

Addressing Discrepancies in I-123 Pill Counting: Structure, Process, and Outcome of Change

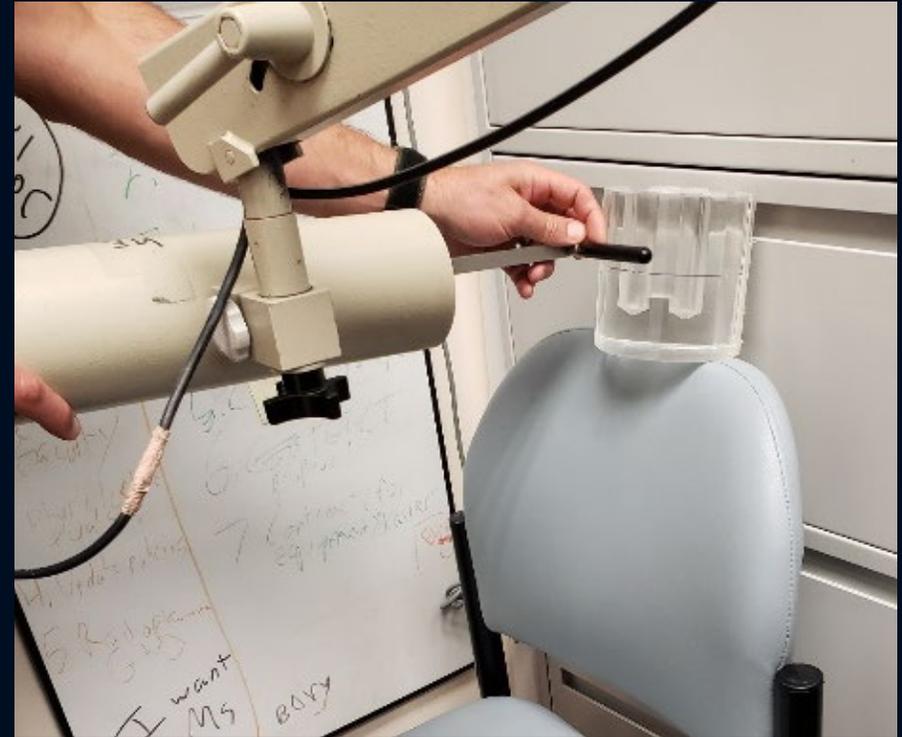
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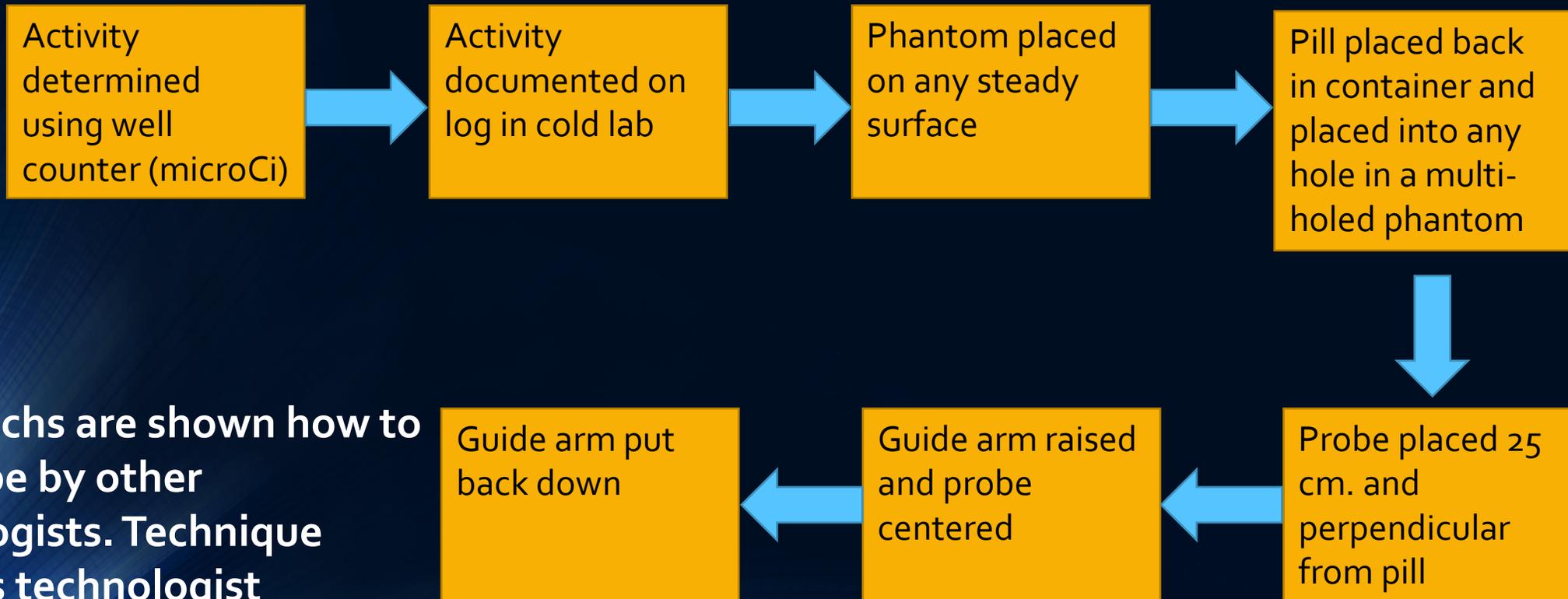
Reason for Action

- I-123 capsule for thyroid uptake scans
initial activity counts demonstrated wide variations of counts per minute (cpm) at one practice site
- The radioactive iodine uptake (RAIU) helps determine the activity of I-131 to be administered to patients for therapy of hyperthyroidism.
- Variations have risks of causing a miscalculation of patient uptake with a possible under or overtreatment of disease



$$\frac{(Neck\ cpm - Thigh\ cpm)}{(I123\ capsule\ cpm - Background\ cpm)} \times 100\% = RAIU$$

Current State Process Map



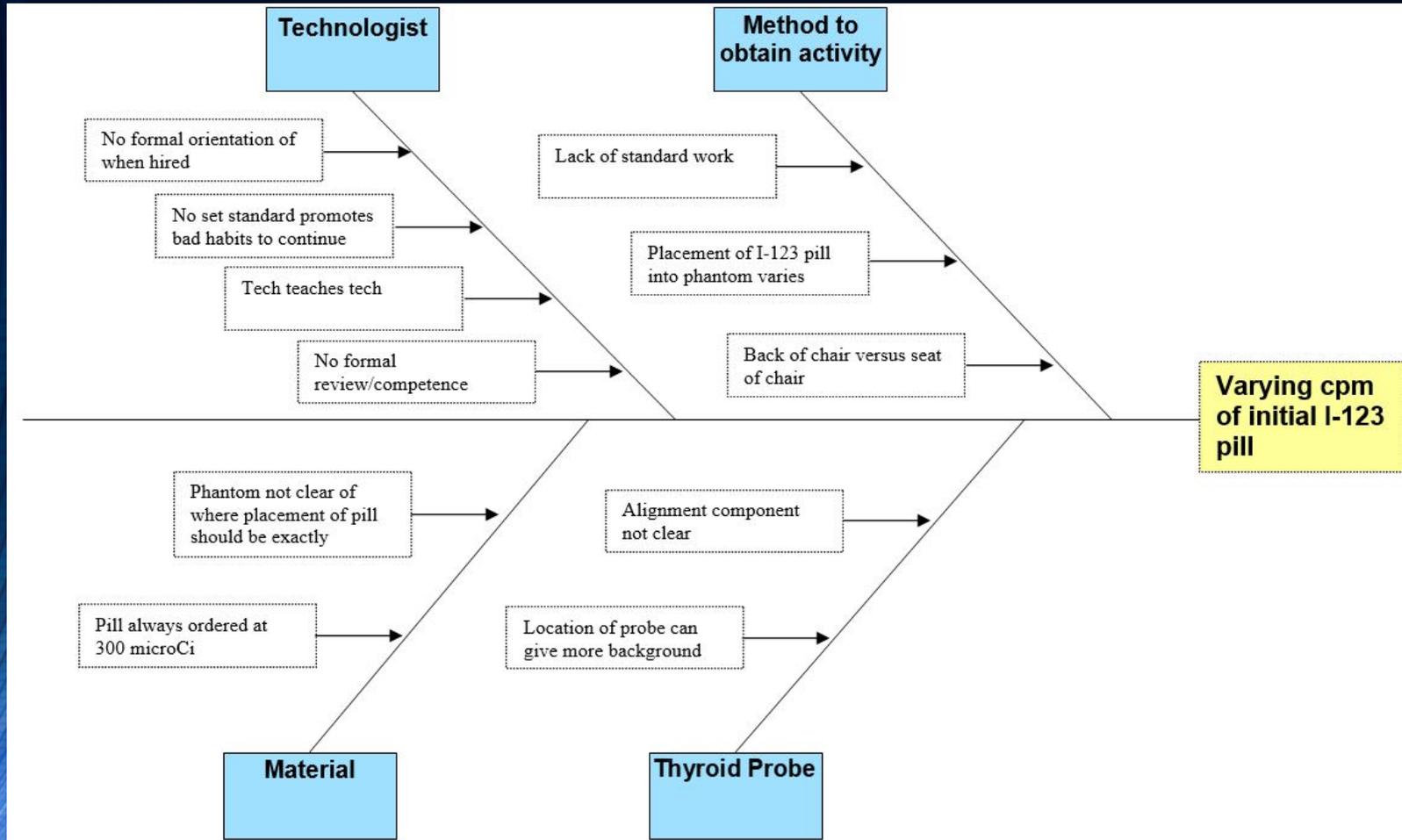
***New techs are shown how to use probe by other technologists. Technique shown is technologist dependent.**

Target State

- Target state was determined by guidelines set by the Society of Nuclear Medicine and Molecular Imaging.
- Goal is to have a 40% reduction in cpm variability from the baseline standard deviation.



Gap Analysis



Sources of variation identified

- Lack of standard work
- Location of the capsule within the phantom
- Positioning of the phantom
- Distance of the phantom to the detector

Solution Approach

PROPOSED COUNTERMEASURES

- Implement formal training on equipment
- Monthly quality review reports
- Implement visual management with pictures, charts or markings on phantom to reduce confusion

PLAN

- Create visual aid marking on probe
- Establish standard work with probe and create chart that is easily accessible which demonstrates the process

Standard Work

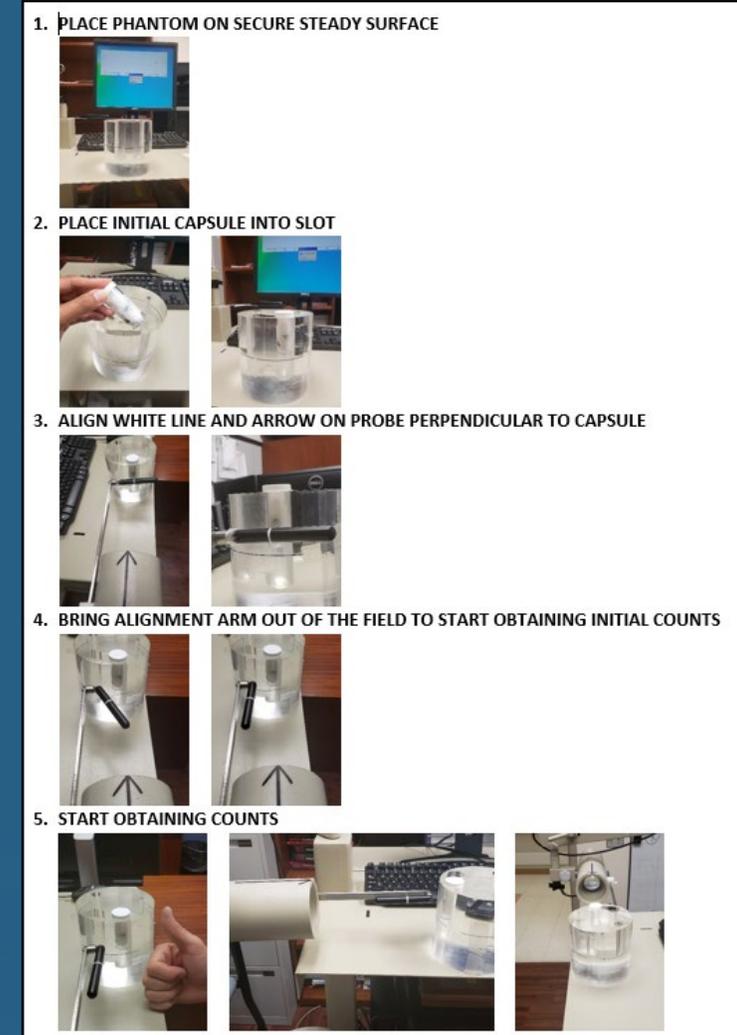
Visual aid
demonstrating
standardized process!



- ✓ Reinforces standard work
- ✓ Display visual aid at a location easy to see

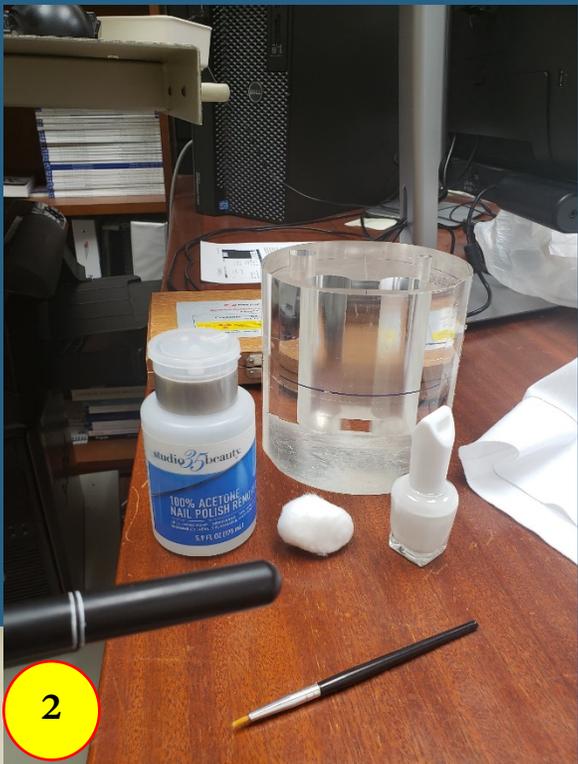


Variability in initial process





1



2



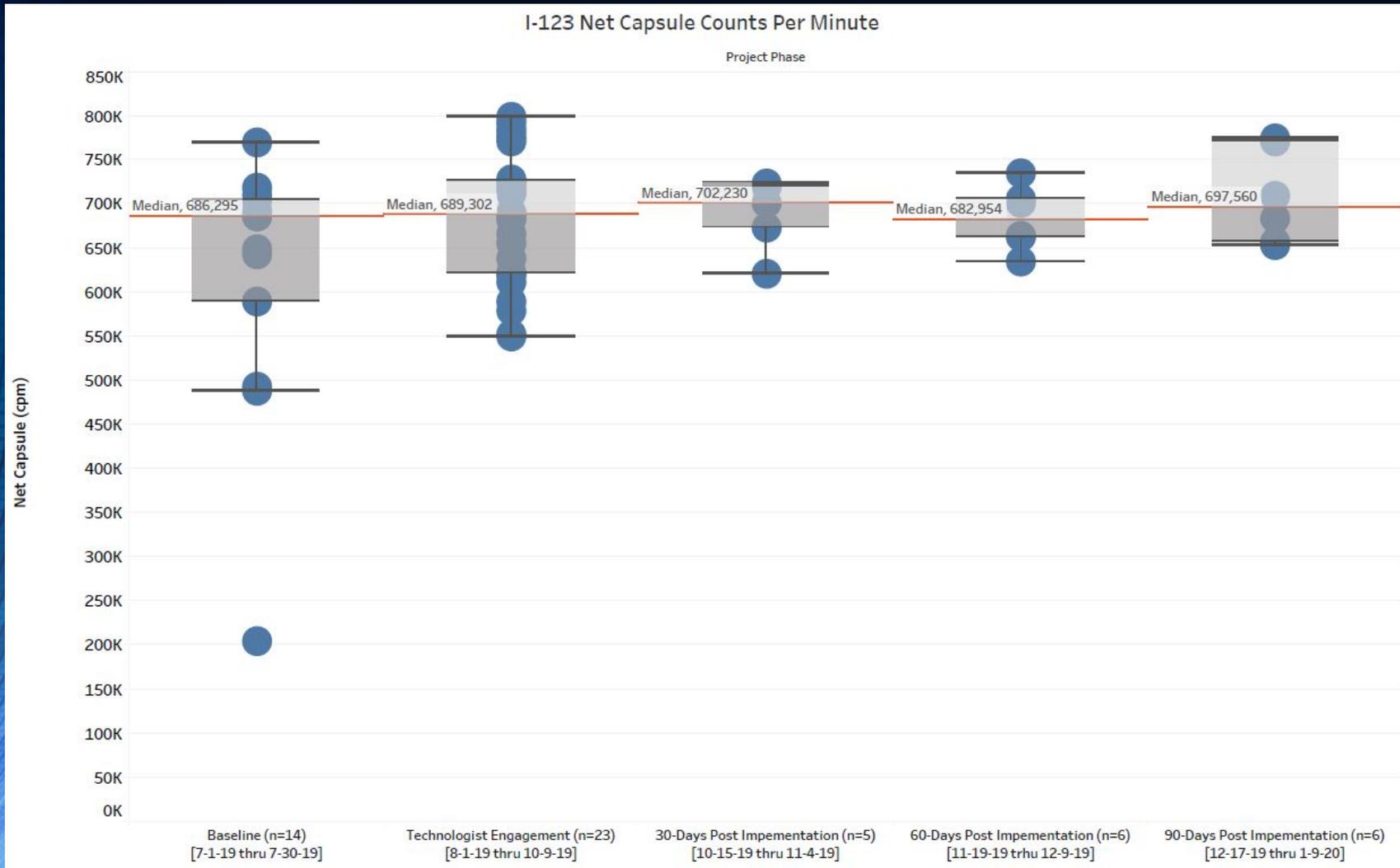
3

Alignment Component on Probe Not Clear

Let's try nail polish!



Confirmed State



- **Baseline**

- Range of 204,871 - 799,722 cpm
- Standard deviation (SD) 145,336 cpm from the mean

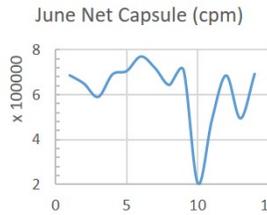
- **Institutional standards**

- Ranges are 600,000 cpm
- SD of 75,000 cpm
- 48% reduction in variability from baseline SD following technologist engagement
- 63% reduction in variability from baseline SD 90 days following introduction of visual aids

Insights

Nine box Problem Solving A3

- Lack of standard work provided variability from case to case
- Standard work implemented reduces variation regardless of location
- Technologist engagement in process redesign improved adaptability of intervention

<p>1. Reason for action: There is a wide variation in counts of the I-123 pill prior to administration with set average dose per patient</p> <p>Why are we doing this:</p> <ul style="list-style-type: none"> • Affects final percent uptake • Can lead to unnecessary exposure • Alters treatment plan 	<p>4. Gap Analysis: Whys: There are variations in initial pill cpm</p> <ol style="list-style-type: none"> 1. Every tech is obtaining counts differently 2. They are positioning thyroid probe at varying locations to the phantoms 3. They are doing what they are taught by others 4. There is no formal in-service/training and they do not understand impact of patient care 	<p>7. Completion plan:</p> <table border="1"> <thead> <tr> <th>Who</th> <th>What</th> <th>When</th> </tr> </thead> <tbody> <tr> <td>Resident</td> <td>Create visual aid</td> <td>10/7</td> </tr> <tr> <td>Lead Tech</td> <td>Take photo. Post visual aid</td> <td>10/15</td> </tr> <tr> <td>Technologist</td> <td>Brainstorming, Engagement</td> <td>Employee meeting (9/26)</td> </tr> </tbody> </table>	Who	What	When	Resident	Create visual aid	10/7	Lead Tech	Take photo. Post visual aid	10/15	Technologist	Brainstorming, Engagement	Employee meeting (9/26)
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<p>2. Current state:</p> <ul style="list-style-type: none"> • Tech places pill in phantom 25 cm in front of the probe to document baseline counts used to calculate uptake • Tech shown by other techs how to use probe  <p><u>Attributes</u> Confusion, Frustration, Mistrust, Fear, Anger, Waste (resources, time)</p>	<p>5. Solution Approach:</p> <ul style="list-style-type: none"> • If we implement formal training on equipment then we reduce variations in technique. • If we do monthly quality review of reports monthly then we can discover problems sooner thereby intervening sooner. • If we implement visual management with pictures, charts or markings on the phantom then we reduce confusion and minimize variations in technique. 	<p>8. Confirmed state:</p> <table border="1"> <thead> <tr> <th>Metric</th> <th>Target</th> <th>Confirmed State</th> </tr> </thead> <tbody> <tr> <td>Calculate variability of SD from mean cpm</td> <td><75,000 cpm variability from baseline SD</td> <td> <ul style="list-style-type: none"> • Evaluation with box & whisker diagram • Calculated SD at 30/60/90 days from baseline SD </td> </tr> </tbody> </table>	Metric	Target	Confirmed State	Calculate variability of SD from mean cpm	<75,000 cpm variability from baseline SD	<ul style="list-style-type: none"> • Evaluation with box & whisker diagram • Calculated SD at 30/60/90 days from baseline SD 						
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<p>3. Target state:</p> <ul style="list-style-type: none"> • Formal orientation to equipment with standardized training • Quality review of data monthly • Standard/Yearly review evaluation of tech <p><u>Attributes</u> Certainty, Organized, Waste (time)</p>	<p>6. Rapid Experiments:</p> <ol style="list-style-type: none"> 1) Technologist engagement. Review guidelines. 2) Visual aid with marking on probe, chart demonstrating process <table border="1"> <thead> <tr> <th>Experiment</th> <th>Expectations</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>Create visual aid with step wise process</td> <td>Less variations in counts following implementation</td> <td>Decreased variations from baseline SD</td> </tr> </tbody> </table>	Experiment	Expectations	Actual	Create visual aid with step wise process	Less variations in counts following implementation	Decreased variations from baseline SD	<p>9. Insights:</p> <ul style="list-style-type: none"> • Techs do not know how to use equipment properly • The probe will be moved so standard work needs to be transferable • Engagement with technologists reduced variability emphasizing importance of quality review reports 						
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