The response times meet the needs of the patient in the most optimal manner

Interventions

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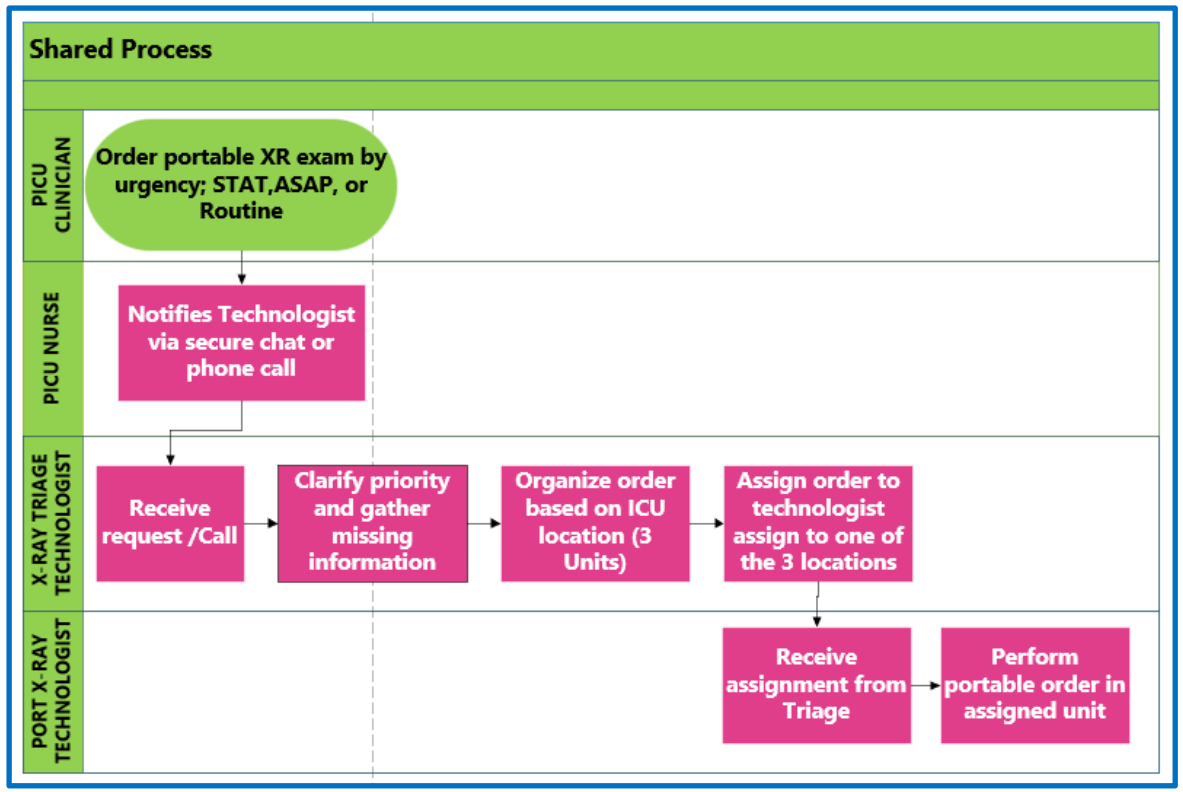
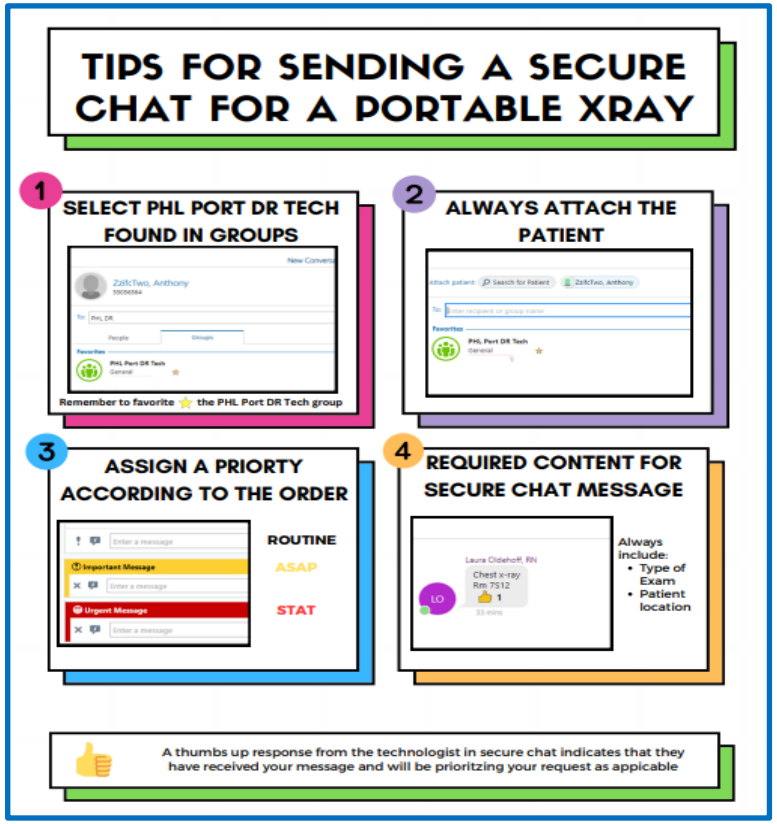
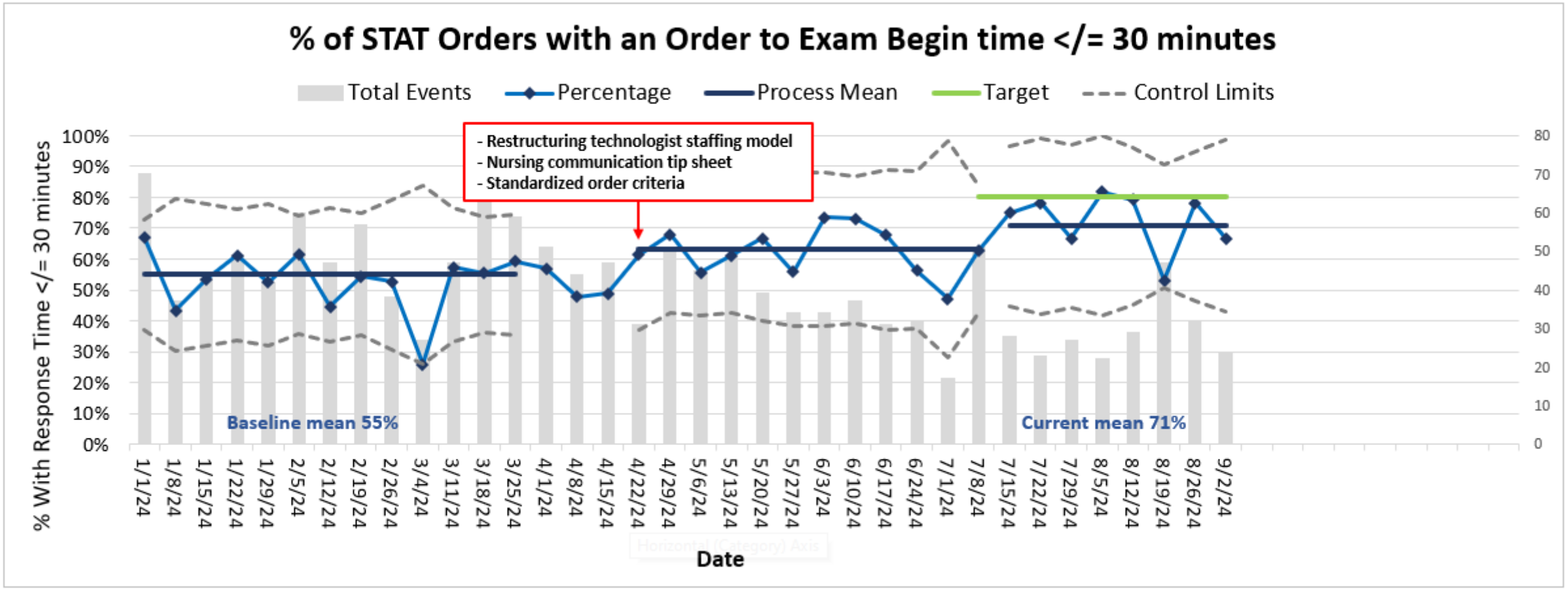
Key Driver	Interventions
Structured communication process between nursing and technologists	Introduce a "TIP SHEET" to request portable radiographs
Develop a staffing model that supports timely completion of orders	Triage tech to manage all requests and assign to Portable Technologists
Clear and consistent method for completing orders	Three Technologists on portables for 4 hours with divided assignments





Results



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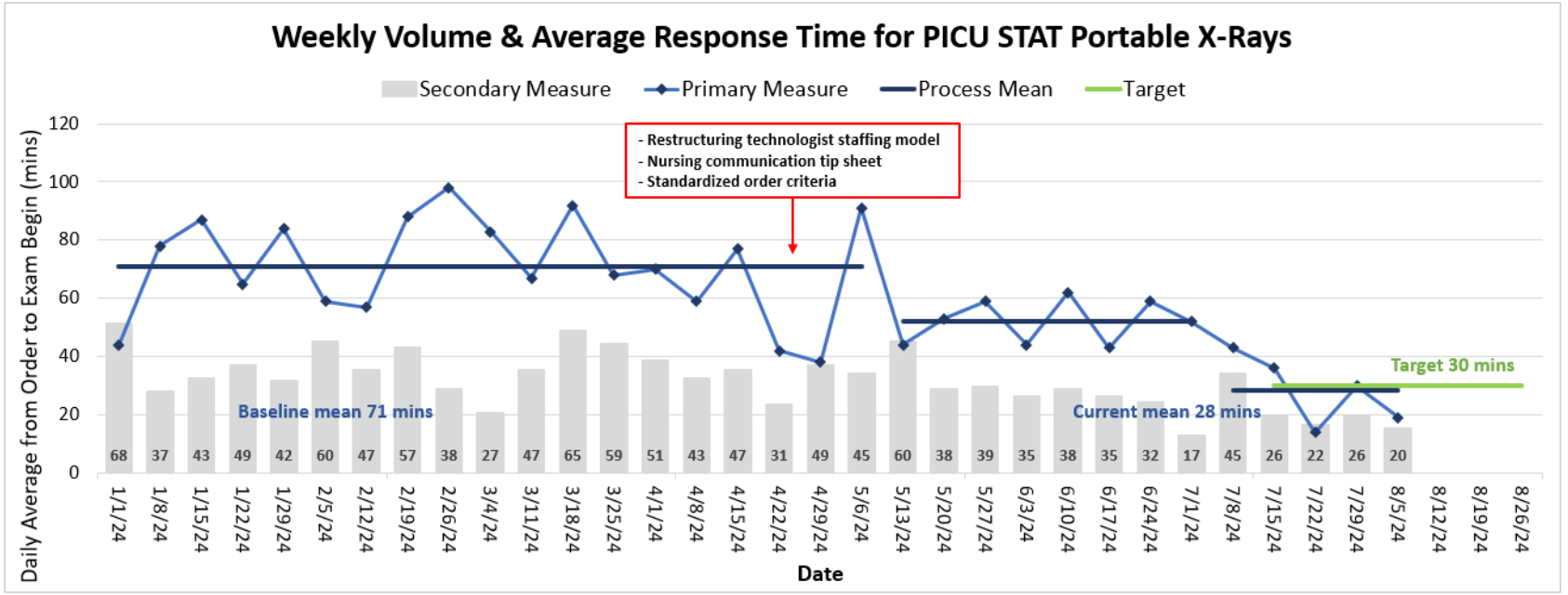
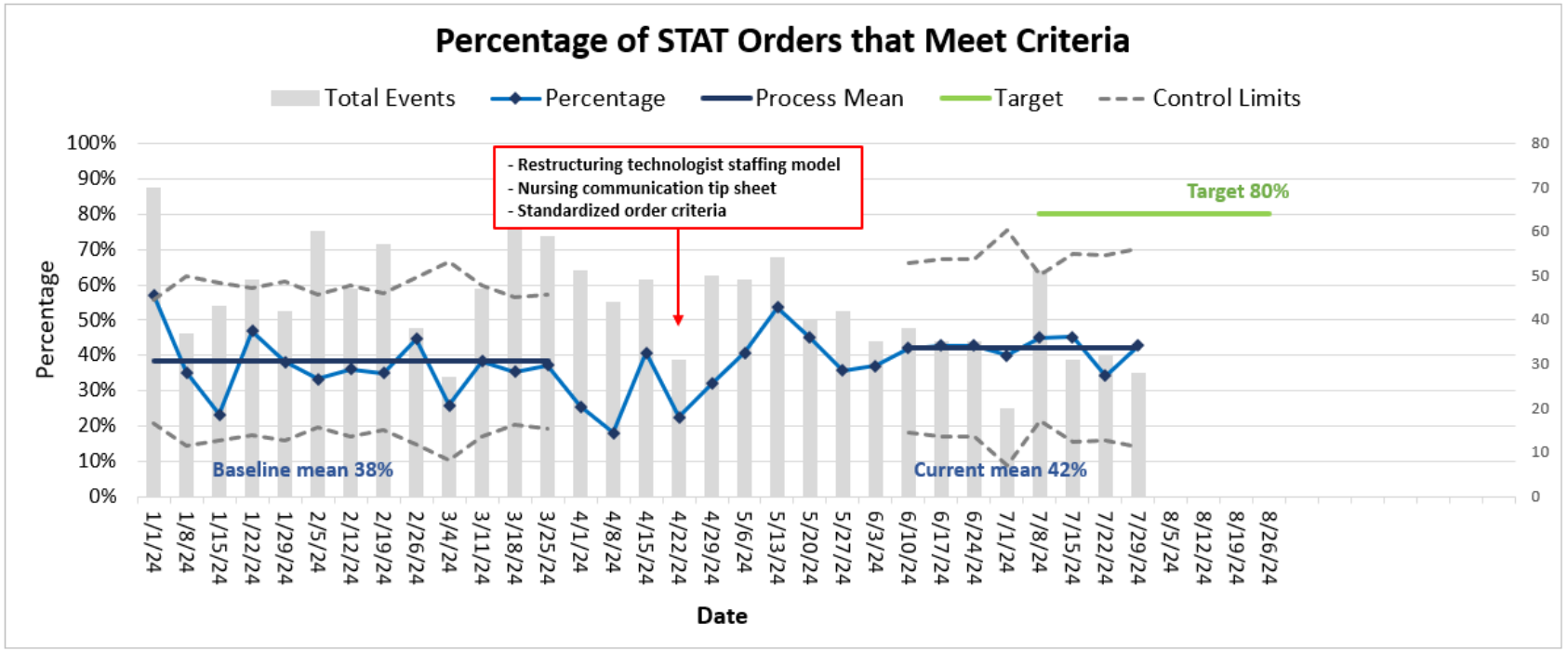
Results


Weekly Volume & Average Response Time for PICU STAT Portable X-Rays
Secondary Measure
Primary Measure
Process Mean
Target
- Restructuring technologist staffing model
- Nursing communication tip sheet
- Standardized order criteria
Daily Average from Order to Exam Begin (mins)
Baseline mean 71 mins
Current mean 28 mins
Target 30 mins
68 37 43 49 42 60 47 57 38 27 47 65 59 51 43 47 31 49 45 60 38 39 35 38 35 32 17 45 26 22 26 20
1/1/24 1/8/24 1/15/24 1/22/24 1/29/24 2/5/24 2/12/24 2/19/24 2/26/24 3/4/24 3/11/24 3/18/24 3/25/24 4/1/24 4/8/24 4/15/24 4/22/24 4/29/24 5/6/24 5/13/24 5/20/24 5/27/24 6/3/24 6/10/24 6/17/24 6/24/24 7/1/24 7/8/24 7/15/24 7/22/24 7/29/24 8/5/24 8/12/24 8/19/24 8/26/24
Date


Percentage of STAT Orders that Meet Criteria
Total Events
Percentage
Process Mean
Target
Control Limits
- Restructuring technologist staffing model
- Nursing communication tip sheet
- Standardized order criteria
Percentage
Target 80%
Baseline mean 38%
Current mean 42%
1/1/24 1/8/24 1/15/24 1/22/24 1/29/24 2/5/24 2/12/24 2/19/24 2/26/24 3/4/24 3/11/24 3/18/24 3/25/24 4/1/24 4/8/24 4/15/24 4/22/24 4/29/24 5/6/24 5/13/24 5/20/24 5/27/24 6/3/24 6/10/24 6/17/24 6/24/24 7/1/24 7/8/24 7/15/24 7/22/24 7/29/24 8/5/24 8/12/24 8/19/24 8/26/24
Date

Conclusion

- By revising the definition of STAT exams, restructuring technologists' workflow, and enhancing communication, we improved response times and avoided delays in urgent care.

- These efforts reduced workflow disturbances and reinforced interdepartmental collaboration, highlighting the importance of structured workflows in optimizing radiology services.

- Our project demonstrates that clear criteria and standardized processes are essential in managing high-priority exams efficiently, ultimately enhancing patient care in the PICU.

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