Adding Friction to the Electronic Health Record to Improve Adherence with Best Practices for Diagnostic Testing Across Multiple Hospital System Intensive Care Units

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BACKGROUND

• Research has proven Daily CXR’s in ICU have low value.

2010
• Meta analysis of 7078 patients shows daily CXR can be eliminated without increase in adverse outcomes

2012
• ACR Appropriateness criteria state daily chest radiographs in ICU are not appropriate

2014
• ABIM Choosing Wisely Campaign and Critical Care Society collaborative recommend against ordering of daily chest radiograph

1. Oba, Zaza Abandoning daily routine chest radiography in the intensive care unit: meta-analysis. Radiology 2010; 255:386-95
BACKGROUND

- There is inherent risk of Patient Harm to patients when completing “Daily” Chest X-rays.
- Risk of tube/line dislodgement
- Patient sleep disturbance
- Microbial dissemination
- Skin injury from cassette positioning
- Cumulative radiation exposure
PROBLEM

- Despite the evidence - daily CXRs continue to be commonly ordered within ICUs throughout the country.

- At our institution, University of Colorado Hospital, ICU CXRs account for 44% of all ICU CXRs ordered.

<table>
<thead>
<tr>
<th></th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>Total /AVG</th>
<th>2021 Daily Averages</th>
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<tr>
<td><strong>XR CHEST SINGLE VIEW</strong></td>
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<td>2577</td>
<td>2344</td>
<td>7143</td>
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<tr>
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<td>1232</td>
<td>963</td>
<td>3129</td>
<td>34</td>
</tr>
<tr>
<td>**STANDING ORDER % **</td>
<td>42%</td>
<td>48%</td>
<td>41%</td>
<td>44%</td>
<td>44%</td>
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*Standing orders calculated as the number of orders placed at the same time for the same patient.

**Standing order % calculated as the number of standing orders/total orders.
PURPOSE

• To determine if making a change in ordering options in the electronic health record (EHR) could decrease standing orders for daily CXR in ICU from 44% to <5%.

• Secondary goal was to reduce radiology technologist job satisfaction/burnout.
METHODS

• We modified the electronic health record, wherein we added friction by eliminating “Daily” as a frequency option when ordering CXRs.

• We engaged hospital leadership and clinicians in advance of the electronic health record modification to gain support and understanding in advance of change.

• We tracked the impact of this intervention by recording the number of repeat ICU CXRs that were ordered at the same sitting for three months before and after the intervention.

• We also surveyed radiology technologists’ level of stress and burnout after the changes were made.
RESULTS: UCHealth System Wide

- After the process change was made in January, the average ICU CXRs decreased from 42/day to 5/day. This represents an 87% decrease in CXRs completed using “daily” standing orders.

Common Question:
If the EMR option to order “Daily” CXRs was removed, then HOW did any “Daily” CXRs get ordered??
→ Physicians are sneaky, some continued to order 10 CXRs at a time, one a day for 10 days....
RESULTS: University of Colorado Hospital

• At UCH, there was an 18% reduction in overall CXRs and 92% reduction in Daily Standing Order ICU CXR’s.

- The change was monitored for 9 months and still proves to be successful.
## RESULTS

| Improved Adherence with Best Practices | • 14,235 un-necessary CXRs were prevented in ONE Year |
| Improved Staffing | • Less morning portables = more staff to help in other areas |
| Saved Inpatient DRG costs | • If average reimbursement is ~$253/ CXR, and 14,235 CXRs were prevented….. ANNUAL SAVINGS could equal $3,601,455 |
| Improved Quality (of Life) for Radiology Techs | • 80% staff reported less daily portable CXRs in the ICUs has contributed to less BURNOUT.  
• 72% staff reported improved Image Quality during morning portable routine. |

- Overall, adding friction to the electronic health record by eliminating “Daily” as a frequency option when ordering CXRs effectively and significantly reduced low-value care, to the benefit of patients and healthcare professionals.

- Standing orders for daily CXRs in the ICU were decreased from 44% to 3.7%
UCHealth, University of Colorado Hospital Anschutz Medical Campus

“Don’t let GOOD be the enemy of GREAT”

Thank You for your time.

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