

# Development and validation of an A3 problem-solving assessment tool and self-instructional package for teachers of quality improvement in healthcare

Jennifer S Myers<sup>1</sup>,<sup>1</sup> Jeanne M Kin,<sup>2</sup> John E Billi,<sup>3,4,5</sup>  
Kathleen G Burke,<sup>6,7</sup> Richard Van Harrison<sup>8</sup>

For numbered affiliations see end of article.

## Correspondence to

Dr. Jennifer S Myers, University of Pennsylvania Perelman School of Medicine, Philadelphia, PA, USA;  
jennifer.myers2@penmedicine.upenn.edu

Received 28 July 2020  
Revised 20 February 2021  
Accepted 10 March 2021  
Published Online First  
26 March 2021



► <http://dx.doi.org/10.1136/bmjqs-2021-013251>



© Author(s) (or their employer(s)) 2022. No commercial re-use. See rights and permissions. Published by BMJ.

**To cite:** Myers JS, Kin JM, Billi JE, et al. *BMJ Qual Saf* 2022;**31**:287–296.

## ABSTRACT

**Purpose** A3 problem solving is part of the Lean management approach to quality improvement (QI). However, few tools are available to assess A3 problem-solving skills. The authors sought to develop an assessment tool for problem-solving A3s with an accompanying self-instruction package and to test agreement in assessments made by individuals who teach A3 problem solving.

**Methods** After reviewing relevant literature, the authors developed an A3 assessment tool and self-instruction package over five improvement cycles. Lean experts and individuals from two institutions with QI proficiency and experience teaching QI provided iterative feedback on the materials. Tests of inter-rater agreement were conducted in cycles 3, 4 and 5. The final assessment tool was tested in a study involving 12 raters assessing 23 items on six A3s that were modified to enable testing a range of scores.

**Results** The intraclass correlation coefficient (ICC) for overall assessment of an A3 (rater's mean on 23 items per A3 compared across 12 raters and 6 A3s) was 0.89 (95% CI 0.75 to 0.98), indicating excellent reliability. For the 20 items with appreciable variation in scores across A3s, ICCs ranged from 0.41 to 0.97, indicating fair to excellent reliability. Raters from two institutions scored items similarly (mean ratings of 2.10 and 2.13,  $p=0.57$ ). Physicians provided marginally higher ratings than QI professionals (mean ratings of 2.17 and 2.00,  $p=0.003$ ). Raters averaged completing the self-instruction package in 1.5 hours, then rated six A3s in 2.0 hours.

**Conclusion** This study provides evidence of the reliability of a tool to assess healthcare QI project proposals that use the A3 problem-solving approach. The tool also demonstrated evidence of measurement, content and construct validity. QI educators and practitioners can use the free online materials to assess learners' A3s, provide formative and summative feedback on QI project proposals and enhance their teaching.

## BACKGROUND

Improving the quality of healthcare is a universal goal for healthcare practitioners

and administrators. A3 problem solving is a structured approach to continuous quality improvement (QI) first employed by Toyota and now widely used by healthcare practitioners and organisations that have adopted the Lean thinking approach to improvement.<sup>1–4</sup> Key elements include understanding the reason for action, defining the current state and performance gap, setting a goal, identifying root causes, choosing countermeasures, formulating action plans and establishing a follow-up plan to measure results. QI efforts are more likely to succeed when these elements are employed.

QI is now a required competency for medical students, residents, practising physicians, nurses, pharmacists and other healthcare professionals worldwide.<sup>5–10</sup> A common approach to developing QI skills involves participation in a QI project (QIP) designed around a gap in local healthcare quality. The use of A3 problem solving as an instructional framework for QI skill development has been described in manufacturing and more recently in healthcare.<sup>11–13</sup> Instruction may occur in formal courses or informally in work settings. While numerous experiential QI curricula have been described, few skills-based assessment tools are available.<sup>14–16</sup> None of the existing QIP assessment tools is specific to the A3 problem-solving approach, nor do they provide an easily replicable method to train educators to assess A3 skills.<sup>17–19</sup>

We combined efforts at our two academic healthcare centres to develop an A3 assessment tool and test its reliability through a series of iterative development

**Table 1** Self-instruction package for A3 assessment tool: components and descriptions

Components	Description
1. Instructions for assessing problem-solving A3s (proposal stage)	2-page document that explains the purpose (to improve the development of QI project proposals), introduces the other items in the package, explains how to learn to use the assessment tool and provides some practical tips in performing assessments.
2. A3 template	1-page document that lists the most important content of a proposal A3, illustrates the layout and presentation of information and illustrates some relevant QI tools.
3. A3 content guide	5-page document that includes (1) the purpose and use of A3 problem solving; (2) a description of each A3 section: title, background, current situation, problem statement, goal, analysis, countermeasures, action plan and follow-up plan; (3) a list of resources for A3 problem solving.
4. A3 assessment tool	23-item assessment tool divided into 7 A3s sections. Each item has a 4-point rating scale that includes descriptive anchors. Each section has a space for written feedback. The tool also includes 10 additional items for raters who are familiar with the local context of the QI project being rated.
5. Description of ratings	8-page document that reproduces the A3 assessment tool and for each item includes descriptions of the four levels of rating anchors. (The rating anchors have been incorporated into the assessment tool and appear when a cursor hovers over a rating option.)
6. Learning examples for practice and feedback: ▶ 3 proposal A3s ▶ A3 assessment tools to complete ▶ A3 ratings and their explanations	Individuals learning to assess proposal A3s use these materials to try out performing assessments and receive feedback on their performance. The first A3 is exemplary, with an accompanying set of ratings and explanations of why this A3 content illustrates the highest ratings. The second and third proposal A3s have various deficiencies that result in many items having lower ratings. Learners complete an A3 assessment tool for an A3. Then learners receive immediate feedback by checking their ratings and reasoning with the provided ratings and explanations for various levels of ratings on items.

The A3 template is shown in figure 1. All other materials are included in online supplemental digital content. QI, quality improvement.

cycles. In order for the A3 assessment tool to be easily learnt and widely used, we wanted to develop and test the assessment tool as the central component of a self-instruction package in learning to assess A3s reliably. Development would necessarily include exploring raters' experiences in using the assessment tool and self-instruction package. Ultimately, the resulting A3 assessment tool and self-instruction package should guide QI educators in assessing learners' A3s, provide consistent formative and summative feedback on QIP proposals and teach A3 problem solving.

## METHODS

### Development cycles for an A3 assessment tool and self-instruction package

We developed an A3 assessment tool and a self-instruction package to assess proposal A3s as part of their QI teaching or advising and to enhance teaching A3 problem solving (online supplemental digital content). Components of the self-instruction package are described in table 1. The five development cycles for the assessment tool and self-instruction package are summarised in the top of table 2. In each cycle, we sought feedback from our raters. In cycles 3–5, we formally tested inter-rater agreement. We used feedback and reliability performance on items at the end of one cycle to refine concepts, improve language precision and enhance presentation of information during the next cycle. Examples of changes across cycles are presented in the bottom of table 2.

We began the first development cycle in 2017 by working with biomedical and business librarians, who performed a systematic literature search using the keywords “A3 thinking”, “A3 problem solving” and

“A3 template”. They searched eight databases covering health sciences, business and engineering (PubMed, Embase, Cochrane Library, Scopus, Web of Science, Compendex, ABI and Business Sources Complete) and publication types (eg, white papers) produced outside of traditional academic publishing channels. We found only one other example of an A3 assessment tool in the engineering literature,<sup>11</sup> and noted that several types of A3s exist, reflecting the stage of improvement work.<sup>2</sup> We focused on a *problem-solving* A3 because our institutions currently teach developing them to analyse a QI problem and propose interventions. A problem-solving A3 includes all the dimensions of problem investigation (background, current state, problem statement, goal, analysis), then proposes recommendations (countermeasures, action plan, follow-up plan) based on the findings. We refer to a problem-solving A3 as simply an ‘A3’ throughout this paper.

The next step in cycle 1 was to create initial drafts of the A3 template, content guide and assessment tool. We reviewed commonly used A3 templates including ones in use at our institutions.<sup>1–3</sup> We created an A3 template that included key sections of A3s with elements described more clearly and operationally than in existing templates. The content guide provided additional descriptive information and illustrations. The assessment tool addressed each element in the template and characteristics across sections. Each item in the assessment tool has response options that range from 0 to 3. General verbal anchors for the options are 0=not addressed, 1=unclear, 2=general and 3=specific, with phrasing modified to reflect an item's content. We realised that items differed in the information that needed to be assessed. The initial assessment

**Table 2** Development of an A3 assessment tool and self-instruction package for QI project proposals: (a) overview of five cycles and (b) examples of adjustments between cycles**(a) Overview of five cycles**

Activity	Cycle #1 Summer 2017–Spring 2018	Cycle #2 Spring 2018–Summer 2018	Cycle #3 Summer 2018–Fall 2018	Cycle #4 Fall 2018–Spring 2019	Cycle #5 Spring 2019–Fall 2019
Development and revisions	Literature review Created initial A3 materials ► Template ► Content guide ► Assessment tool  shared with A3 teachers for comments	Revised materials Added instructions for use of the self-instruction package and assessment tool	Revised materials	Revised materials Added: ► Description of rating options ► Exemplary and deficient A3 examples with rating explanations	Revised materials Added another deficient A3 example with rating explanations Added automated functions to assessment tool
Checks	Feedback from two raters who assessed one A3	Feedback from two experts who reviewed materials	Test of agreement for 4 raters×4 A3s and rater feedback	Test of agreement for 12 raters×6 A3s and rater feedback	Final test of agreement for 12 raters×6 A3s and rater feedback

**(b) Examples of adjustments between cycles**

Document	Cycle #1 to cycle #2	Cycle #2 to cycle #3	Cycle #3 to cycle #4	Cycle #4 to cycle #5
A3 template	<i>Within section.</i> Removed question: 'What residual issues can be anticipated?'	<i>Across sections.</i> Moved analysis section to after goal section to match original order used by Toyota.	<i>Within section.</i> Added prompt: 'What is contributing to the problem?'	<i>Within section.</i> Added question: 'What will be monitored, by whom, when?'
A3 content guide	(No adjustments)	<i>Within section.</i> Added illustration of criteria matrix to countermeasures.	<i>Within section.</i> Elaborated: 'process map use' and 'strength of countermeasures'.	<i>Across sections.</i> Graphics changed to similar set of colours.
A3 assessment tool	<i>Across sections.</i> Better visual distinction between items ratable from A3 only or require context knowledge	<i>Within section.</i> Eliminated vague question ('How often is information clearly conveyed in each section of the A3?').	<i>Within section.</i> Wording improvement: from 'Are timeframes identified ...' to 'Are completing dates identified ...'	<i>Within section.</i> Two items re-categorised from 'ratable from A3 only' to 'requires contextual knowledge'.

Part (a) of this table provides an overview of each development cycle, including when initial versions of documents were developed and the checks performed at the end of each cycle. We created the A3 template, A3 content guide and A3 assessment tool during the first cycle. Part (b) of this table provides examples of adjustments to these documents that were based on comments and testing at the end of one cycle and incorporated in the next cycle. Documents are listed in hierarchical order, with an adjustment to a document often resulting in parallel adjustments (not shown) to subsequently listed documents. In each cycle, minor wording changes (not shown) were made to the documents to improve clarity of language.

tool had 27 items that could be answered directly from information in an A3 document (eg, How specific is the goal?) and 7 items that required additional knowledge of the local problem context (eg, extent to which important root causes are identified). We decided that individuals unfamiliar with the problem context need only rate items that can be determined from the A3 alone. An experienced QI trainer at each institution reviewed and used the materials, then provided feedback.

Cycle 2 incorporated feedback from cycle 1. Then two external Lean experts reviewed the materials with two of the authors (JEB, JMK). In cycle 3, suggestions from the experts were incorporated and formal tests of agreement began. Each test included raters from our two academic healthcare centres. Four individuals (two physicians with QI teaching experience and two non-physician QI professionals) rated four A3s. Their feedback and performance indicated that agreement in

assessments would be enhanced through more detailed definitions and guided experience in applying them. In cycle 4, we added a 'description of ratings' document that elaborated operational definitions of individual rating options. We also added examples of exemplary and deficient A3s with rating explanations and the opportunity to assess an A3 and compare ratings against a standard for immediate feedback on performance. The test of agreement expanded the number of raters from 4 to 12 and the number of A3s from 4 to 6. In cycle 5, we added another deficient A3 with rating explanations to compare against a standard. Automated functions were added to the assessment tool to facilitate referencing definitions and totaling scores.

In cycles 3 through 5, we developed exemplary and deficient A3 training examples and A3s used to test inter-rater agreement. First, the authors (JSM, JMK) reviewed examples of A3s submitted by learners in QI methods courses for healthcare professionals (eg,

**An A3 Problem-Solving Template (Proposal Stage)**

**Title:** The problem being addressed.

**Owner:**

**Date:**

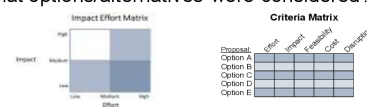
**Background**  
 Why is the problem important?  
 Consequences (e.g., harm, frustration, waste):  
 For whom? Severity? Frequency?

**Current Situation**  
 What is actually happening?  
 Current level of performance? [If not in Background]  
 How is work done now (process), who is involved?

**Problem Statement**  
 What is the performance gap (actual vs. expected)?

**Goal**  
 What target condition or specific performance is desired? By when? [S.M.A.R.T. goal: Specific, Measurable, Achievable, Relevant and Timebound]

**Analysis**  
 What is contributing to the problem?  
 What are its root causes?  
 [How were root causes identified?]

**Countermeasures**  
 What options/alternatives were considered?  


What countermeasures or strategies are proposed?  
 [How directly are countermeasures linked to root causes?]

**Action Plan**  
 To pilot & implement the selected countermeasures:  
 What activities will be required?  
 Who will be responsible for each activity?  
 When will activities be performed?  
 Monitor implementation of action plan:  
 What will be monitored, by whom, when?

**Follow-up Plan**  
 Has desired goal(s) been achieved?  
 What will be checked/measured?  
 Who will perform the check/measurement?  
 When will it be performed?

Toyota originated the A3 tool. This template was modified from earlier versions used by Lean teachers David Verble, John Y. Shook, David LaHote, and John E. Bill

**Figure 1** An A3 problem-solving template (proposal stage). Toyota developed the A3 document. This A3 proposal template was modified from previously published versions<sup>1-3</sup> and variations used by Lean educators at our institutions.

physicians, nurses, other healthcare team members) in training (eg, medical students, residents, graduate nursing students) at our institutions. We used course evaluations of A3s to identify examples of excellent, good and poor A3s. Then, we modified most of the A3s by improving some elements (eg, adding completion dates for action plan items) and making other elements worse (eg, adding a countermeasure that did not correspond to a listed root cause) to provide a range on items across the A3s. The three training A3s addressed evidence-based treatment for epilepsy, patient congestion in a clinic and improving the accessibility of cardiac catheterisation films. The six A3s assessed in cycle 5 addressed patient throughput in a psychiatric emergency room (ER), time to decision-making for chest pain patients in the ER, access to care for patients with diabetes after renal transplant, unnecessary phlebotomy in the hospital and equipment waste in the operating room.

#### Check on cycle 5 of the assessment tool and self-instruction package

Cycle 5 was the culmination of our work. Its check had two objectives: (1) assess inter-rater agreement among raters using the assessment tool and self-instruction package and (2) learn about the raters' experiences and views in using the self-instruction package and performing assessments.

The final A3 template is presented in figure 1. The final A3 assessment tool (online supplemental digital

content) has 23 items that can be assessed from the A3 document itself and an additional 10 items that require knowledge of the local context.

Our sample size to test inter-rater agreement was based on practical feasibility for the number of raters and the number of A3s assessed.<sup>20</sup> We felt that 4 hours was the maximum time commitment that we could reasonably request of volunteer raters. Cycle 4 demonstrated that raters could go through the self-instruction package and rate six A3s in approximately 4 hours. We recruited 12 raters for cycle 5 knowing that the increased number of raters would increase precision in estimating inter-rater agreement. The design of 12 raters rating 23 items on 6 A3s produced 72 ratings per item and 1656 ratings overall.

We identified 12 individuals from our two academic healthcare centres (6 from each) and invited them by email to participate as raters. All raters were at least proficient in QI. We selected raters with some, but varying QI teaching experience to reflect the types of individuals most commonly involved in teaching QI in healthcare. Four raters were non-physician QI professionals who routinely led QI initiatives and taught QI as part of their work. The other eight raters were physicians with experience teaching and/or advising students, residents and fellows in QIP work. Four of the eight had been teaching QI for >2 years while the other four had been teaching QI for <2 years.

One of the authors (JSM, JMK, RVH) had a 10 min phone conversation with each rater, orienting the



individual to the study and confirming access to the online self-instruction materials. Raters had 1 month to complete the self-instruction package, rate the six A3s, and submit their ratings.

We created a structured feedback form and distributed it to raters at the time of the orientation phone call (see online supplemental digital content, last section). The form had 19 open-ended items addressing: study orientation, the self-instruction package, the A3 assessment tool and their overall experience with the tool and self-instruction package. Raters provided written feedback when they submitted their A3 ratings and participated in a short debriefing phone call led by one of the investigators. During the call raters could clarify and elaborate upon their comments.

### Analysis

We used intraclass correlation coefficients (ICCs) as the primary method to quantify inter-rater agreement. The three variables are rater, A3 and item rating. Values range from 0 to 1. The value is 1 if raters give similar ratings (low variation) to an item within an A3, but ratings differ (high variation) between A3s. The value is 0 if ratings vary within an A3 item as much as they vary between A3s. While guidelines for interpreting ICCs vary, a frequently quoted interpretation is: <0.40 is poor, 0.40–0.59 is fair, 0.60–0.74 is good and 0.75–1.0 is excellent.<sup>21</sup> Lower ICCs reflect greater variation in ratings for an A3 item, so as ICC values decrease the width of an ICC's CIs increases. For our design of 12 raters and 6 A3s, examples of the decreasing precision (95% CI) with which an ICC is measured for an item are: 0.90 (0.77–0.98, within 'excellent'), 0.75 (0.44–0.95, 'fair' to 'excellent') and 0.50 (0.23–0.87, 'poor' to 'excellent').

We calculated ICCs for each of the 23 rating items. To reflect a rater's overall assessment of an individual A3, for each A3 we calculated each rater's mean assessment on the 23 items. A rater's mean rating for an A3 was treated as an additional item for which the ICC was calculated. The 95% CIs for ICCs were also calculated. The ICCs and CIs were calculated using 'R' software for statistical computing based on a single rater, absolute agreement, two-way random effects model.<sup>22</sup>

The ICC is less appropriate as a measure of inter-rater agreement when ratings are similar across A3s. Little variation in ratings within an A3 is similar to the little variation between A3s, resulting in an artificially low ICC, even though raters actually agree and provide similar rating values for an item on all of the A3s. To check that a limited range of scores on an item across A3s might methodologically lower an ICC, we first calculated within each of the six A3s an item's mean score over the 12 raters. Then, we used the means for an item across the six A3s to calculate across the six A3s the overall item mean and the SD of item means. A low SD for an item mean across the six A3s indicates a limited range (little variation) in scores between A3s.

For these items, we reviewed the actual scores across A3s to confirm that raters agreed in providing similar rating values across A3s.

In addition to analysing the raters' assessments of items on A3s, we collated qualitative information from raters' feedback forms and debriefing calls and reviewed responses for illustrative themes.

### RESULTS

The ICCs and 95% CIs for agreement over a range of scores for the 12 raters across the six A3s are shown in table 3 for the overall A3 rating and the ratings for each of the 23 individual items.

For overall A3 assessment (mean of ratings on an A3's 23 items), the ICC is 0.89 (95% CI 0.75 to 0.98), indicating excellent reliability across raters over a range of scores. For individual items, the ICCs for 17 items ranged from 0.57 to 0.97, indicating fair to excellent reliability; the ICCs for three items (#2, #16, #17) ranged from 0.41 to 0.46, indicating marginally fair reliability.

For the remaining three items (#1, #11, #14), the ICCs range from 0.10 to 0.39, suggesting poor reliability across a range of scores. However, these items did not have a wide range of scores. As shown in table 3, these three items have the lowest SDs (0.28 to 0.55) of the 23 items. For these items, raters generally agreed on the items' scores, but the scores were similar across the six A3s. For example, for item #11 with an ICC of 0.10, with possible ratings ranging from 0 to 3, the means of the 12 rating scores on each of six A3s were 2.9, 2.9, 2.8, 2.7, 2.6 and 2.2. While the raters highly agreed in rating this item between A3s, the variability of scores across A3s was insufficient to demonstrate agreement across a range of scores using an ICC. For items #1, #11 and #14, the lack of variation across A3s methodologically lowered ICCs, limiting our ability to confirm agreement across a range of scores. However, the low SD for these items demonstrate substantial agreement on the score among raters on the items across the six A3s.

For the 20 items with more variation across A3s, the items with higher ICCs tend to have simpler content that focuses on only one element of the A3. For example, the item with the highest ICC is #20. 'Are estimated completion dates identified for each action item (ie, 'when')?' (ICC=0.97). In contrast, items with ICCs in the 'fair' inter-rater agreement range (ICCs 0.40–0.59) require raters to relate multiple elements of information simultaneously, for example, item #17. 'How many of the proposed countermeasures are linked to identified root causes?' (ICC=0.46).

The six raters from each of the two institutions used the rating scales similarly (mean ratings of 2.10 and 2.13,  $p=0.57$ ). Across institutions, the eight physicians provided slightly higher ratings than the four QI professionals (mean ratings of 2.17 and 2.00,

**Table 3** Inter-rater agreement (intraclass correlation coefficients) on overall mean score and individual item scores

Item	Intraclass correlation		For the mean score of an item on an A3 (mean of 12 raters)	
	Coefficient	95% CI	Mean across 6 A3s*	SD across 6 A3s
Overall assessment of A3s (mean of 23 item scores†)	0.89	0.75 to 0.98	2.1	0.51
<b>Individual items</b>				
<b>Background</b> <i>Why is the problem important?</i>				
1. Negative consequences (eg, harm, frustration, waste): how specific is the clearest statement of a negative consequence of the problem?	0.32	0.11 to 0.77	2.7	0.37
2. Individuals/Groups impacted by the negative consequences (eg, harm, frustration, waste): how specific is the clearest statement identifying an impacted individual, group/unit or organisation?	0.44	0.19 to 0.84	2.5	0.61
3. Severity of the negative consequences (eg, harm, frustration, waste): how specific is the clearest statement of the severity (eg, extent/amount) of at least one negative consequence?	0.71	0.45 to 0.94	2.3	0.82
4. Frequency of the negative consequences (eg, harm, frustration, waste): how specific is the clearest statement of the frequency (# events/unit of time) of at least one negative consequence?	0.68	0.41 to 0.93	1.8	1.01
<b>Current situation</b> <i>What is actually happening?</i>				
5. Current level of performance	0.71	0.46 to 0.94	1.8	0.90
6. How is work done (process/workflow)?	0.72	0.47 to 0.94	1.8	1.07
7. Clear identification of who is involved in performing the work?	0.71	0.45 to 0.94	1.5	1.01
8. Performance problem/gap?	0.58	0.31 to 0.90	1.8	0.90
<b>Goal</b> <i>What target condition or specific performance is desired? By when?</i>				
9. How specific is the goal?	0.79	0.57 to 0.96	2.0	0.83
10. Is the goal measurable?	0.60	0.33 to 0.91	2.3	0.68
11. How relevant is the goal to addressing the problem?	0.10	0.0 to 0.52	2.7	0.28
12. How time-bound (clear timeframe for accomplishment) is the goal?	0.96	0.90 to 0.99	1.9	1.49
<b>Analysis</b> <i>What is contributing to the problem? What are its root causes?</i>				
13. Is the display of method(s) for analysing root causes easy to understand? (eg, fishbone diagram, '5-whys'/root cause tree diagram, Pareto chart)	0.65	0.38 to 0.92	2.1	0.91
14. How clear are the identified root causes?	0.39	0.15 to 0.81	2.3	0.55
<b>Countermeasures</b> <i>What options/alternatives were considered? What countermeasures/strategies are proposed?</i>				
15. How many options for countermeasures were considered?	0.78	0.55 to 0.96	2.7	0.60
16. Identify the strongest countermeasure considered. How strong is it?	0.41	0.17 to 0.82	2.1	0.55
17. How many of the proposed countermeasures are linked to identified root causes?	0.46	0.21 to 0.85	2.0	0.85
<b>Action plan</b> <i>To pilot and implement the selected countermeasures: what, who, when?</i>				
18. For the action plan on the A3, how clearly are activities described (ie, 'what' is to be done)?	0.60	0.33 to 0.91	2.3	0.68
19. Are individuals identified to be responsible for each action item to be carried out (ie, 'who')?	0.90	0.77 to 0.98	2.4	1.14
20. Are estimated completion dates identified for each action item (ie, 'when')?	0.97	0.93–1.0	2.5	1.18
21. Is monitoring planned for the implementation of actions (what will be monitored, by whom, when)?	0.57	0.30 to 0.89	1.3	1.06
<b>Follow-up plans</b> <i>Checking whether desired goal(s) was achieved?</i>				
22. Is follow-up planned to measure achievement of the desired goal(s) (what will be measured, by whom, when)?	0.83	0.63 to 0.97	1.7	1.00
<b>Across A3 sections</b>				

Continued

Table 3 Continued

Item	Intraclass correlation		For the mean score of an item on an A3 (mean of 12 raters)	
	Coefficient	95% CI	Mean across 6 A3s*	SD across 6 A3s
23. How clearly does the title identify the problem to be addressed?	0.56	0.29 to 0.89	2.3	0.60

Each item has response options that range from 0 to 3 on a 4-point scale. Each response option has verbal anchors appropriate for the item, for example, 0=not addressed, 1=vague, 2=somewhat specific and 3=very specific. The response anchors for each item and their illustrative descriptions and comparisons are presented in the 'Description of Ratings' in the online supplemental digital content.

For each of 6 problem-solving A3s, 12 raters assessed each of 23 items. This produced a total of 1656 ratings, including 12 ratings for each item on each A3, 72 ratings per item across the 6 A3s and 276 ratings per A3 across items.

\*The six A3s used to assess inter-rater agreement were modified to increase the range of scores across A3s on several items. The mean scores along with their SD help indicate the extent of variation across A3s for the item. The mean scores do not necessarily reflect a representative sample of student's scores.

†The overall assessment of an A3 is the mean of the 12 raters' assessments for each of the 23 items on an A3 (276 ratings).

$p=0.003$ ), but the small difference is not practically meaningful.

On the feedback forms, raters reported that the work took an average of 3.5 hours: the self-instruction package took 1.5 hours (range 1.0–3.0 hours) and rating the six A3s took 2.0 hours (range 1.0–3.5 hours). Illustrative comments about their learning and rating experience are presented in table 4. Overall, raters reported that the self-instruction package and assessment tool were easy to learn and worthwhile to use. For example, "I thought it was easy. I think this tool is going to be a great way to set expectations and give feedback about student A3s". One rater noted "but [I] had to make sure I wasn't inferring information and only evaluated what was on the A3".

## DISCUSSION

This study developed and demonstrated the reliability of a tool to assess the quality of learners' investigations

and recommendations for QI problems in healthcare using the A3 approach. The assessment tool was developed as part of a self-instruction package to assist a broad range of educators in efficiently learning how to reliably assess and provide feedback on learners' A3 documents. We found that 12 raters using the assessment tool and self-instruction package could reliably rate items across six A3s, with excellent agreement across raters over a range of scores on the overall rating of an A3 and with fair to excellent agreement on 20 items. For the remaining three items, raters agreed in item scoring, but the limited range of scores across A3s precluded confirming agreement across a range of scores. Ratings were similar for raters from different institutions and functionally similar for physician and QI professional raters. The self-instruction package allowed raters to learn to use the assessment tool in about 1.5 hours. Raters found the package and tool easy to learn and worthwhile to use.

Table 4 Illustrative feedback from raters on the A3 self-instruction package and assessment tool

Topic	Responses
A3 template	'The one-page template was really, really well-done in terms of having all the information there especially for people who are learning it for the first time'.
Practice assessing A3s	"Extremely helpful. I appreciated the explanations for why different scores were selected". "I found [the practice] incredibly helpful in providing a systematic and comprehensive way to review the A3s. We all have our focuses and particular areas of expertise/interest, and the standard ratings helped mitigate my personal biases about which aspects to provide feedback on". '...it is a lot of reading. May consider other types of learners and how that information could be packaged for audio/visual learners'.
Applying the assessment tool	'It is a brilliant and pragmatic tool. It was also enjoyable (fun) to use'. "I thought it was easy. I think this tool is going to be a great way to set expectations and give feedback about student A3s". "It was easy in that it confirmed, standardized, and systematized many of the best practices I've learned in my experience doing/teaching process improvement. Everything struck me as an accurate representation of the fundamental concepts". "Yes [I found the assessment tool easy to use], but had to make sure I wasn't inferring information and only evaluated what was on the A3".
Prepare you to better evaluate an A3	'Yes, sharpened understanding and ability to evaluate topics where don't know clinical content as well'. 'Yes. The most helpful components of the package were the description of assessment options, the 'good' A3 example, and the A3 template'.
Will use the package and assessment tool	"I want it right now to use in teaching residents". 'It will be useful to have a consistent tool that's in use across the organization'.

Three other studies reported developing assessment tools for QIP. Leenstra *et al* developed the Quality Improvement Project Assessment Tool (QIPAT-7) in 2007, Rosenbluth *et al* developed the Multi-Domain Assessment of Quality Improvement Projects (MAQIP) in 2017 and Steele *et al* developed the Quality Improvement Project Evaluation Report (QIPER) in 2019.<sup>17–19</sup> Our study adds to this body of literature. Rather than develop a new conceptual framework, we built on the widely recognised Lean A3 problem-solving approach to QI, which an increasing number of healthcare organisations have adopted. For these institutions, our materials facilitate integration of QI operations and QI education for healthcare professionals, educators and learners at all levels. This integration supports high-quality patient care and is now an expectation for healthcare systems that sponsor graduate medical education programmes in the USA.<sup>23</sup> Building on the established A3 framework, we identified specific aspects of A3s to assess and provide educators with a visual template that embeds common QI tools, a companion content guide for the template, examples, practice with feedback and links to resources. Our package of materials is the first to provide training examples of assessments of completed proposals, providing external benchmarks for teachers (and learners). We have gone beyond previous work by demonstrating consistency across raters who are at different institutions, are physicians and QI professionals and are not members of the research team. While we tested the materials on individuals with some experience performing and teaching QI, we anticipate that the self-instruction materials will assist novice QI educators. The assessment tool and instructional package are available online at no cost and require only 2 hours to learn, facilitating their broad use.<sup>24</sup>

The process of developing and testing the reliability of the assessment tool also demonstrated several aspects of its measurement validity—the extent to which it measures what it claims to measure. The first step in establishing content validity was to review the literature on A3 content and templates, assemble and refine the model A3 template and have experts and teachers of A3 problem solving agree that this was the appropriate content to measure. Experts and teachers also agreed that the rating tool represents the content of the A3 template and the logic underlying it. As a component of content validity, ‘face’ validity is evident in most statements in the template being quoted in items to be rated. Construct validity is demonstrated through items performing in conceptually expected ways, such as items asking about the presence or absence of one element of information being rated more reliably than items involving simultaneous consideration of multiple elements.

Our sequence of development cycles and refinements identified insights that are useful for the QI education and assessment efforts of others. One insight

is to distinguish between assessments based on the A3 document alone and assessments based on additional knowledge of the local problem context. Assessments based on the A3 document alone should be consistent among raters. Assessments based on knowledge of the local problem will vary with the assessor’s knowledge. Another insight is to help learners differentiate between the QI problem (‘what is the specific performance gap’) and consequences of the problem (‘why the problem is important’). Both learners and raters may use previous knowledge to assume that a problem is important with no explicit statement of why it is important. More precise wording and examples help both learners and raters realise that consequences of a problem are separate from the problem being addressed. Another insight from examining previously developed A3s is that having a plan for monitoring whether the proposed actions are actually implemented (‘intervention fidelity’) is frequently overlooked.<sup>25</sup> Including this concept in the A3 template and assessment tool helps ensure that this important step is addressed.

Our study has several limitations. The assessment tool does not address actual outcomes of QIPs that have been completed. We focused on the proposal stage because development of well-researched, well-analysed and well-considered proposals for interventions is the foundation for carrying out successful QI efforts. Some healthcare settings may not use the A3 framework on which our materials are based. However, use of the framework is sufficiently widespread that teachers and learners should be aware of this approach to developing QIPs. Including only 6 A3s and 12 raters limited the ranges sampled and ICC precision but reasonable evidence of inter-rater agreement was demonstrated. The generalisability of the results to other settings and professional roles is uncertain. Our raters were from one country and two academic centres, which possibly provided some common contexts regarding views of QI and the QI training available. The tool would likely not perform as well with individuals inexperienced in QI or with no experience teaching QI. However, within groups likely to be responsible for teaching and assessing A3s, the results potentially apply to a range of settings, personnel and training levels because our study included raters from different professions (physicians, QI professionals) with experience ranging from some to extensive proficiency in performing QI and teaching QI, and because the A3s that were the basis for testing agreement were authored by different professional student groups (eg, physicians, nurses, pharmacists). Finally, the raters typically knew one of the authors personally, potentially biasing feedback towards being more favourable. However, in our preliminary cycles, similarly chosen raters provided critical feedback that prompted changes. Since previous feedback included negative comments that were addressed, the



favourable feedback in the final cycle appears to reflect reasonably unbiased views.

The A3 assessment tool and self-instruction package can be used for future research. The effect of being better trained to assess A3s has yet to be explored for subsequent outcomes such as providing better feedback or teaching effectiveness. Also to be explored is the impact of the assessment tool and self-instruction package on the quality of learners' A3s and actual QIP outcomes. Assessments and feedback could be provided prospectively to learners to determine the impact of longitudinal formative feedback on A3s. The materials could also be provided to learners to determine the extent to which learners on their own can improve their A3s and those of peers. Future research could also expand studies of reliability of agreement among raters across institutional settings and individuals with different levels of QI knowledge and skills. Finally, supplementing the documents in the current self-instruction package with materials in video format may enhance learning efficiency and effectiveness.

In summary, this study provides evidence of the reliability and validity of a tool to assess the quality of A3 project proposals in healthcare. The assessment tool was developed as the focus of a self-instruction package to assist a broad range of QI educators and practitioners to assess learners' A3s, to provide consistent formative and summative feedback on QIP proposals and to enhance their teaching of A3 problem solving. We demonstrated that after using the self-instruction package, raters from different institutions and professional backgrounds who are proficient in QI and have some experience teaching QI can reliably assess A3s. Raters performed ratings in about 1.5 hours and found the package and tool to be easy to learn and worthwhile to use. The materials are available on our institutional website at no charge.<sup>24</sup> The minimal investment required to use the materials facilitates their widespread use by individuals teaching QI to healthcare professionals and by individuals performing QI in healthcare.

#### Author affiliations

<sup>1</sup>Medicine, University of Pennsylvania Perelman School of Medicine, Philadelphia, Pennsylvania, USA

<sup>2</sup>Quality, Michigan Medicine, University of Michigan, Ann Arbor, Michigan, USA

<sup>3</sup>Medicine and Learning Health Sciences, Michigan School of Medicine, University of Michigan, Ann Arbor, Michigan, USA

<sup>4</sup>Health Management and Policy, School of Public Health, University of Michigan, Ann Arbor, Michigan, USA

<sup>5</sup>Integrative Systems and Design, College of Engineering, University of Michigan, Ann Arbor, Michigan, USA

<sup>6</sup>Biobehavioral Health, University of Pennsylvania School of Nursing, Philadelphia, Pennsylvania, USA

<sup>7</sup>Leonard Davis Institute of Health Economics, University of Pennsylvania, Philadelphia, Pennsylvania, USA

<sup>8</sup>Learning Health Sciences, University of Michigan Health System, Ann Arbor, Michigan, USA

**Acknowledgements** The authors would like to thank the following individuals who participated as raters in this study: Amber-Nicole Bird, Ryan Buckley, Debbie Palani Burke,

Caitlin Clancy, Kevin DeHority, Tammy Ellies, Sara Figueroa, Laurel Glaser, Kevin Gregg, Katie Grzyb, Katy Harmes, Jessica Hart, Michael Heung, Elena Huang, Chloe Hill, Christopher Klock, Jamie Lindsay, Erin Lighthead, Rosalyn Maben-Feaster, Patricia Macolino, Neha Patel, Anita Shelgikar, Elizabeth Valentine, Kimberly Volpe, Jason Wagner, Sarah Yentz. The authors would also like to thank Eric Ethington and John Shook, well known Lean thought leaders, who reviewed and provided feedback on an early version of the materials; the librarians Maylene Kefeng Qiu, Mia Wells, Melanie Cedrone and Sherry Morgan who assisted with the literature review and Larry Gruppen, who provided comments on the manuscript draft.

**Funding** The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

**Competing interests** None declared.

**Patient consent for publication** Not required.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** All data relevant to the study are included in the article or uploaded as supplementary information.

**Supplemental material** This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

#### ORCID iD

Jennifer S Myers <http://orcid.org/0000-0002-3450-9572>

#### REFERENCES

- 1 Shook J. *Managing to learn: using the A3 management process to solve problems, gain agreement, mentor, and lead*. Cambridge, MA: Lean Enterprise Institute, Inc., 2008.
- 2 Sobek D, Smalley A. *Understanding A3 thinking: a critical component of Toyota's PDCA management system*. New York, NY: Productivity Press, Taylor & Francis Group, 2008.
- 3 Jimmerson C. *A3 problem solving for healthcare: a practical method for eliminating waste*. New York, NY: Healthcare Performance Press, 2007.
- 4 Jimmerson C, Weber D, Sobek DK. Reducing waste and errors: piloting lean principles at intermountain healthcare. *Jt Comm J Qual Patient Saf* 2005;31:249–57.
- 5 Association for American Medical Colleges. Quality improvement and patient safety competencies across the learning continuum. Available: <https://www.aamc.org/data-reports/report/qipscompetencies> [Accessed March 1, 2020].
- 6 Accreditation Council of graduate medical education common program requirements. Available: <http://www.acgme.org/What-We-Do/Accreditation/Common-Program> [Accessed March 1, 2020].
- 7 Brown DR, Warren JB, Hyderi A. AAMC core entrustable professional activities for entering residency Entrustment concept group. finding a path to entrustment in undergraduate medical education: a progress report from the AAMC core entrustable professional activities for entering residency Entrustment concept group. *Acad Med* 2017;92:774–9.

- 8 World Federation for Medical Education. Basic medical education WFME global standards for quality improvement. accessed at. Available: <https://wfme.org/download/wfme-global-standards-for-quality-improvement-bme/> [Accessed on July 25, 2020].
- 9 Quality & Safety Education for Nurses Competencies. Accessed at. Available: <https://qsen.org/competencies/pre-licensure-ksas/> [Accessed on July 25, 2020].
- 10 American College of clinical pharmacists: ACCP clinical pharmacist competencies. accessed at. Available: [https://www.accp.com/docs/positions/guidelines/Saseen\\_et\\_al-2017-Pharmacotherapy\\_FINAL](https://www.accp.com/docs/positions/guidelines/Saseen_et_al-2017-Pharmacotherapy_FINAL) [Accessed on July 25, 2020].
- 11 Amos A, Taylor K, Johnson K. Assessing the quality of the A3 thinking tool for problem solving. In: Ahram TZ, Karwowski W, eds. *Advances in the service side of human engineering, advances in intelligent systems and computing*. Switzerland: Springer International Publishing, 2017: 49–61.
- 12 Waits SA, Reames BN, Krell RW, *et al*. Development of team action projects in surgery (TAPS): a multilevel team-based approach to teaching quality improvement. *J Surg Educ* 2014;71:166–8.
- 13 Kim CS, Lukela MP, Parekh VI, *et al*. Teaching internal medicine residents quality improvement and patient safety: a lean thinking approach. *Am J Med Qual* 2010;25:211–7.
- 14 Wong BM, Etchells EE, Kuper A, *et al*. Teaching quality improvement and patient safety to trainees: a systematic review. *Acad Med* 2010;85:1425–39.
- 15 Boonyasai RT, Windish DM, Chakraborti C, *et al*. Effectiveness of teaching quality improvement to clinicians: a systematic review. *JAMA* 2007;298:1023–37.
- 16 Peiris-John R, Selak V, Robb G, *et al*. The state of quality improvement teaching in medical schools: a systematic review. *J Surg Educ* 2020;77:889–904.
- 17 Leenstra JL, Beckman TJ, Reed DA, *et al*. Validation of a method for assessing resident physicians' quality improvement proposals. *J Gen Intern Med* 2007;22:1330–4.
- 18 Rosenbluth G, Burman NJ, Ranji SR, *et al*. Development of a multi-domain assessment tool for quality improvement projects. *J Grad Med Educ* 2017;9:473–8.
- 19 Steele EM, Butcher R, Carluzzo KL, *et al*. Development of a tool to assess trainees' ability to design and conduct quality improvement projects. *Am J Med Qual* 2020;35:125–32.
- 20 Ionan AC, Polley M-YC, McShane LM, *et al*. Comparison of confidence interval methods for an intra-class correlation coefficient (ICC). *BMC Med Res Methodol* 2014;14:121.
- 21 Cicchetti DV. Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychol Assess* 1994;6:284–90.
- 22 R Core Team. R: a language and environment for statistical computing. R foundation for statistical computing, Vienna, Austria. URL, 2013. Available: <http://www.R-project.org/>
- 23 Co JPT, Weiss KB, CLER Evaluation Committee. CLER pathways to excellence, version 2.0: Executive summary. *J Grad Med Educ* 2019;11:739–41.
- 24 A3 Problem-Solving Resources – Center for Healthcare Improvement & Patient Safety | University of Pennsylvania Perelman School of Medicine (upenn.edu) (accessed on Dec 24, 2020).
- 25 Etchells E, Woodcock T. Value of small sample sizes in rapid-cycle quality improvement projects 2: assessing fidelity of implementation for improvement interventions. *BMJ Qual Saf* 2018;27:61–5.

## Development and Validation of an A3 Problem-Solving Assessment Tool and Self-Instructional Package for Teachers of Quality Improvement in Healthcare

Jennifer S. Myers, MD, Jeanne M. Kin, MHA, JD, John E. Billi, MD,  
Kathleen Burke, RN, PhD, R. Van Harrison, PhD

### Supplemental Digital Content

#### A3 Assessment Tool and Instruction Package

The "A3 Assessment Toolkit" is a self-instruction package for individuals teaching quality improvement in healthcare to learn about creating A3s and about assessing them. The package provides opportunity to practice assessing A3s and to check the assessments. After learning and practicing (about 2 hours), individuals with some familiarity with A3s and with teaching quality improvement should provide reasonably reliable/consistent assessments and feedback. Individuals with less experience may need more review and practice.

The self-instruction package is available at A3 Problem-Solving Resources – Center for Healthcare Improvement & Patient Safety | University of Pennsylvania Perelman School of Medicine (<https://chips.med.upenn.edu/resources/a3-problem-solving-resources/>). The materials in the self-instruction package, including the A3 Assessment Tool, are included here, except as noted for items already accessible to readers of the main article.

Page # (lower right corner)

Learn about the self-instruction package, assessment tool, and using them:

Instructions for Assessing Problem-Solving A3s (Proposal Stage) [2 pages] 2

Learn about A3s and assessing them:

A3 Template [1 page] – reproduced in main article as Figure 1

A3 Content Guide [5 pages] 4

A3 Assessment Tool [4 pages] 9

A3 Assessment Tool with Description of Response Options for Each Item [8 pages] 13

Practice assessing A3s and check your assessments:

Example 1 – A3 [1 page, 11"x17"] 21

Example 1 – Assessments/explanations [7 pages] 22

Example 2 – A3 [1 page, 11"x17"] 29

Example 2 – Assessment tool to use [4 pages] – copy of A3 Assessment Tool, not reproduced here

Example 2 – Assessments/explanations [7 pages] 30

Example 3 – A3 [1 page, 11"x17"] 37

Example 3 – Assessment tool to use [4 pages] – copy of A3 Assessment Tool, not reproduced here

Example 3 – Assessments/explanations [7 pages] 38

#### Feedback Form for Study Raters 45

This 2-page structured feedback form with 19 open-ended items was distributed to raters at the time of the orientation phone call. Raters provided written feedback when they submitted their A3 ratings. An investigator had a debriefing phone call with each rater during which raters could clarify and elaborate their comments.

#### Contact for Further Information

Jennifer S. Myers, MD

Hospital of the University of Pennsylvania  
3400 Spruce Street, Maloney Building, Suite 5033  
Philadelphia, PA 19104

Phone: (215) 662-3797

Email: [jennifer.myers2@penmedicine.upenn.edu](mailto:jennifer.myers2@penmedicine.upenn.edu)

Twitter: @drjensmyers

## Instructions for Assessing Problem-Solving A3s (Proposal Stage)

### Background

Healthcare professionals are now expected to improve the quality of the care they provide. Many healthcare systems and healthcare educators teach Lean Thinking as quality improvement (QI) methodology to their learners. An A3 proposal is a lean practice to summarize and document a problem-solving effort on one page. As the use of “problem solving” A3s increases in healthcare settings, the need is also increasing for a systematic method to assess their quality. Individuals developing A3s need coaching on their problem-solving skills and guidance concerning what information to include. Individuals teaching the use of A3s need to assess and provide feedback concerning the content and quality of information in A3s developed by learners individually or in teams.

**Purpose.** We have designed an assessment tool and supporting materials to provide structured guidance, ratings, and feedback concerning the content and quality of problem-solving A3s. Properties of the assessment tool are being studied with the goal of sharing the tool widely.

**A3s and their authors.** Problem-solving A3s communicate to others the nature of a problem and its importance, current state, root causes, goal for improvement, recommended countermeasures, proposed action plan, and follow up steps.

Authors of A3s may be at any stage of experience in developing A3s. However, the assessment tool will most frequently be used to assess A3s developed by learners in formal training programs. Such programs often require assessment of an individual's or team's accomplishment in carrying out a quality improvement (QI) project or QI project proposal. A3s in development can be assessed to provide formative feedback. Completed A3s can be assessed for final or summative evaluation.

**Individuals assessing A3s.** In order to evaluate a problem-solving A3, the assessor needs to understand the principles of Plan-Do-Check-Act/Adjust (PDCA) based problem solving and have experience developing A3s. Also desirable is experience teaching or mentoring others to develop problem-solving A3s.

The assessment tool and associated materials presented here highlight important aspects of developing A3s, but they are not a substitute for a formal introduction into the purpose and development of A3s.

Sources for training and general instructional materials for developing A3s are presented below in the A3 Content Guide in the section titled “Resources.”

### A3 Assessment Toolkit

The “A3 Assessment Toolkit” includes six coordinated items: (1) these instructions, (2) A3 template, (3) A3 content guide, (4) A3 assessment tool, (5) description of response options for each item in the tool, and (6) three A3 assessment examples.

**Instructions for assessing A3s at the proposal stage of problem solving.** The instructions that you are reading introduce the purpose of the toolkit and the use of the other components.

**A3 template.** Sections of the A3 template provide a location to organize and highlight key information in the problem-solving process. This template has been adapted from versions in use at two academic medical centers, which were adapted from nationally available models (e.g., see Shook, 2008, and Jimmerson, 2007, listed in Resources in the content guide).

The A3 template outlines key information to be rated and a typical order in which information is presented. However, an individual A3 may vary in how its problem-solving story is presented. Assessments do not depend on information order (as long as logic flow is clear), just on whether key information is presented understandably somewhere in the A3.

**A3 content guide.** The content guide describes in more detail the key information to be presented and formats often used to present information. The explanations provide a more consistent, shared understanding of key information and its presentation across A3 authors and across A3 raters.

**A3 assessment tool.** The 23-item tool outlines key information to assess using a simple 4-point rating scale for each item. The assessment tool focuses on the written A3 as a stand-alone document that anyone can assess without additional contextual knowledge or information.

- A3s are typically the basis for a presentation, discussion, and dialog. However, if the assessor is not present to interact with the author, the document is the only source of information. (If desired, the assessment tool could be applied to information presented both in a written A3 and verbally.)



- While some assessors may have personal knowledge of the actual situation, the assessments focus on information in the document that can be rated without first-hand knowledge of the problem and its context. (If an assessor has personal knowledge of the situation, the assessment tool has 9 supplementary items concerning adequacy and feasibility that may also be rated.)

**Description of rating options.** Items in the assessment tool have four response options. This document describes the meaning of each item's response options. This shared understanding of responses helps provide consistent ratings across individuals and across A3s.

**A3 Assessment examples.** Three "finished" problem-solving A3s, at the proposal stage, and their assessments are provided as examples.

- The first example A3 is thoroughly done. The high quality of the content is reflected in its ratings and explanations for them.
- The second and third example A3s are less complete. The content contains some areas of lower quality. An assessment tool is provided to try out rating the items, then to compare them with the standard ratings and explanations provided.

## Learning to Use the Assessment Tool

Learning about the tool and practicing its use are straightforward.

1. Review the materials. Review the A3 template, A3 content guide, assessment tool, and explanation of item ratings to understand the content to be assessed and the ratings to be performed.
2. Review A3 Example 1 and its ratings. After reviewing the A3, go through each item on its completed ratings and explanations form to understand how each item's rating was determined. Reviewing this well done A3 and its scoring provides a basis for subsequent comparisons when making assessments.
3. Practice using the assessment tool on A3 Example 2 and/or A3 Example 3 (less well done). Review the A3, then download and fill out the rating tool for it. Then compare your ratings with the standard ratings and explanations provided. Review why your ratings may have diverged from the standard ratings, particularly for differences of 2 points or more. (Note: less well organized or incomplete A3s may take a little longer to assess.)
4. Consider using the assessment tool on an A3 with which you are familiar. If you have access to an A3 developed locally, use the assessment tool to rate it.

Review your ratings for information content and quality that you have not considered previously.

The learning and practice should help you use the assessment tool to provide ratings of A3s that are reasonably consistent with ratings that others would make. This level of experience should be adequate to differentiate A3s that are of overall low, moderate, and high quality in presenting key information. Additional practice and comparisons with others will likely be needed to rate some individual items consistently.

## Tips

**Some A3s will not address all items listed in the assessment tool.** Even when working from a template, A3 authors may not remember or understand the need to address all of the content, may not have information to address all of the content, or may not be far enough along in their problem investigation to complete the A3. This assessment tool helps teachers and learners of A3 problem solving understand the key content to include. Providing A3 authors with structured feedback regarding this content will help develop their problem-solving skills.

**Relevant information may be located in different sections of an A3.** A3 authors may place relevant information in another section of the A3, most likely in an adjacent section. Also, an A3 may present sections of information in a different order than the order on the A3 template presented here and on the rating tool. If logic flow is clear, consider any information in the A3 when rating an item.

**Assessing a specific A3 will involve some judgement.** Deciding which of two adjacent rating options is most appropriate may be somewhat arbitrary for a specific A3. However, for most purposes a rating in the appropriate range of the rating scale is sufficient.

A3 Content Guide

Purpose & Use

A3 thinking is a method to:

**Solve problems.** A3s are grounded in scientific thinking – cycles of empirical observation, hypothesis generation, and testing. The A3 template guides the problem owner through a systematic, structured thought process to diagnose and treat performance problems – analogous to completing a History & Physical with Assessment and Plan for a patient. A3s can be adapted for diverse settings, audiences and problems. A3s can address problems of varying scope – from small local improvements to major strategic initiatives.

**Develop problem solvers.** An A3 requires problem owners to “show their thinking.” An increasing number of organizations use dialog between a problem owner and his/her manager or mentor around an A3 as a means to develop individuals to solve problems in their work, and to capture organizational learning. A3 topics can be self-selected or assigned to problem owners as a development activity.

**Communicate, engage and build consensus.** As the problem owner shares the A3 with key stakeholders, he or she can incorporate the thinking of others, create a shared understanding, and build consensus on each section of the A3:

Grasping the Situation [left side]	Countermeasures & Implementation Plans [right side]
<p><b>Background</b> or reason for action.</p> <p><b>Current Situation</b> of problem to be solved, concluding with a <u>Problem Statement</u> identifying a performance gap to be closed.</p> <p><b>Goal</b> of the improvement effort.</p> <p><b>Analysis</b> to identify root causes of problem.</p>	<p><b>Countermeasures</b> proposed to address causes.</p> <p><b>Action Plan</b> for testing, implementation and monitoring if planned actions were performed.</p> <p><b>Follow Up Plan</b> to assess if desired goals were achieved.</p>

**Tell a story.** A3s are intended to tell a story. Use an effective combination of visual images and words to communicate. Space limits you to only highlights on the page, but you can expand when presenting. A3s can be handwritten or composed using software.

**Propose action.** This A3 template is designed to propose action. The problem owner acquires a thorough grasp of the situation and problem, designs a robust set of countermeasures and plans, and builds consensus needed to start the “Do” phase of the **P-D-C-A** (Plan-Do-Check-Adjust) cycle.

Sections of the A3

The content of an A3 is organized to help readers follow the logic flow. The top of the page has headings introducing the overall topic and who is involved. The left side generally addresses what the A3’s author has observed (Background, Current Situation ending with a Problem Statement, and Analysis). The right side generally describes what the author wants to try out (Countermeasures, Action Plan, and Follow Up).

**Header:** Orientation information:

Title: The topic of the A3, described in a way that clearly identifies the problem to be addressed.

Owner: The name of the A3 owner/author who is investigating the problem – the “problem solver.” The owner may also list team members, sponsors, coaches and anticipated reviewers.

Date: The date of the draft to assure version control. Multiple revision dates are likely as the problem owner learns more about the problem, incorporates ideas of others and demonstrates the iterations of his/her thinking.

**Background:** Summarize the reason for action---the clinical and/or business case for change. This section should communicate the significance of the problem by describing its serious consequences: who


is impacted, how severely, and how frequently. Tell the “ugly story” of how the problem harms patients/customers, frustrates workers, or wastes resources. Highlight relevant historical and organizational context. Keep the customer perspective in mind. Consider using pictures as well as words to tell a compelling story. Simple, hand-drawn illustrations can be powerful.

**Background** “Time is Brain”

- Clinical outcomes in Acute Ischemic Stroke are better the more rapidly IV thrombolysis (tPA) is administered.\*
- Each 15 minute reduction in the time to initiate tPA is associated with a:
  - 4% decrease in the odds of death before discharge
  - 4% decrease in the odds of symptomatic hemorrhagic transformation of infarction
  - 4% increase in the odds of walking independently at discharge
  - 3% increase in the odds of being discharged home, rather than to an institution
- Our “Door-to-Needle” time standard in the ED is 60 minutes or less.
- Despite multiple revisions to our ED stroke protocol, we only meet the 60-minute target about half of the time.

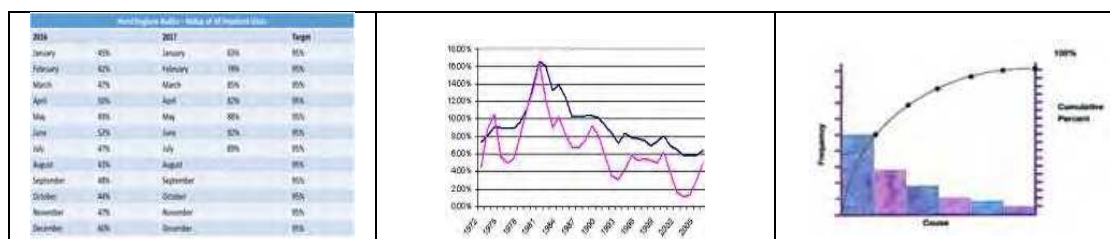
[Target was met in 44 out of 90 cases presenting to the ED in Q4 2018]

\* Saver JL, Fonarow GC, Smith EE, et al. Time to treatment with intravenous tissue plasminogen activator and outcome from acute ischemic stroke. *JAMA* 2013; 309(21):2480-2488

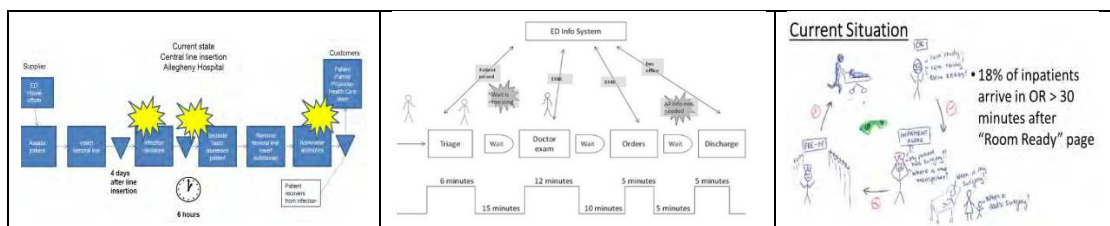


**Current Situation:** Accurately depict the:

- Current level of performance



- Process for doing the work



Ideally, both can be visually illustrated, e.g., baseline measures, trend chart, process map or value stream map of current state. Again, simple hand-drawn illustrations can be effective.

To deeply understand the current situation, “Go and See” to observe firsthand the problem and its context. (A “Go See” takes place at the *gemba*, a Japanese term meaning the real place where the work is done). Talk to and engage people working in the process. They are best positioned to understand the issues, the constraints, and feasible solutions.

Focus on “Five Actuals”: 1) what is actually happening; 2) actual individuals involved in performing the work; 3) actual location where the problem occurs; 4) the actual process; and 5) the actual conditions.

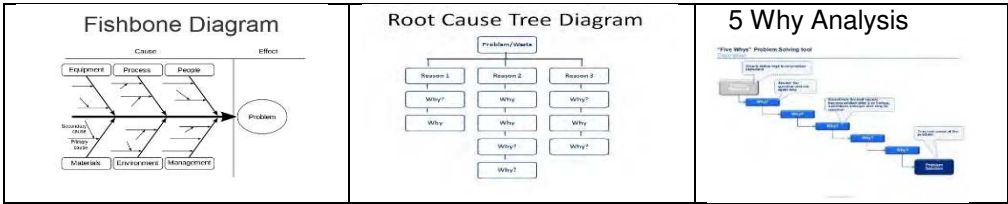
**Problem Statement:** Conclude the section on Current State with a clear sentence describing the specific gap in performance. A performance gap is the difference between what should be happening and what is actually happening, that is, standard v. actual. The gap can be in any dimension of performance: Safety, Quality, Patient Experience, Timeliness/Efficiency, Equity, Value, Financial Performance, Employee Engagement, or others.

The Problem Statement should describe the gap in measurable terms (e.g., callbacks to patients should occur within one working day; only 44% currently meet the standard), not in vague or general terms (callbacks to patients take too long).

**Goal:** Establish the target condition or specific performance improvement to be achieved in a set timeframe. "How much of the gap do you want to close, by when?" The A3 may establish an interim goal (a "next target condition") that is part way to a longer-term goal, or ideal state, requiring a longer time horizon to achieve. Think in terms of setting SMART goals: Specific, Measurable, Achievable, Relevant, and Time-bound.

**Analysis:** Explain causation. Identify contributors to the problem, significant root causes and constraints. The core of A3 problem-solving is to delve beyond symptoms to an actionable root cause or causes. In a complex system, a problem may have multiple root causes – a "web of causation". Multiple causes may need to be addressed for the problem solving to succeed.

Observe the problem at the point of cause and gather relevant facts and data. Then complete the Analysis section of the A3. Depict root causes, ideally with visuals, e.g., fishbone diagram, tree diagram, "5 Whys" analysis, or Pareto chart. Caution: be careful to describe what is observable: "absence or lack of" a potential countermeasure, such as training, standard work or an IT system, are not root causes.

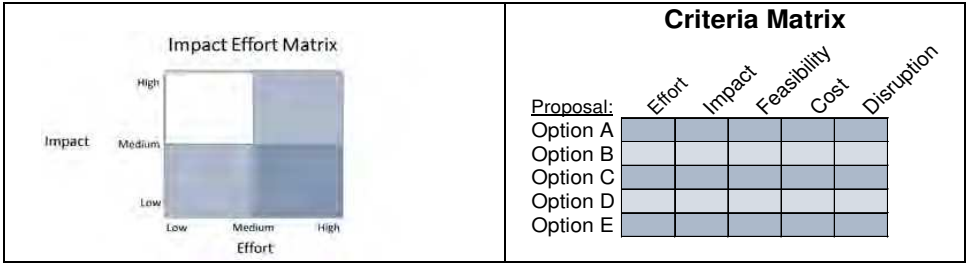


**Countermeasures:** Consider, prioritize and propose countermeasures. The term countermeasures is preferred to "solutions", since it is rarely possible to solve a problem permanently and completely. The countermeasures serve as a prescription for improvement. If the Analysis section of the A3 is thorough, the countermeasures should be readily apparent.

Recommendations should go beyond "weak" countermeasures (such as policy changes, reliance on human memory or education/training), to more effective interventions (such as standard work/roles, just-in-time reminders, redesigning forms and visual/ cognitive aids). If possible, include strong countermeasures such as work system changes, changes in the environment, and physically "error proofing" processes. When strong countermeasures are not feasible, select a set of countermeasures that together are likely to achieve the desired result.

The content of this section should describe:

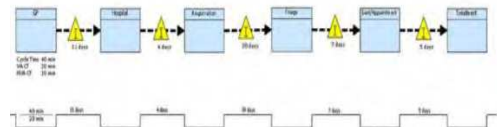
- Direct linkage of countermeasures to identified root causes
- Evidence of having evaluated multiple options (including ones that don't need new resources); this may take the form of an impact/effort matrix or criteria matrix



- Simple experiments that can be run to trial the countermeasures
- Prediction of the outcome of the countermeasure

Consider including a future state map as an illustration of what will happen when the proposed improvement is in place





**Action Plan:** The Action Plan describes the D (Do) in the PDCA cycle. Detail the activities required for pilot testing and implementation. List tasks, responsible leads and due dates. Plans should be run like experiments to reveal what is not understood about the work. The plan may be shown in a simple table or a schedule of linked tasks in a Gantt Chart.

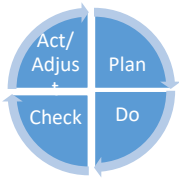
What	Who	By When
1)~~~	JB	6/1/19
2)~~~	LD	6/15/19
3)~~~	BG	8/15/19

A related “monitoring plan” should describe the process (monitoring tasks, responsible leads, due dates) for monitoring whether “action items” are performed. *Did we run the experiment?* Often desired results are not achieved because no one monitors whether the Action Plan is implemented.

**Follow Up:** Outline a plan for checking whether the desired results have been achieved: *Did we get the results we were anticipating?* This is the C (Check) in the PDCA cycle.

Like Action Plans, Follow Up Plans should outline the follow-up methods:

- What will be checked (e.g., process, outcome, balancing measures).
- Who will perform the check(s).
- When the check(s) will occur.



The Follow Up section may also be used to identify unresolved issues known at the time of planning and to describe plans for sustaining results and spreading learning, as appropriate. Although testing of countermeasures and implementation actions will not yet have occurred, consider in advance how you will know whether planned activities actually happened, the change is an improvement, and the goal has been achieved.

## Resources on A3s and Problem Solving

### Books

Cindy Jimmerson, *A3 Problem Solving for Healthcare: A Practical Method for Eliminating Waste*, CRC Press, 2007. (Practical guide written specifically for healthcare)

John Shook, *Managing to Learn: Using the A3 Management Process to Solve Problems, Gain Agreement, Mentor, and Lead*, Lean Enterprise Institute, 2008. (Description of how A3s may be used as a management process to foster individual and organizational learning)

Art Smalley. *The Four Types of Problems*, Lean Enterprise Institute, 2018. (Description of 4 main categories of problems, and how to approach each: trouble shooting, gap from standard; target condition and open ended/innovation).

Derek K. Sobek III and Art Smalley, *Understanding A3 Thinking*, CRC Press, 2008. (Detailed guide on writing and reviewing A3s of various types, including templates, examples and practical advice)

### Chapters and Articles

Jeffrey K. Liker and David Meier, *The Toyota Way Fieldbook: A Practical Guide for Implementing Toyota's 4 Ps*, Chapter 18, "Telling the Story Using an A3 Report", McGraw-Hill, 2006.

Mark Graban, *Lean Hospitals*, Chapter 7, "Proactive Root Cause Problem Solving", CRC Press, 2012.

Roberto Priolo, "What is A3 Thinking?" Planet Lean: The Lean Global Network Journal. March 2, 2020. <https://planet-lean.com/what-is-a3-thinking/>

### A3 Training Opportunities

Lean Enterprise Institute, <https://www.lean.org/>

Catalysis, <https://createvalue.org/>

University of Michigan College of Engineering ISD, <http://isd.engin.umich.edu/>

### Web Resources - Quality Improvement Tools

All of the tools included in the A3 content guide are further explained, with examples and templates provided, at one or more of these websites:

ASQ (American Society for Quality). *The Seven Basic Quality Tools for Process Improvement*: <http://asq.org/learn-about-quality/seven-basic-quality-tools/overview/overview.html>

Institute for Healthcare Improvement. *IHI Quality Improvement Essential Toolkit*: <http://www.ihl.org/resources/Pages/Tools/Quality-Improvement-Essentials-Toolkit.aspx>

Minnesota Department of Health. *Public Health and Quality Improvement Resources and Tools*: <http://www.health.state.mn.us/divs/opi/qi/toolbox/>

revised 1/17/20

## Assessment Tool for a Problem-Solving (Proposal) A3

### Directions

#### Items Assessed by Direct Review of the Proposal A3

Items numbered 1 – 23 can be assessed without knowing the actual situation. Most items reflect descriptive content suggested in the accompanying A3 template.

**Rating these items.** For each item, review the A3 and assess the item using one of the four rating options. *Include information in adjacent sections when assessing items – information on the left side or on the right side may be in a different order/location on a specific A3.* Record the “points” (0 to 3) associated with the rating option to the right under “Item Rating.”

**Overall mean rating for these items.** At the end, add the item “points” to calculate the overall total rating “points.” Calculate the overall mean item rating by dividing the total rating points by 23, the total number of items. *(If completed on a computer, calculations are performed automatically – see below.)*

#### Items That Require Knowledge of the Actual Situation

Unnumbered items (noted with “➤”) address how well an A3 reflects the actual situation. Only individuals who are somewhat familiar with the specific context (beyond description in the A3) can assess these ten items. When these items can be rated, they assess the A3’s accuracy in representing the actual situation.

**Rating these items.** For each item, review the A3 and:

- If you have adequate knowledge of the actual situation, assess the item using one of the four rating options.
- If you are not familiar (or not adequately familiar) with the current situation, indicate “Cannot assess.”

These items are not included in aggregated mean ratings because not all raters will be familiar with the problem.

#### Providing Feedback

Provide feedback to A3 authors using the item ratings, comment box for each section, and overall ratings. For “Problem Solving” A3s in development, feedback provides important formative assessments. For finished A3s, feedback explains summative/final assessments.

#### Functions When Completing on a Computer

The assessment tool is a PDF fillable form that performs two functions when completed on a computer.

**“Hover” for rating explanations.** “Hover” your pointer over a rating option and a more detailed explanation will appear.

**Entering ratings and calculating scores.** Use the dropdown menu for each answer box to enter the score. For the numbered items, the total and the mean for the 23 numbered items will be calculated and appear at the end. *(If numbered items are not answered, they are scored as zero in calculating the total and mean scores.)*

revised 1/17/20

**Assessment Tool for a Problem-Solving (Proposal) A3****A3 Title:** \_\_\_\_\_**Author:** \_\_\_\_\_ **Reviewer:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Items (based on A3 Template) and Rating Scale	Rating
---	--------

**Background** *Why is the problem important?*

- |   |                      |
|---|----------------------|
| 1. <b>Negative consequences</b> (e.g., harm, frustration, waste): how specific is the clearest statement of a negative consequence of the problem?<br>0. Not addressed    1. Unclear    2. General (eg, "harm," "difficulties," "waste")    3. Specific type of consequence   | <input type="text"/> |
| 2. <b>Individuals/groups</b> impacted by the negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement identifying an impacted individual, group/unit, or organization?<br>0. Not addressed    1. Unclear    2. General (eg, "staff," or "patients," but not which)    3. Specific individual, group, or organizational unit | <input type="text"/> |
| 3. <b>Severity</b> of the negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement of the severity (e.g., extent/amount) of at least one negative consequence?<br>0. Not addressed    1. Unclear    2. General (eg, significant harm)    3. Specific extent/amount  | <input type="text"/> |
| 4. <b>Frequency</b> of the negative consequences (e.g., harm, frustration, waste): how specific is clearest statement of the frequency (# events/unit of time) of at least one negative consequence?<br>0. Not addressed    1. Unclear    2. General (eg, rare, often)    3. Specific frequency (eg, events per unit of time)                                     | <input type="text"/> |
| ➤ <b>Extent to which important negative consequences</b> (e.g., harm, frustration, waste) are identified?<br>None    Inadequate    Adequate    Thorough    Cannot assess  | <input type="text"/> |

*Background – reviewer comments:***Current Situation** *What is actually happening?*

- |   |                      |
|---|----------------------|
| 5. <b>Current level of performance</b><br>0. Not addressed    1. General words, but no data    2. Some data    3. Thorough and robust data  | <input type="text"/> |
| 6. <b>How is work done (process/workflow)?</b><br>0. Not addressed    1. Addressed, but unclear    2. Illustration/ description somewhat clear    3. Illustration/ description very clear | <input type="text"/> |
| 7. <b>Clear identification of who is involved in performing the work?</b><br>0. Not addressed    1. Unclear    2. Somewhat clear    3. Very clear   | <input type="text"/> |
| 8. <b>Performance problem/gap?</b><br>0. Not addressed    1. Unclear    2. Partially specified    3. Clearly specified/quantified   | <input type="text"/> |
| ➤ <b>Extent to which the A3 author demonstrates direct observation of the work process?</b><br>Not observed    A little    Some    All    Cannot assess                                   | <input type="text"/> |
| ➤ <b>Extent of demonstration of learning from the people involved in the process?</b><br>None    A little    Some    All    Cannot assess   | <input type="text"/> |

*Current Situation – reviewer comments:*



revised 1/17/

**Goal** What target condition or specific performance is desired? By when?9. How specific is the goal?

0. Not addressed    1. Vague    2. Somewhat specific    3. Very specific

10. Is the goal measurable?

0. Not addressed    1. Not measurable    2. May be measurable    3. Clearly measurable

➤ How achievable is the goal?

- Not achievable    Unlikely    Possibly    Probably    Cannot assess

11. How relevant is the goal to addressing the problem?

0. Not addressed    1. Not relevant    2. Somewhat relevant    3. Very relevant

12. How time-bound (clear timeframe for accomplishment) is the goal?

0. Not addressed    1. Unclear    2. Somewhat clear (eg, relative timeframe)    3. Very clear (eg, date specified)

Goal – reviewer comments:

**Analysis** What is contributing to the problem? What are its root causes?13. Is the display of method(s) for analyzing root causes easy to understand? (E.g., fishbone diagram, “5-whys”/root cause tree diagram, Pareto chart)

0. Not displayed    1. Not understandable    2. Partially understandable    3. Easy to understand

14. How clear are the identified root causes?

0. Not addressed    1. Unclear    2. Somewhat clear    3. Very clear

➤ Extent to which important root causes are identified?

- None    Inadequate    Adequate    Thorough    Cannot assess

Analysis – reviewer comments:

**Countermeasures** What options/alternatives were considered? What countermeasures/strategies are proposed?15. How many options for countermeasures were considered?

0. None    1. One    2. Two    3. Three or more

16. Identify the strongest countermeasure considered. How strong is it?

0. No counter-measures    1. Weak (e.g., policy change, education and training)    2. Intermediate (e.g., standard work/roles, just-in-time reminders, or visual/cognitive aids)    3. Strong (e.g., “forcing function” that ensures work done right way)

17. How many of the proposed countermeasures are linked to identified root causes? (Review each countermeasure and see if it addresses a root cause identified in the Analysis Section.)

0. None linked to causes    1. Minority linked to causes    2. Majority linked to causes    3. All linked to causes

➤ To what extent are countermeasures feasible to carry out?

- Not feasible    Unlikely    Possibly    Highly likely    Cannot assess

➤ How likely will countermeasures result in achieving the goal?

- Not possible    Unlikely    Possibly    Highly likely    Cannot assess

revised 1/17/20

**Countermeasures – reviewer comments:**

**Action Plan** *To pilot & implement the selected countermeasures: what, who, when?*18. For the action plan on the A3, how clearly are activities described (i.e. "what" is to be done)?

0. Not addressed      1. Unclear      2. Somewhat clear      3. Very clear

19. Are individuals identified to be responsible for each action item to be carried out (i.e. "who")?

0. Not addressed      1. For the minority      2. For the majority      3. For all

20. Are estimated completion dates identified for each action item (i.e. "when")?

0. Not addressed      1. For the minority      2. For the majority      3. For all

21. How clear is the plan for monitoring the implementation of actions in 18-20 above (what will be monitored, by whom, when)?

0. Not addressed      1. Plan unclear (no or minority of actions monitored – what, who, when)      2. Plan partially clear (majority of actions monitored – what, who, when)      3. Plan clear (all actions monitored – what, who, when?)

➤ How adequate is the action plan?

Not adequate      Possibly      Probably      Very likely      Cannot assess

**Action plan – reviewer comments:**

**Follow-up Plans** *Checking whether desired goal(s) was achieved?*22. Is follow-up planned to measure achievement of the desired goal(s) (what will be measured, by whom, when)?

0. Not addressed      1. Plan unclear (no more than one of "what, who, when")      2. Plan partially clear (two of "what, who, when")      3. Plan clear ("what, who, when")

**Across A3 Sections**23. How clearly does the title identify the problem to be addressed?

0. No title      1. Unclear      2. Somewhat clear      3. Very clear

➤ How often does the logic flow clearly from one section of the A3 to the next section?

Not at all      Occasionally      Majority      Always      Cannot assess

➤ In general, how informative are the visual illustrations?

None used or not informative      Not very informative      Somewhat informative      Very informative      Cannot assess

**Across A3 Sections – reviewer comments:**

**OVERALL RATING** (items 1 – 23)

Total points (max = 69)

Mean (divide total by 23 items)

*Note: check that all 23 numbered items have been answered. Missing answers are coded "0."*


0.00

12

## Description of Rating Options

1/17/20

### Assessment Tool for a Problem-Solving (Proposal) A3

#### Directions

##### Items Assessed by Direct Review of the Proposal A3

Items numbered 1 – 23 can be assessed without knowing the actual situation. Most items reflect descriptive content suggested in the accompanying A3 template.

**Rating these items.** For each item, review the A3 and assess the item using one of the four rating options. *Include information in adjacent sections when assessing items – information on the left side or on the right side may be in a different order/location on a specific A3.* Record the “points” (0 to 3) associated with the rating option to the right under “Item Rating.”

**Overall mean rating for these items.** At the end, add the item “points” to calculate the overall total rating “points.” Calculate the overall mean item rating by dividing the total rating points by 23, the total number of items. *(If completed on a computer, calculations are performed automatically – see below.)*

##### Items That Require Knowledge of the Actual Situation

Unnumbered items (noted with “➤”) address how well an A3 reflects the actual situation. Only individuals who are somewhat familiar with the specific context (beyond description in the A3) can assess these ten items. When these items can be rated, they assess the A3’s accuracy in representing the actual situation.

**Rating these items.** For each item, review the A3 and:

- If you have adequate knowledge of the actual situation, assess the item using one of the four rating options.
- If you are not familiar (or not adequately familiar) with the current situation, indicate “Cannot assess.”

These items are not included in aggregated mean ratings because not all raters will be familiar with the problem.

##### Providing Feedback

Provide feedback to A3 authors using the item ratings, comment box for each section, and overall ratings. For “Problem Solving” A3s in development, feedback provides important formative assessments. For finished A3s, feedback explains summative/final assessments.

##### Functions When Completing on a Computer

The assessment tool is a PDF fillable form that performs two functions when completed on a computer.

**“Hover” for rating explanations.** “Hover” your pointer over a rating option and a more detailed explanation will appear. *(Not functioning on this “Descriptions” form because the detailed explanation is presented below the item.)*

**Entering ratings and calculating scores.** Use the dropdown menu for each answer box to enter the score. For the numbered items, the total and the mean for the 23 numbered items will be calculated and appear at the end. *(If numbered items are not answered, they are scored as zero in calculating the total and mean scores.)*

## Description of Rating Options

1/17/20

## Assessment Tool for a Problem-Solving (Proposal) A3

A3 Title: \_\_\_\_\_

Author: \_\_\_\_\_ Reviewer: \_\_\_\_\_ Date: \_\_\_\_\_

Items (based on A3 Template) and Rating Scale	Rating
<b>Background</b> <i>Why is the problem important?</i>	
<b>1. <u>Negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement of a negative consequence of the problem?</u></b> 0. Not addressed      1. Unclear      2. General (eg, "harm," "difficulties," "waste")      3. Specific type of consequence	
0. Not Addressed – No negative consequences are mentioned. 1. Unclear – Statements are unclear or vague regarding whether the problem results in meaningful negative consequences or the problem is not differentiated from its negative consequences. 2. General (eg, "harm," "difficulties," "waste") – Statements are made about negative consequences occurring, but the type of consequences are stated only in general terms. 3. Specific types of consequences – at least one specific type of negative consequence is specifically stated (eg, increased patient length of stay, increased cost in providing care, increased staff frustration).	
<b>2. <u>Individuals/groups impacted by the negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement identifying an impacted individual, group/unit, or organization?</u></b> 0. Not addressed      1. Unclear      2. General (eg, "staff," or "patients," but not which)      3. Specific individual, group, or organizational unit	
0. Not Addressed – No identification of individuals or other entities impacted by negative consequences of the performance problem. 1. Unclear – Individuals or other entities impacted by negative consequences of the performance problem (e.g., patients, clinical personnel, or institution) are implied, but not specifically stated. 2. General (eg, "staff," or "patients," but not which) – Individuals or other entities impacted by negative consequences of the performance problem are stated broadly (e.g., "patients") without clarifying the specific type or group of individuals/entities (e.g., not clarifying patients with a specific medical condition). 3. Specified individual, group, or organizational unit – at least one set of individuals or other entity impacted by the negative consequences of the performance problem is clearly stated.	
<b>3. <u>Severity of the negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement of the severity (e.g., extent/amount) of at least one negative consequence?</u></b> 0. Not addressed      1. Unclear      2. General (eg, significant harm)      3. Specific extent/amount	
0. Not Addressed – the negative consequences of the performance problem are not addressed. 1. Unclear – statement that performance problems cause negative consequences (e.g., "causes problems for patients"), but no indication of their severity or extent of impact the consequences. 2. General (e.g., significant harm) – statement of the general severity of negative consequences (e.g., poor clinical outcomes, dissatisfaction) without indicating the degree of severity or extent of harm. 3. Specified extent/amount – for at least one negative consequence, a specific severity or degree of impact is indicated (e.g., % mortality, type of morbidity, length of prolonged hospitalization, level of staff dissatisfaction, amount of healthcare costs).	
<b>4. <u>Frequency of the negative consequences (e.g., harm, frustration, waste): how specific is clearest statement of the frequency (# events/unit of time) of at least one negative consequence?</u></b> 0. Not addressed      1. Unclear      2. General (eg, rare, often)      3. Specific frequency (eg, events per unit of time)	
0. Not Addressed – the negative consequences of the performance problem are not addressed.	

## Description of Rating Options

1/17/20

1. Unclear – statement that performance problems cause negative consequences (e.g., “causes problems for patients”), but no indication of the general frequency of the negative consequences.
2. General (e.g., rare, often) – statement of the general frequency of negative consequences (e.g., occasionally, frequently), with the no specific frequency indicated.
3. Specified (events per unit of time) – for at least one negative consequence, a specific frequency is indicated (e.g., patients affected per month, % of staff reporting extremely dissatisfaction last month, dollars wasted per year).

*Note: This item is about the frequency of negative consequences. The frequency of negative consequences resulting from a performance problem may be confused with the frequency of a performance problem. Some performance problems may seldom result in negative consequences, so the frequency of negative consequences may be much lower than the frequency of the performance problem. However, if each instance of a performance problem results in negative consequences, the frequency of performance problems also reflects the frequency of negative consequences.*

➤ Extent to which important negative consequences (e.g., harm, frustration, waste) are identified?

None      Inadequate      Adequate      Thorough      Cannot assess

### Current Situation *What is actually happening?*

5. Current level of performance

0. Not addressed      1. General words, but no data      2. Some data      3. Thorough and robust data

0. Not addressed – No information or data reflecting the current level of performance.
1. General words, but no data – Performance is stated only in general terms (e.g., “poor”).
2. Some data – General quantitative statements are made about performance (e.g., less than half of the time) or data may be questionable (e.g., based on a very small number of patients).
3. Thorough and robust data – Data are presented that directly represent the level/frequency of the performance problem (e.g., % of cases with recommended action not performed) and appear to be reliable.

6. How is work done (process/workflow)?

0. Not addressed      1. Addressed, but unclear      2. Illustration/ description somewhat clear      3. Illustration/ description very clear

0. Not addressed – No information about how the work is done.
1. Addressed, but unclear – Presents information about a sequence of activities, but omits information about some steps or about who is involved.
2. Illustration/description somewhat clear – A process map or other description that includes most key process steps and usually indicates who performs them.
3. Illustration/description very clear – A process map or other description that details the key process from beginning to end and who is involved in each step.

7. Clear identification of who is involved in performing the work?

0. Not addressed      1. Unclear      2. Somewhat clear      3. Very clear

0. Not addressed – No visual or written statement on the A3 indicates who is involved in performing the work.
1. Unclear – General statements are made about the people involved in the work, but who was doing what work is not indicated.
2. Somewhat clear – Some of the individuals involved in performing some parts of the work are identified, but who does some of the work is not identified.
3. Very clear – Individuals involved in performing each step of the work are identified.



## Description of Rating Options

1/17/20

### 8. Performance problem/gap?

0. Not addressed      1. Unclear      2. Partially specified      3. Clearly specified/quantified

0. Not addressed – A performance problem and gap are not stated.
1. Unclear – A performance problem and gap are stated in vague or unclear language.
2. Partially specified – A performance problem/gap is stated with some general information (e.g., “less than half”).
3. Clearly specified/quantified – a performance problem is stated with quantified gap.

### ➤ Extent to which the A3 author demonstrates direct observation of the work process?

Not observed      A little      Some      All      Cannot assess

### ➤ Extent of demonstration of learning from the people involved in the process?

Not observed      A little      Some      All      Cannot assess

## Goal *What target condition or specific performance is desired? By when?*

### 9. How specific is the goal?

0. Not addressed      1. Vague      2. Somewhat specific      3. Very specific

0. Not addressed – No statement is made about a goal.
1. Vague – A very general goal is stated (e.g., improve the performance).
2. Somewhat specific – A statement is made about the amount of improvement is made (e.g., improve by X percentage points) without specifying the baseline level of performance or the target level of performance.
3. Very specific – A statement is made that identifies both the baseline level of performance and the target level of performance.

### 10. Is the goal measurable?

0. Not addressed      1. Not measurable      2. May be measurable      3. Clearly measurable

0. Not addressed – No goal is stated regarding an aspect of performance to measure.
1. Likely not measurable – Performance related to the goal has not been measured (i.e., no baseline data) and for which performance is not likely to be measured easily (at least based on information in the A3).
2. May be measurable – Performance related to the goal has not been measured (i.e., no baseline data), but may be measurable from routinely available data (e.g., in an electronic health record, recording observable activities, surveys of patients or care providers).
3. Clearly measurable – Either performance related to the goal has been measured (e.g., in baseline data), obviously measurable, or measurement is described in the Action Plan.

### ➤ How achievable is the goal?

Not achievable      Unlikely      Possibly      Probably      Cannot assess

### 11. How relevant is the goal to addressing the problem?

0. Not addressed      1. Not relevant      2. Somewhat relevant      3. Very relevant

0. Not addressed – No goal is stated.
1. Not relevant – The stated goal is not relevant to the stated problem/performance gap.
2. Somewhat relevant – The stated goal is only generally related to the stated problem/performance gap.
3. Very relevant – The stated goal directly addresses the stated problem/performance gap.

### Description of Rating Options

1/17/20

#### 12. How time-bound (clear timeframe for accomplishment) is the goal?

0. Not addressed    1. Unclear    2. Somewhat clear (eg, relative timeframe)    3. Very clear (eg, date specified)

0. Not addressed – No timeframe is stated for accomplishing the goal.
1. Unclear – A general timeframe is stated (e.g., over the next year) for which no beginning and ending points are indicated.
2. Somewhat clear (e.g., relative timeframe) – A general timeframe is provided (e.g., over the next year) for which the beginning date is indicated.

### Analysis *What is contributing to the problem? What are its root causes?*

#### 13. Is the display of method(s) for analyzing root causes easy to understand? (E.g., fishbone diagram, “5-whys”/root cause tree diagram, Pareto chart)

0. Not displayed    1. Not understandable    2. Partially understandable    3. Easy to understand

0. Not displayed – No method(s) for analyzing root causes are visually displayed.
1. Not understandable – Methods for analyzing root causes are visually displayed, but the content and logic are not understandable (e.g., unclear, confusing).
2. Partially understandable – Methods for analyzing root causes are visually displayed, but the content and logic can only be partially understood.
3. Easy to understand – Methods for analyzing root causes are visually displayed with content and logic that are easy to understand.

#### 14. How clear are the identified root causes?

0. Not addressed    1. Unclear    2. Somewhat clear    3. Very clear

0. Not addressed – No information is presented about root causes.
1. Unclear – While information about causes is presented, no causes are identified as root causes.
2. Somewhat clear – Some root causes are identified, but their meaning is not clear.
3. Very clear – For all identified root causes, the meaning is clear.

#### ➤ Extent to which important root causes are identified?

- None    Inadequate    Adequate    Thorough    Cannot assess

*Analysis – reviewer comments:*

#### 15. How many options for countermeasures were considered?

0. None    1. One    2. Two    3. Three or more

0. None – No countermeasures are presented.
1. One – One countermeasure is presented.
2. Two – Two countermeasures are presented.

### Description of Rating Options

1/17/20

3. Three or more – Three or more countermeasures are presented.

*Note: This item emphasizes considering options for more than one or two countermeasures. In the two supplementary items at the end of the Countermeasures section, someone familiar with the local circumstances can indicate whether the proposed countermeasures (however many) are feasible and are likely to achieve the goal.*

16. Identify the strongest countermeasure considered. How strong is it?

- |                        |   |   |   |
|------------------------|---|---|---|
| 0. No counter-measures | 1. Weak (e.g., policy change, education and training) | 2. Intermediate (e.g., standard work/roles, just-in-time reminders, or visual/cognitive aids) | 3. Strong (e.g., “forcing function” that ensures work done right way) |
|------------------------|---|---|---|

0. No countermeasures – No countermeasures are presented.

1. Weak (e.g., policy change, education and training) – None of the countermeasures is “stronger” than policy change, education, or training.

2. Intermediate (e.g., standard work/roles, just-in-time reminders, or visual/cognitive aids) – None of the countermeasures is “stronger” than standard work/roles, just-in-time reminders, or visual/cognitive aids.

3. Strong (e.g., “forcing function” that ensures work is done the right way) – at least one of the countermeasures makes it impossible to do a task incorrectly.

*Note: Although strong countermeasures are not always feasible, combining two or more weak or intermediate countermeasures may be sufficient. In the supplementary item at the end of the Countermeasures section, someone familiar with the local circumstances can indicate whether the proposed countermeasures are likely to achieve the goal.*

17. How many of the proposed countermeasures are linked to identified root causes? (Review each countermeasure and see if it addresses a root cause identified in the Analysis Section.)

- |                          |                              |                              |                         |
|--------------------------|------------------------------|------------------------------|-------------------------|
| 0. None linked to causes | 1. Minority linked to causes | 2. Majority linked to causes | 3. All linked to causes |
|--------------------------|------------------------------|------------------------------|-------------------------|

0. No linkage – No countermeasures are linked to (address) root causes.

1. Minority linked to causes – A minority (i.e., less than half) of the countermeasures are linked to root causes.

2. Majority linked to causes – The majority (i.e., more than half), but not all of the countermeasures are linked to root causes.

3. All linked to causes – All of the countermeasures are linked to root causes.

➤ To what extent are countermeasures feasible to carry out?

- |              |          |          |               |               |
|--------------|----------|----------|---------------|---------------|
| Not feasible | Unlikely | Possibly | Highly likely | Cannot assess |
|--------------|----------|----------|---------------|---------------|

➤ How likely will countermeasures result in achieving the goal?

- |              |          |          |               |               |
|--------------|----------|----------|---------------|---------------|
| Not possible | Unlikely | Possibly | Highly likely | Cannot assess |
|--------------|----------|----------|---------------|---------------|

*Countermeasures – reviewer comments:*

**Action Plan** *To plan & implement the selected countermeasures: what, who, when?*

18. For the action plan on the A3, how clearly are activities described (i.e. “what” is to be done)?

- |                  |            |                   |               |
|------------------|------------|-------------------|---------------|
| 0. Not addressed | 1. Unclear | 2. Somewhat clear | 3. Very clear |
|------------------|------------|-------------------|---------------|

0. Not addressed – No activities to be performed are listed.

1. Unclear – All statements about activities to be performed (“what” is to be done) are vague with no indication of the operational action to be taken.

2. Somewhat clear – Some statements about activities to be performed (“what” is to be done) are clear, but others are vague.

**Description of Rating Options**

1/17/20

3. Very clear – All statements about activities to be performed (“what” is to be done) are clear.

*Note: Whether each countermeasure in the previous section is linked to an action in this section is part of item 23 concerning logic flow from one section to the next.*

19. Are individuals identified to be responsible for each action item to be carried out (i.e. “who”)?

0. Not addressed    1. For the minority    2. For the majority    3. For all

0. Not addressed – No individuals are identified to carry out any of the activities (or if no action plan is listed).

1. For the minority – Individuals are identified to carry out actions for only a minority of activities.

2. For the majority – Individuals are identified to carry out actions for the majority of activities.

3. For all – Individuals are identified to carry out actions for all of the activities.

20. Are estimated completion dates identified for each action item (i.e. “when”)?

0. Not addressed    1. For the minority    2. For the majority    3. For all

0. Not addressed – No estimated completion dates are identified to carry out any of the activities (or if no action plan is provided).

1. For the minority – Estimated completion dates are identified to carry out actions for only a minority of activities.

2. For the majority – Estimated completion dates are identified to carry out actions for the majority of activities.

3. For all – Estimated completion dates are identified to carry out actions for all of the activities.

*Note: Estimated completion dates should be stated for an activity. Specific dates (e.g., April 30, 2020) are clearest, although the month may be adequate with the end of the month understood as the completion date. More vague statements (e.g., by spring, by next year) are generally unacceptable because they are not practically useful for knowing when to see if work has been performed.*

21. How clear is the plan for monitoring the implementation of actions in 18-20 above (what will be monitored, by whom, when)?

0. Not addressed    1. Plan unclear (no or minority of actions monitored – what, who, when)    2. Plan partially clear (majority of actions monitored – what, who, when)    3. Plan clear (all actions monitored – what, who, when)

0. Not addressed – No monitoring plan is noted for checking on whether the action plan is carried out.

1. Unclear – For none of the action plan activities or for only a minority (less than half) of action plan activities it is clear “what will be monitored by whom, when.”

2. Partially clear – For the majority of action plan activities it is clear “what will be monitored, by whom, when.”

3. Clear – For all of the action plan activities it is clear “what will be monitored, by whom, when.”

➤ How adequate is the action plan?

Not adequate    Possibly    Probably    Very likely    Cannot assess

*Action plan – reviewer comments:*

**Follow-up Plans** *Checking whether desired goal(s) was achieved?*

22. Is follow-up planned to measure achievement of the desired goal(s) (what will be measured, by whom, when)?

0. Not addressed    1. Plan unclear (no more than one of “what, who, when”)    2. Plan partially clear (two of “what, who, when”)    3. Plan clear (“what, who, when”)

0. Not addressed – No follow-up plan is noted for measuring on achievement of desired goal(s).

Description of Rating Options1/17/20

1. Unclear – Measuring achievement of desired goal(s) includes no more than one element of “what is to be measured by whom and when.”

2. Partially clear – Measuring achievement of desired goal(s) includes two of the three elements of “what is to be measured by whom and when.”

3. Clear – Measuring achievement of desired goal(s) includes all three elements of “what is to be measured by whom and when.”

Across A3 Sections

23. How clearly does the title identify the problem to be addressed?

0. No title

1. Unclear

2. Somewhat clear

3. Very clear

0. No title – No title is listed.

1. Unclear – The title is completely unclear in indicating the problem is that the A3 is to address.

2. Somewhat clear – The title indicates that something needs to be improved in a general area, but does not indicate the performance problem.

3. Very clear – The title indicates the specific performance problem being addressed.

➤ How often does the logic flow clearly from one section of the A3 to the next section?

Not at all

Occasionally

Majority

Always

Cannot assess

➤ In general, how informative are the visual illustrations?

None used or not informative

Not very informative

Somewhat informative

Very informative

Cannot assess

OVERALL RATING (items 1 – 23)

Total points (max = 69)

Mean (divide total by 23 items)

Note: check that all 23 numbered items have been answered. Missing answers are coded “0”.

Myers JS, et al. BMJ Qual Saf 2021;0:1–10. doi: 10.1136/bmjqs-2020-012105

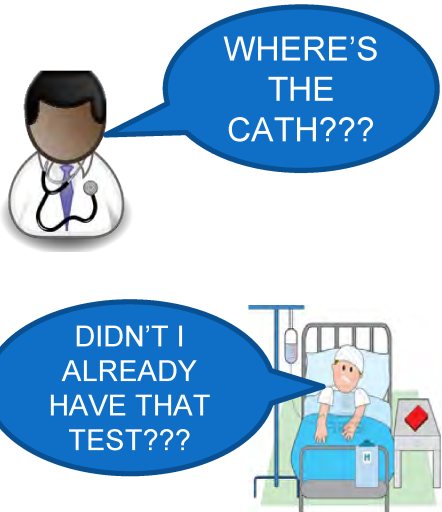


Where’s the cath??? Increasing the % of outside cardiac catheterization films arriving with transferred patients

Authors:

BACKGROUND

- University Hospital Cardiology Service receives 50-80 transfer requests monthly from outside hospitals (OSH).
  - In FY2017, 744 patient transfer requests accepted by the Cardiology admitting officer of the day (AOD) resulted in an admission.
- HOWEVER, outside imaging studies needed by the care team arrived before or with the patient less than half (329/744) of the time. Not having the images leads to:
- Delays in patient care of hours to several days, with potential for harm to patients
  - Repeat procedures [average of 6/month], with potential clinical complications for patients and unnecessary healthcare costs [average of \$3,200/study]
  - Delays in patient throughput, with financial consequences to institution [Finance Dept. estimates we lose > \$350,000 in revenue annually from blocked Cardiology admissions]
  - Less satisfied patients and families
  - Frustrated staff



CURRENT STATE

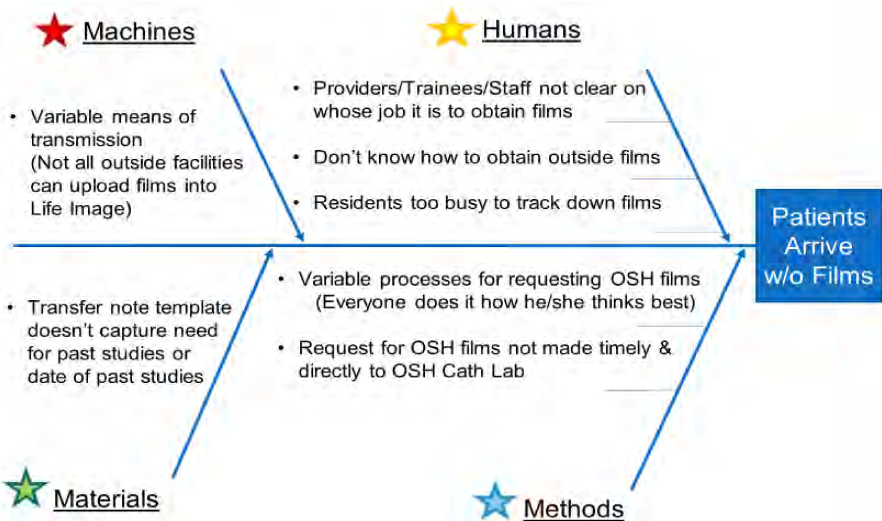


= variability in process      = delay

**Problem Statement:**  
Only 44% of outside hospital transfers to the Cardiology Service arrive with necessary catheterization study films.

	April 17	May 17	June 17
# of outside transfers	72	57	66
# of transfers arriving with films available	35	24	30
% of transfers arriving with films available	49%	42%	45%

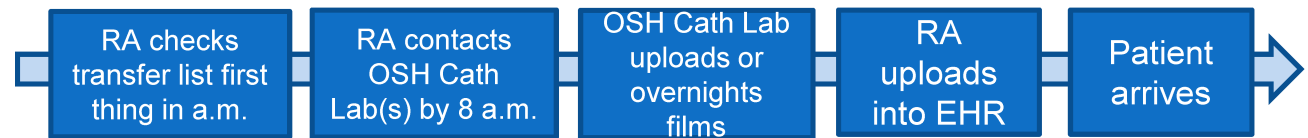
ROOT CAUSE ANALYSIS



**GOAL:** Increase % of transfer patients arriving with outside catheterization study films from 44% to >75% by April 2018.

PROPOSED COUNTERMEASURES AND FUTURE STATE

	Countermeasures:	Effort	Impact
Humans	★ Assign responsibility to Resident Assistants for obtaining films and uploading them into EHR. Provide Job Aid.	Low	High
Methods	★ Create & implement Resident Assistant Standard Work with set <u>timeframe</u> for making <u>direct</u> contact with OSH cath labs.	Medium	High
Materials	★ Add <u>required</u> fields to AOD's electronic Transfer Note to check need for past films and to provide date of last study.	Low	Medium
Machines	★ Out of Scope: Image transfer capability of outside hospitals		



ACTION PLAN

What:	Who:	When:
Meet with RAs for input on proposed standard work and job aid.	A3 Owner	By 10/15/17
Present A3 and socialize proposed work changes with attendings (including AODs), residents, fellows and PAs at November division meeting; obtain agreement from service chief to pilot in January.	A3 Owner	11/7/17
Work with IT to add new fields to electronic transfer note template.	Cardiology Administrator	By 12/15/17
Finalize standard work and job aid and provide training session for resident assistants.	Chief Resident	By 12/22/17
Pilot new template and new RA standard work as a PDCA cycle.	A3 Owner/AODs/RAs	1/1/18-1/31/18

Monitoring Plan:

✓ Check that (a) an October meeting with RAs and (b) time on agenda at November division meeting were scheduled	Lead RA	10/01/17
✓ Confirm new fields were added to note template and are working	Chief Resident	12/16/17
✓ Check that final standard work and job aid documents were completed and approved, and that training occurred	A3 Owner	12/23/17
✓ Audit RA standard work and AOD utilization of new template over course of pilot	Nursing Supervisor	1/1/18-1/31/18]

FOLLOW UP

- ✓ QI Analyst to track performance on cath study film availability during pilot, and add to Division Quality dashboard monthly post-pilot.

revised 1/28/20

## Assessment Tool for a Problem-Solving (Proposal) A3

**A3 Title:** (Ex. 1) Where's the Cath??? Increasing outside cardiac cath films arriving with transferred patients

**Author:** XXXXX

**Reviewer:** XXXXX

**Date:** XXXXX

Items (based on A3 Template) and Rating Scale	Rating
<b>Background</b> <i>Why is the problem important?</i>	
<p>1. <b>Negative consequences</b> (e.g., harm, frustration, waste): how specific is the clearest statement of a negative consequence of the problem?</p> <p>0. Not addressed      1. Unclear      2. General (eg, "harm," "difficulties," "waste")      3. Specific type of consequence</p>	<b>3</b>
<p><u>Rating.</u> 3. Specific type of consequence</p> <p><u>Explanation.</u> The Background identifies several types of consequences: "delays in care...with potential for harm to patients," "financial consequences to institution," "less satisfied patients and families," and "frustrated staff." One clearly specified negative consequence is sufficient for rating "3. Specific type of consequence."</p> <p>Would be "2. General" if negative consequences were identified broadly without clarifying the specific type of consequence (e.g., "difficulties for patients" rather than "increased complication rate," "problems for the institution" rather than "financial consequences to institution").</p>	
<p>2. <b>Individuals/groups</b> impacted by the negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement identifying an impacted individual, group/unit, or organization?</p> <p>0. Not addressed      1. Unclear      2. General (eg, "staff," or "patients," but not which)      3. Specific individual, group, or organizational unit</p>	<b>3</b>
<p><u>Rating.</u> 3. Specific individual, group, or organizational unit</p> <p><u>Explanation.</u> The Background identifies several impacted entities: "delays in care...with potential for harm to patients," "financial consequences to institution," "less satisfied patients and families," and "frustrated staff." One clearly specified impacted entity is sufficient for rating "3. Specific individual, group, or organizational unit."</p> <p>Would be "2. General" if impacted individuals or entities were identified broadly without clarifying the specific type of individuals/entities (e.g., "patients" rather than "patients transferred from outside the hospital to the cardiology service").</p>	
<p>3. <b>Severity</b> of the negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement of the severity (e.g., extent/amount) of at least one negative consequence?</p> <p>0. Not addressed      1. Unclear      2. General (eg, significant harm)      3. Specific extent/amount</p>	<b>3</b>
<p><u>Rating.</u> 3. Specific extent/amount</p> <p><u>Explanation.</u> The Background clearly specifies the extent/amount of some impacts: "repeat procedures [average of 6/month], with unnecessary healthcare costs [average of \$3,200/study]" and "we lose &gt; \$350,000 in revenue annually from blocked Cardiology admissions." The Background also provides descriptions of the extent of consequences: "delays in patient care of hours to several days, with potential for harm to patients;" "repeat procedures [average of 6/month], with associated potential for clinical complications for patients;" "less satisfied patients and families;" and "frustrated staff." One clearly specified extent/amount of severity is sufficient for rating "3. Specific extent/amount."</p> <p>Would be "2. General (e.g., significant harm)" if the impacts were described only in general terms (e.g., potential for harm, potential for clinical complications, less satisfied or frustrated individuals, increased cost) without indicating the extent of harm, extent of lowered satisfaction, or amount of cost.</p>	
<p>4. <b>Frequency</b> of the negative consequences (e.g., harm, frustration, waste): how specific is clearest statement of the frequency (# events/unit of time) of at least one negative consequence?</p> <p>0. Not addressed      1. Unclear      2. General (eg, rare, often)      3. Specific frequency (eg, events per unit of time)</p>	<b>3</b>
<p><u>Rating.</u> 3. Specific frequency (e.g., events per unit of time)</p> <p><u>Explanation.</u> The Background specifies the frequency of some negative consequences: "repeat procedures [average of 6/month]" and "we lose &gt; \$350,000 in revenue annually." However, frequency is not clear for other negative consequences: "delays in patient care of hours to several days," "potential for harm," "potential clinical</p>	

revised 1/28/20

complications, "less satisfied," "frustrated." One clearly specified frequency of negative outcomes is sufficient for rating "3. Specified."

*Note: the Background does specify the frequency of the performance problem "imaging studies . . . arrive less than half [329/744] of the time", however, if negative consequences do not occur every time the performance problem occurs, the frequency of the performance problem does not indicate the frequency of negative consequences, and the frequency of negative consequences must be separately addressed.*

Would be "2. General (e.g., rare, often)" if only a general sense of frequency of the resulting harm (e.g., occasionally, majority of the time) were indicated.

- Extent to which important negative consequences (e.g., harm, frustration, waste) are identified?  
None      Inadequate      Adequate      Thorough      Cannot assess

Cannot assess

*Background – reviewer comments:*

### Current Situation *What is actually happening?*

#### 5. Current level of performance

0. Not addressed      1. General words, but no data      2. Some data      3. Thorough and robust data

3

Rating. 3. Thorough and robust data

Explanation. In Background: "imaging studies...arrived before or with the patient less than half (329/744) of the time." In Current State, the table includes three months of baseline data for transfers arriving with films available.

Would be "2. Some data" if a general quantitative statement were made about performance (e.g., less than half of the time) were made or if data were questionable (e.g., based on a very small number of patients).

#### 6. How is work done (process/workflow)?

0. Not addressed      1. Addressed, but unclear      2. Illustration/ description somewhat clear      3. Illustration/ description very clear

3

Rating. 3. Illustration/description very clear

Explanation. In Current State: The process map shows the process steps, their sequence, and who carries out each step. Problems and delays in the process are highlighted. The map would be even more informative if the time delays were quantified.

Would be "2. Illustration/description somewhat clear" if a process map or other description were present that included most key process steps and usually indicated who would perform them.

#### 7. Clear identification of who is involved in performing the work?

0. Not addressed      1. Unclear      2. Somewhat clear      3. Very clear

3

Rating. 3. Very clear

Explanation. The process map in Current State includes who is involved in performing each step of the work.

Would be "2. Somewhat clear" if individuals (e.g., nurses, residents) involved in performing the work were indicated for some parts of the work, but not for other parts of the work.

#### 8. Performance problem/gap?

0. Not addressed      1. Unclear      2. Partially specified      3. Clearly specified/quantified

3

Rating. 3. Clearly specified/quantified

Explanation. In Background "...less than half (329/274) of the time". In Current State data are provided for three months. In Problem Statement the performance gap is clearly articulated ("Only 44% of outside hospital transfers . . .").

Would be "2. Partially specified" if the performance problem/gap were written with some general language (e.g., "less than half") or did not state the time frame for the measurement.

revised 1/28/20

➤ Extent to which the A3 author demonstrates direct observation of the work process?

Not observed      A little      Some      All      Cannot assess

Cannot assess

➤ Extent of demonstration of learning from the people involved in the process?

None      A little      Some      All      Cannot assess

Cannot assess

*Current Situation – reviewer comments:***Goal** *What target condition or specific performance is desired? By when?*9. How specific is the goal?

0. Not addressed      1. Vague      2. Somewhat specific      3. Very specific

3

Rating. 3. VeryExplanation. In Goal: "Increase % of transfer patients arriving with outside catheterization study films from 44% to >75%..."

Would be "2. Somewhat specific" if the goal were stated quantitatively in relative terms (e.g., improve the availability of cath films by 55 percentage points) without specifying the baseline or actual target goal.

10. Is the goal measurable?

0. Not addressed      1. Not measurable      2. May be measurable      3. Clearly measurable

3

Rating. 3. Clearly measurableExplanation. In Goal: "... from 44% to >75%" is a rate that has been measured in the past and therefore is likely to be measurable in the future.

Would be "2. May be measurable" if the goal were to improve an aspect of performance that has not been measured (e.g., no baseline data), but may be measurable from routinely available data sets (e.g., in an electronic health record).

➤ How achievable is the goal?

Not achievable      Unlikely      Possibly      Probably      Cannot assess

Cannot assess

11. How relevant is the goal to addressing the problem?

0. Not addressed      1. Not relevant      2. Somewhat relevant      3. Very relevant

3

Rating. 3. Very relevantExplanation. In Goal: "To increase % of transfer patients arriving with outside ...films" directly addresses the gap identified in Problem Statement: "Less than half of outside hospital transfers to the Cardiology Service arrive with necessary catheterization study films".

Would be "2. Somewhat relevant" if the goal were only generally related to the problem statement (e.g., goal discussed improving some aspect of communication with an outside hospital around the transfer process, but did not specifically relate to obtaining outside films).

12. How time-bound (clear timeframe for accomplishment) is the goal?

0. Not addressed      1. Unclear      2. Somewhat clear (eg, relative timeframe)      3. Very clear (eg, date specified)

3

Rating. 3. Very clearExplanation. In Goal: "...by April 2018." sets a clear, specified deadline. By April 1, 2018 or by April 30, 2018 would be even clearer.

Would be "2. Somewhat clear" if the goal were to state a more relative timeline (e.g., 6 months "following countermeasure implementation").

revised 1/28/20

*Goal – reviewer comments:***Analysis** *What is contributing to the problem? What are its root causes?*

13. Is the display of method(s) for analyzing root causes easy to understand? (E.g., fishbone diagram, “5-whys”/root cause tree diagram, Pareto chart)

0. Not displayed      1. Not understandable      2. Partially understandable      3. Easy to understand

**3**Rating. 3. Easy to understandExplanation. In Analysis: Fishbone diagram with clear categories---easy to understand.

Would be “2. Partially understandable” if some parts of the visuals were understandable and some of the logic could be followed, but other parts were unclear (e.g., if a fishbone was included, but “ribs” were not labeled).

14. How clear are the identified root causes?

0. Not addressed      1. Unclear      2. Somewhat clear      3. Very clear

**3**Rating. 3. Very clearExplanation. In Analysis: the fishbone diagram identifies 7 root causes of the problem that are arrayed by category.

*Note: The analysis would be even stronger if the frequency of various causes were displayed in a Pareto chart or identified some other way.*

Would be “2. Somewhat clear” if from the written statements and visuals you could understand some of the indicated root causes, but not others.

- Extent to which important root causes are identified?

None      Inadequate      Adequate      Thorough      Cannot assess

Cannot assess

*Analysis – reviewer comments:***Countermeasures** *What options/alternatives were considered? What countermeasures/strategies are proposed?*

15. How many options for countermeasures were considered?

0. None      1. One      2. Two      3. Three or more

**3**Rating. 3. Three or moreExplanation. In Proposed Countermeasures and Future State: three countermeasures are proposed. A map of how their implementation would change the work is included.

Would be “2. Two” if two countermeasures were included.

*Note: This item emphasizes considering options for more than one or two countermeasures. In the two supplementary items at the end of the Countermeasures section, someone familiar with the local circumstances can indicate whether proposed countermeasures (however many) are feasible and are likely to achieve the goal.*

16. Identify the strongest countermeasure considered. How strong is it?

0. No counter-measures      1. Weak (e.g., policy change, education and training)      2. Intermediate (e.g., standard work/roles, just-in-time reminders, or visual/cognitive aids)      3. Strong (e.g., “forcing function” that ensures work done right way)

**3**Rating. 3. StrongExplanation. In Countermeasures: the required field in the electronic transfer note template forces collection of information needed to perform the next step of the work in a timely and complete manner.



revised 1/28/20

Would be “2. Intermediate (e.g., standard work/roles, just-in-time reminders, or visual/cognitive aids)” if the only countermeasure were “new Resident Assistant standard work.”

*Note: Although strong countermeasures are often not feasible, combining two or more weak or intermediate countermeasures may be sufficient.*

17. How many of the proposed countermeasures are linked to identified root causes? (Review each countermeasure and see if it addresses a root cause identified in the Analysis Section.)

0. None linked to causes      1. Minority linked to causes      2. Majority linked to causes      3. All linked to causes

3

Rating. 3. All linked to causes

Explanation. The color-coded stars in the Analysis section and in the Countermeasures section show the linkage between types of causes in the Analysis section to the countermeasures addressing those causes.

Would be “2. Majority linked to causes” if the majority (i.e., more than half), but not all of the countermeasures were explicitly linked to (address) root causes.

- To what extent are countermeasures feasible to carry out?

Not feasible      Unlikely      Possibly      Highly likely      Cannot assess

Cannot assess

- How likely will countermeasures result in achieving the goal?

Not possible      Unlikely      Possibly      Highly likely      Cannot assess

Cannot assess

*Countermeasures – reviewer comments:*

### Action Plan *To pilot & implement the selected countermeasures: what, who, when?*

18. For the action plan on the A3, how clearly are activities described (i.e. “what” is to be done)?

0. Not addressed      1. Unclear      2. Somewhat clear      3. Very clear

3

Rating. 3. Very clear

Explanation. In Action Plan the column labeled “What” lists 7 sets of activities to be performed.

Would be “2. Somewhat clear” if an action plan has some statements about what is to be done that are vague and others that are clear.

19. Are individuals identified to be responsible for each action item to be carried out (i.e. “who”)?

0. Not addressed      1. For the minority      2. For the majority      3. For all

3

Rating. 3. For all

Explanation. The Action Plan is set up with headings in “What/Who/When” format. All major activities (“what” is to be performed) are listed with an owner (“who”) to see that they are carried out.

Would be “2. For the majority of action items” if individuals were identified to carry out the majority (more than half, but not all) of the actions.

20. Are estimated completion dates identified for each action item (i.e. “when”)?

0. Not addressed      1. For the minority      2. For the majority      3. For all

3

Rating. 3. For all

Explanation. The Action Plan is set up with headings in “What/Who/When” format. All major activities (“what” is to be performed) are listed with an estimated date for completion.

Would be “2. For the majority of action items” if estimated completion dates were identified to carry out the majority (more than half, but not all) of the actions.

revised 1/28/20

21. How clear is the plan for monitoring the implementation of actions in 18-20 above (what will be monitored, by whom, when)?

3

0. Not addressed      1. Plan unclear (no or minority of actions monitored – what, who, when)      2. Plan partially clear (majority of actions monitored – what, who, when)      3. Plan clear (all actions monitored – what, who, when)

**Rating.** 3. Clear (for all action plan activities, “what will be monitored, by whom, and when” is clear)

**Explanation.** The Action Plan lists five action activities (i.e. “what” to monitor). The Monitoring Plan lists four monitoring activities on whether action items are performed, with the first monitoring activity addressing both of the first two action items. Each of the monitoring activities identifies “what” is to be monitored, “who” is the lead for checking, and by “when” the checking will occur.

Would be “2. Plan partially clear” if only three or four of the action activities (majority of the five action activities) were monitored (what is to be monitored, by whom, when)."

➤ How adequate is the action plan?

Not adequate      Possibly      Probably      Very likely      Cannot assess

Cannot assess

*Action plan – reviewer comments:*

### Follow-up Plans *Checking whether desired goal(s) was achieved?*

22. Is follow-up planned to measure achievement of the desired goal(s) (what will be measured, by whom, when)?

3

0. Not addressed      1. Plan unclear (no more than one of “what, who, when”)      2. Plan partially clear (two of “what, who, when”)      3. Plan clear (“what, who, when”)

**Rating.** 3. Clear

**Explanation.** In Follow Up, the measure on “performance on cath study film availability” (“what”) to assess achievement of the desired goal (> 75% of transfer patients arriving with outside catheterization study films). The follow-up plan also addresses “who will measure when”: the QI Analyst (“who”) will report cath film availability metric on division Quality dashboard monthly beginning 1/1/18 (“when”).

Would be “2. Partially clear” if the check on whether the desired goal is achieved identified only two of “what, who, and when.”

### Across A3 Sections

23. How clearly does the title identify the problem to be addressed?

3

0. No title      1. Unclear      2. Somewhat clear      3. Very clear

**Rating.** 3. Very clear

**Explanation.** Title: “Where’s the cath??? Increasing the % of outside cardiac catheterization films arriving with transferred patients” describes the problem to be addressed.

Would be “2. Somewhat clear” if a title were listed and it indicated the general area of concern (e.g., “Where are the cath films?” without further information in the title).

➤ How often does the logic flow clearly from one section of the A3 to the next section?

Not at all      Occasionally      Majority      Always      Cannot assess

Cannot assess

➤ In general, how informative are the visual illustrations?

None used or not informative      Not very informative      Somewhat informative      Very informative      Cannot assess

Cannot assess

*Across A3 Sections – reviewer comments:*

revised 1/28/20

**OVERALL RATING** (items 1 – 23)

Total points (max = 69)

69

Mean (divide total by 23 items)

*Note: check that all 23 numbered items have been answered. Missing answers are coded "0."*

3.0

Improving the Status of Status Epilepticus

BACKGROUND:

- Status epilepticus, defined as prolonged seizures with incomplete return to baseline, is a neurological emergency. Though relatively rare with an incidence of 20-40 per 100,000 population, the impact of status epilepticus for affected patients is substantial.
- Status epilepticus requires prompt and effective treatment with anti-epileptic medication. Phenytoin or fosphenytoin are the first-line drugs of choice for status epilepticus. Prescribing less effective medications increases the potential for poor outcomes in these patients. Given the high mortality of status epilepticus and the challenge of delivering appropriate and timely therapy, our standardized status epilepticus treatment protocol is to administer phenytoin.
- Fosphenytoin has fewer infusion-related side effects, and acts even more rapidly, but it is not currently on our formulary as it is more expensive than phenytoin.

Problem Statement:

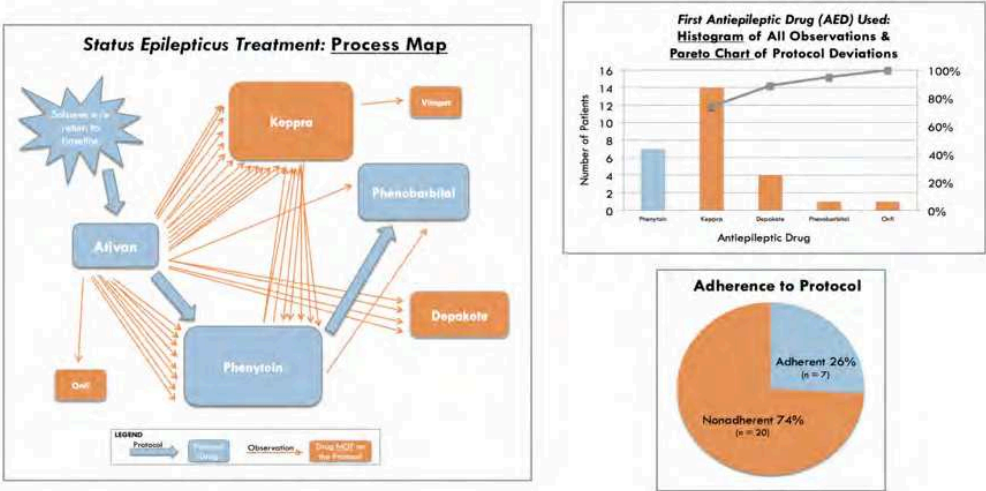
In the last two fiscal years, **only 26% of patients** presenting to Hospital of the University of Pennsylvania (HUP) for initial treatment of unremitting seizures were **treated with phenytoin in accordance with the status epilepticus anti-epileptic drug (AED) treatment protocol**. Poor adherence to this protocol leads to unnecessary variations in care and delayed, less effective treatment.

CURRENT CONDITION:

Baseline Data:

Query of patients with a *primary diagnosis* of status epilepticus by ICD-9 code treated at HUP in FY14 and FY15 yielded 83 patients in total

→ *retrospective chart review of the 27 patients with treatment initiated at HUP showed:*



TARGET CONDITION:

**Aim: To improve adherence to the status epilepticus anti-epileptic drug treatment protocol from 26% to 80%\* for patients with unremitting seizures presenting to HUP for initial treatment in the year following countermeasure implementation.**  
*\* allowing ~20% deviation for patient-specific considerations*

	METRIC	BASELINE	GOAL
PROCESS	Adherence to Status Epilepticus Protocol	26%	80%
OUTCOME	Time to cessation of seizures	needs to be assessed	< 30 minutes
	Length of Stay	Average 16 days	Average <16 days
	Mortality	needs to be assessed	0%
BALANCING	Cost of AED therapy	needs to be assessed	

PROPOSED COUNTERMEASURES:

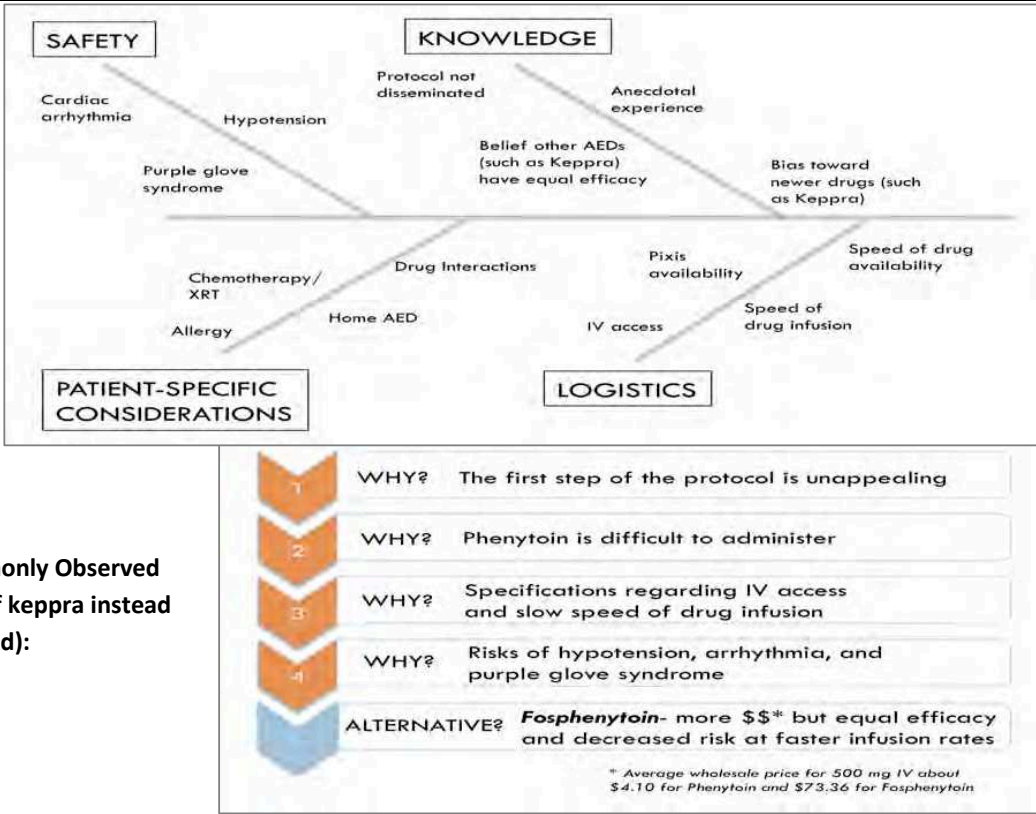
Root Cause	Countermeasures
<u>Logistical and safety concerns</u> regarding the use of phenytonin	<ul style="list-style-type: none"><li>• Develop an updated Status Epilepticus treatment protocol with fosphenytoin as the preferred drug because of its logistical and safety advantages.</li></ul>
<u>Knowledge</u> about the Status Epilepticus treatment protocol and drug efficacy	<ul style="list-style-type: none"><li>• When new protocol is approved, disseminate information about the Status Epilepticus protocol hospital-wide, emphasizing fosphenytoin as the new first step and its logistical and safety advantages.</li><li>• Develop a relevant curriculum for the Neurology Department</li></ul>

ROOT CAUSE ANALYSIS:

**Fishbone Diagram for Nonadherence to the Anti-Epileptic Drug Treatment Protocol**

Summation of input from:

- epileptologists
- neurology
- neurosurgery



**ACTION PLAN – Implement the first two countermeasures.** (Address the neurology curriculum next year after the new protocol and its explanatory material are available.)

- 1. Develop and disseminate an updated Status Epilepticus treatment protocol with fosphenytoin as the preferred drug because of its logistical and safety advantages.**
  - a. Petition UPHS pharmacy administration to obtain fosphenytoin**  
Katherine to present rationale for purchasing fosphenytoin to the hospital's Pharmacy & Therapeutics Committee at their in January 2017 meeting, with goal to obtain this drug by early spring. Dr. Knox to check on subsequent pharmacy administration discussions.
  - b. Rewrite status epilepticus anti-epileptic treatment protocol**  
First draft completed by 2/1/17.
- 2. When the new protocol is approved, develop plan to disseminate the updated Status Epilepticus protocol hospital-wide.**  
Katherine and Dr. Patrick will complete this spring with plans to roll-out this summer.

FOLLOW-UP

- TBD

revised 1/28/20

## Assessment Tool for a Problem-Solving (Proposal) A3

**A3 Title:** (Ex. 2) Improving the Status of Status Epilepticus

**Author:** XXXXX

**Reviewer:** XXXXX

**Date:** XXXXX

Items (based on A3 Template) and Rating Scale	Rating
<b>Background</b> <i>Why is the problem important?</i>	
<p>1. <b>Negative consequences</b> (e.g., harm, frustration, waste): how specific is the clearest statement of a negative consequence of the problem?</p> <p>0. Not addressed      1. Unclear      2. General (eg, "harm," "difficulties," "waste")      3. Specific type of consequence</p>	
<p><b>Rating.</b> 3. Specific type of consequence</p> <p><b>Explanation.</b> In Background: "Prescribing less effective medications increases the potential for poor clinical outcomes in these patients" (i.e. patients with status epilepticus). One clearly specified impacted entity is sufficient for the rating.</p> <p><b>Note:</b> The statement "the impact of status epilepticus on affected patients is substantial" refers to the general clinical impact of status epilepticus rather than to the negative consequences of the performance problem of prescribing less effective medications.</p> <p>Would be "2. General" if the author had stated broadly that prescribing less effective medications could cause "problems" for patients.</p>	
<p>2. <b>Individuals/groups</b> impacted by the negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement identifying an impacted individual, group/unit, or organization?</p> <p>0. Not addressed      1. Unclear      2. General (eg, "staff," or "patients," but not which)      3. Specific individual, group, or organizational unit</p>	
<p><b>Rating.</b> 3. Specific individual, group, or organizational unit</p> <p><b>Explanation.</b> In Background: "Prescribing less effective medications increases the potential for poor outcomes in these patients" (i.e. patients with status epilepticus). One clearly specified impacted entity is sufficient for the rating.</p> <p>Would be "2. General" if the author had implied or stated broadly that patients were impacted without clarifying specifically "patients with status epilepticus."</p>	
<p>3. <b>Severity</b> of the negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement of the severity (e.g., extent/amount) of at least one negative consequence?</p> <p>0. Not addressed      1. Unclear      2. General (eg, significant harm)      3. Specific extent/amount</p>	
<p><b>Rating.</b> 2. General (eg, significant harm)</p> <p><b>Explanation.</b> In Background: "Prescribing less effective medications increases the potential for poor outcomes in these patients." While the general nature of the negative consequences is indicated by "poor outcomes," the extent/severity of the poor outcomes is not specified.</p> <p>Would be "1. Unclear" if the author had implied or stated simply that using other medication would be "less effective" with no indication of the nature of the harm or degree of severity of consequences/impacts.</p> <p>Would be "3. Specified (extent/amount of at least 1 consequence)" if the author had specified a specific degree of severity of the negative consequences of prescribing less effective medications (e.g., % mortality, type of morbidity, prolonged hospitalization, amount of healthcare costs).</p>	
<p>4. <b>Frequency</b> of the negative consequences (e.g., harm, frustration, waste): how specific is clearest statement of the frequency (# events/unit of time) of at least one negative consequence?</p> <p>0. Not addressed      1. Unclear      2. General (eg, rare, often)      3. Specific frequency (eg, events per unit of time)</p>	
<p><b>Rating.</b> 1. Unclear</p> <p><b>Explanation.</b> In Background: The only information provided is "the potential for poor outcomes in these patients." No information is provided regarding how frequently that prescribing less effective medications results in poor outcomes.</p>	



revised 1/28/20

*Note: The Problem Statement indicates how frequently the performance problem (less effective medications prescribed) occurs, which is different than the frequency of negative consequences resulting when the performance problem occurs.*

Would be "0. Not Addressed" if the author did not refer to the occurrence of negative consequences when the performance problem occurred (i.e. when less effective medications were prescribed).

Would be "2. General (e.g., rare, often)." if the author had indicated a general sense of relative frequency (e.g., occasionally, frequently).

➤ Extent to which important negative consequences (e.g., harm, frustration, waste) are identified?

None                      Inadequate                      Adequate                      Thorough                      Cannot assess

Cannot assess

*Background – reviewer comments:*

**Current Situation** *What is actually happening?*

5. Current level of performance

0. Not addressed                      1. General words, but no data                      2. Some data                      3. Thorough and robust data

3

Rating. 3. Thorough and robust data

Explanation. In Background: "In the last two fiscal years, only 26% of patients presenting to Hospital of the University of Pennsylvania (HUP) for initial treatment of unremitting seizures were treated in accordance with the status epilepticus anti-epileptic drug treatment protocol." In Current State, there is a pareto chart and a pie chart that illustrate the data.

Would be "2. Some data" if the author had made a general quantitative statement about performance (e.g., less than half of the time) or had provided data for small number of patients (e.g., less than 5) so that confidence in the data was uncertain.

6. How is work done (process/workflow)?

0. Not addressed                      1. Addressed, but unclear                      2. Illustration/ description somewhat clear                      3. Illustration/ description very clear

2

Rating. 2. Illustration/description somewhat clear

Explanation. In Current Situation: the diagram shows the sequence of the choice of anti-epileptic medications, with each arrow representing an instance of drug selection. However, no information is provided for who is involved (e.g., who orders the anti-epileptic, how it is selected) or for some steps (e.g., patient arrival and how/who determines diagnosis to initiate ordering, how and when the medication reaches the patient).

Would be "1. Addressed, but unclear" if the author had provided some narrative that could not be easily followed or a process map that could not be interpreted.

Would be "3. Illustration/description very clear" if the author had laid out a complete process sequence depicting who is involved at each step.

7. Clear identification of who is involved in performing the work?

0. Not addressed                      1. Unclear                      2. Somewhat clear                      3. Very clear

0

Rating. 0. Not addressed

Explanation. No process map or written statement on the A3 indicates who is involved in performing the work of treating a patient with status epilepticus.

Would be "1. Unclear" if the author had written general statements about the people involved in the work (e.g., nurses, physicians, pharmacists), but did not indicate who was doing what work.

8. Performance problem/gap?

0. Not addressed                      1. Unclear                      2. Partially specified                      3. Clearly specified/quantified

3

Rating. 3. Clearly specified/quantified

revised 1/28/20

**Explanation.** In Background under Problem Statement heading: "In the last two fiscal years, only 26% of patients presenting to Hospital of the University of Pennsylvania (HUP) for initial treatment of unremitting seizures were treated in accordance with the status epilepticus anti-epileptic drug treatment protocol. Poor adherence to this protocol leads to unnecessary variations in care and delayed, less effective treatment."

Would be "2. Partially specified" if the author had written the performance problem/gap with some general information (e.g., "less than half") or did not state the time frame for the measurement).

➤ Extent to which the A3 author demonstrates direct observation of the work process?

Not observed      A little      Some      All      Cannot assess

Cannot assess

➤ Extent of demonstration of learning from the people involved in the process?

None      A little      Some      All      Cannot assess

Cannot assess

*Current Situation – reviewer comments:*

**Goal** What target condition or specific performance is desired? By when?

9. How specific is the goal?

0. Not addressed      1. Vague      2. Somewhat specific      3. Very specific

3

**Rating.** 3. Very specific

**Explanation.** In Target Condition: "To improve adherence to the status epilepticus protocol from 26% to 80% for patients with unremitting seizures presenting to HUP in the year following countermeasure implementation."

Would be "2. Somewhat specific" if the author made a relative statement (e.g., improve status epilepticus anti-epileptic drug treatment protocol by 55 percentage points) without specifying the baseline (or target goal).

10. Is the goal measurable?

0. Not addressed      1. Not measurable      2. May be measurable      3. Clearly measurable

3

**Rating.** 3. Clearly measurable

**Explanation.** In Target Condition: "To improve adherence to the status epilepticus anti-epileptic drug treatment protocol from 26% to 80%." This statement indicates that "adherence to the status epilepticus anti-epileptic drug treatment protocol" has been measured in the past and therefore is likely to be measurable in the future.

Would be "2. May be measurable" if the author included a goal statement for an aspect of performance that has not been measured (e.g., no baseline data), but may be measurable from routinely available data sets (e.g., in an electronic health record).

➤ How achievable is the goal?

Not achievable      Unlikely      Possibly      Probably      Cannot assess

Cannot assess

11. How relevant is the goal to addressing the problem?

0. Not addressed      1. Not relevant      2. Somewhat relevant      3. Very relevant

3

**Rating.** 3. Very relevant

**Explanation.** In Target Condition: "To improve adherence to the status epilepticus anti-epileptic drug treatment protocol from 26% to 80% for patients with unremitting seizures..." In Problem Statement: "In the last two fiscal years, only 26% of patients presenting to Hospital of the University of Pennsylvania (HUP) for initial treatment of unremitting seizures were treated in accordance with the status epilepticus anti-epileptic drug treatment protocol." Thus the goal directly addresses the problem statement/performance gap.

Would be "2. Somewhat relevant" if the author had stated a goal that was generally related to the problem statement (i.e. goal discussed improving care for status epilepticus without clearly addressing the problem of adherence to the protocol).

12. How time-bound (clear timeframe for accomplishment) is the goal?

0. Not addressed      1. Unclear      2. Somewhat clear (eg, relative timeframe)      3. Very clear (eg, date specified)

2

3

32

revised 1/28/20

**Rating.** 2. Somewhat clear (e.g., relative timeframe)**Explanation.** In Target Condition: “. . . in the year following countermeasure implementation.” This statement provides a relative timeframe, with the beginning date (following countermeasure implementation) unknown.

Would be “1. Unclear” if the author had simply said “over the next year” and did not include the phrase “following countermeasure implementation” to indicate a relative starting point.

Would be “3. Very clear (e.g., date specified)” if the author had stated a timeframe with a specified date for achieving the goal (e.g., by June 30, 2017).

*Goal – reviewer comments:***Analysis** *What is contributing to the problem? What are its root causes?*

- 13.
- Is the display of method(s) for analyzing root causes easy to understand? (e.g., fishbone diagram, “5-whys”/root cause tree diagram, Pareto chart)

0. Not displayed      1. Not understandable      2. Partially understandable      3. Easy to understand

**3****Rating.** 3. Easy to understand**Explanation.** In Analysis: Fishbone diagram with clear categories and text. *Note: Usually the problem would be listed at the “head” of the fish. In this case the problem is listed in the title of the fishbone diagram.* The “four”-whys analysis has logic that is easy to follow and understand

Would be “2. Partially understandable” if the author included 1 or more visuals with some parts that were understandable and some of the logic could be followed, but other parts were unclear.

- 14.
- How clear are the identified root causes?

0. Not addressed      1. Unclear      2. Somewhat clear      3. Very clear

**3****Rating.** 3. Very clear**Explanation.** In Analysis: The description of the identified root causes of the problem is clear by category (on a fishbone diagram). The analysis is even more detailed by identifying the most common causes (on a 5-whys analysis). Additionally, sources of input are listed.*Note: the statement of the “alternative” of fosphenytoin is a proposed solution that more typically would have been listed in the Countermeasure section.*

Would be “2. Somewhat clear” if the author had written statements or included visuals from which you could understand some of the indicated root causes, but not others.

- 
- Extent to which important root causes are identified?

None      Inadequate      Adequate      Thorough      Cannot assess

Cannot assess

*Analysis – reviewer comments:***Countermeasures** *What options/alternatives were considered? What countermeasures/strategies are proposed?*

- 15.
- How many options for countermeasures were considered?

0. None      1. One      2. Two      3. Three or more

**3****Rating.** 3. Three or more**Explanation.** In Countermeasures: the Root Cause-Countermeasures table presents three separate bulleted countermeasures that were considered. *Note: In this A3 the author placed the recommendation to initiate the first two countermeasures and to defer the third countermeasure in the Action Plan section rather than in the Countermeasure section.*

Would be “2. Two” if the author had included only two countermeasures.

revised 1/28/20

## 16. Identify the strongest countermeasure considered. How strong is it?

- |                        |   |   |   |
|------------------------|---|---|---|
| 0. No counter-measures | 1. Weak (eg, policy change, education and training) | 2. Intermediate (eg, standard work/roles, just-in-time reminders, or visual/cognitive aids) | 3. Strong (eg, "forcing function" that ensures work done right way) |
|------------------------|---|---|---|

2

**Rating.** 2. Intermediate (eg, standard work/roles, just-in-time reminders, or visual/cognitive aids)

**Explanation.** In Countermeasures: the "countermeasures" column in the table lists three that were considered. The first countermeasure is "intermediate," substituting fosphenytoin for phenytoin in the treatment protocol, which changes the actual work to perform. The other two countermeasures are "weaker" education and training activities (disseminate the new protocol, develop a curriculum) that make people aware of the protocol and the rationale for the recommended drug. Other "intermediate" strength countermeasures might be changing work roles (e.g., restricting prescribing for this condition to a set of specially trained individuals), just-in-time reminders (e.g., an alert on an electronic prescribing system when something other than fosphenytoin is prescribed for status epilepticus), or a visual reminder (e.g., a copy of the treatment protocol posted in staff rooms).

Would be "1. Weak (eg., policy change, education and training)" if only the educational activities were proposed.

Would be "3. Strong (eg., 'forcing function' that ensures work is done the right way)" if the author had listed a forcing function (e.g. providers were required to order any/all anti-epileptic through a status epilepticus order set that had fosphenytoin pre-selected; if a prescriber wanted to order a drug for status epilepticus other than fosphenytoin, the prescriber is required to obtain a pharmacy or neurology consultation in order to ensure the most evidence-based drug was ordered).

*Note: Although strong countermeasures are not always feasible, combining two or more weak or intermediate countermeasures may be sufficient.*

## 17. How many of the proposed countermeasures are linked to identified root causes? (Review each countermeasure and see if it addresses a root cause identified in the Analysis Section.)

- |                          |                              |                              |                         |
|--------------------------|------------------------------|------------------------------|-------------------------|
| 0. None linked to causes | 1. Minority linked to causes | 2. Majority linked to causes | 3. All linked to causes |
|--------------------------|------------------------------|------------------------------|-------------------------|

3

**Rating.** 3. All linked to causes

**Explanation.** In Proposed Countermeasures, the table lists the root cause and the related countermeasures. The first countermeasure addresses the logistical and safety concerns with phenytoin, which were displayed in the 4-whys diagram in the Analysis section as well as addressed on the fishbone diagram. The next 2 countermeasures address the lack of knowledge about status epilepticus treatment and its protocol, which was indicated as one of the problem "bones" in the fishbone diagram in the Analysis section.

Would be "2. Majority linked to causes" if the majority (i.e. more than half), but not all, of the countermeasures were explicitly linked to (address) root causes.

## ➤ To what extent are countermeasures feasible to carry out?

Not feasible	Unlikely	Possibly	Highly likely	Cannot assess
--------------	----------	----------	---------------	---------------

Cannot assess

## ➤ How likely will countermeasures result in achieving the goal?

Not possible	Unlikely	Possibly	Highly likely	Cannot assess
--------------	----------	----------	---------------	---------------

Cannot assess

Countermeasures – reviewer comments:

**Action Plan** To pilot & implement the selected countermeasures: what, who, when?

## 18. For the action plan on the A3, how clearly are activities described (i.e. "what" is to be done)?

- |                  |            |                   |               |
|------------------|------------|-------------------|---------------|
| 0. Not addressed | 1. Unclear | 2. Somewhat clear | 3. Very clear |
|------------------|------------|-------------------|---------------|

3

**Rating.** 3. Very clear

**Explanation.** In Action Plan: for the two countermeasures that are to be addressed now, three actions are listed ("what" is to be done). The first countermeasure has two actions (1a. petition UPHS pharmacy to obtain fosphenytoin; 1b.

revised 1/28/20

rewrite the status epilepticus protocol) and the second countermeasure has one action (2. develop plan to disseminate the treatment protocol).

Would be "2. Somewhat clear" if an action plan has some statements about what is to be done that are vague and others that are clear.

19. Are individuals identified to be responsible for each action item to be carried out (i.e. "who")?

0. Not addressed    1. For the minority    2. For the majority    3. For all

2

Rating. 2. For the majority

Explanation. In Action Plan: individuals or groups ("who") are identified for first countermeasure's first action (1a. "Katherine") and for the second countermeasure's action (2. "Katherine and Dr. Patrick"). However, no one is identified for to perform the first countermeasure's second action (1b. complete first draft).

Would be "3. For All" if the author had identified individuals to carry out actions for all of the activities.

20. Are estimated completion dates identified for each action item (i.e. "when")?

0. Not addressed    1. For the minority    2. For the majority    3. For all

1

Rating. 1. For the minority

Explanation. In Action Plan: only one of the three actions has a clear estimated completion date ("by when"). A clear completion date is identified for the action of rewriting the treatment protocol (1b. "by 2/1/17"). The other two actions have vaguely stated timeframes (1a. "goal of obtaining this drug by early spring" and 2. "will complete this spring with plans to roll-out this summer.") "Spring" and "summer" are not practically useful for knowing when to follow up to see if work has been performed.

Would be "0. Not addressed" if no estimated completion dates were listed or if all were vague.

Would be "2. For the majority of action items" if the author had listed multiple action plan activities and estimated time frames were identified for the majority of activities (e.g., 2 of the 3 activities).

21. How clear is the plan for monitoring the implementation of actions in 18-20 above (what will be monitored, by whom, when)?

0. Not addressed    1. Plan unclear (no or minority of actions monitored – what, who, when)    2. Plan partially clear (majority of actions monitored – what, who, when)    3. Plan clear (all actions monitored – what, who, when)

1

Rating. 1. Unclear

Explanation. The Monitoring Plan only partially addresses the first action in the Action Plan and does not address the other two of the actions in the Action Plan. The Action Plan lists two activities for the first countermeasure (1a and 1b) and one activity for the second countermeasure. For the first countermeasure's first action (1a. "Petition UPHS pharmacy administration to obtain fosphenytoin"), the Monitoring Plan addresses components of implementing this action ("Dr. Knox to follow-up on pharmacy administration discussions"). While the individual ("who") is identified to carry out this check ("Dr. Knox"), the time frame ("when") the follow-up will occur is not clear. No monitoring ("who will check when") is addressed for either of the other two actions in the Action Plan (1b. rewriting the protocol, 2. develop plan to disseminate the protocol).

Would be "0. Not addressed" if monitoring was not addressed for any of the three action activities.

Would be "2. Partially clear" if monitoring was addressed for at least a second activity and both checks addressed "what would be monitored, by whom, and when." That would result in the majority of the action plan activities (two of the three) being monitored.

➤ How adequate is the action plan?

Not adequate    Possibly

Probably

Very likely

Cannot assess

Cannot assess

Action plan – reviewer comments:

revised 1/28/20

**Follow-up Plans** *Checking whether desired goal(s) was achieved?*22. Is follow-up planned to measure achievement of the desired goal(s) (what will be measured, by whom, when)?

0

0. Not addressed

1. Plan unclear (no more than one of "what, who, when")

2. Plan partially clear (two of "what, who, when")

3. Plan clear ("what, who, when")

Rating. 0. Not addressedExplanation. The A3 does not address measuring achievement of the desired goal, (i.e. improving adherence to the new status epileptics anti-epileptic drug treatment protocol).

Would be "1. Unclear" if measuring achievement of the desired goal addressed one element of "who is to do what, when."

**Across A3 Sections**23. How clearly does the title identify the problem to be addressed?

2

0. No title

1. Unclear

2. Somewhat clear

3. Very clear

Rating. 2. Somewhat clearExplanation. Title: "Improving the Status of Status Epilepticus" identifies in general that something needs to be improved regarding status epilepticus. However, the title does not indicate that the problem is with poor adherence to the treatment protocol.

Would be "1. Unclear" if a title were listed but is completely unclear what the problem is that the A3 is addressing (e.g., "Needed Improvement in Patient Care").

Would be "3. Very clear" if the title indicated the specific problem being addressed (e.g., "Improving Adherence to Evidence-based Practice Guidelines for Status Epilepticus").

➤ How often does the logic flow clearly from one section of the A3 to the next section?

Not at all

Occasionally

Majority

Always

Cannot assess

Cannot assess

➤ In general, how informative are the visual illustrations?

None used or not informative

Not very informative

Somewhat informative

Very informative

Cannot assess

Cannot assess

*Across A3 Sections – reviewer comments:***OVERALL RATING** (items 1 – 23)

Total points (max = 69)

51

Mean (divide total by 23 items)

*Note: check that all 23 numbered items have been answered. Missing answers are coded "0."*

2.2



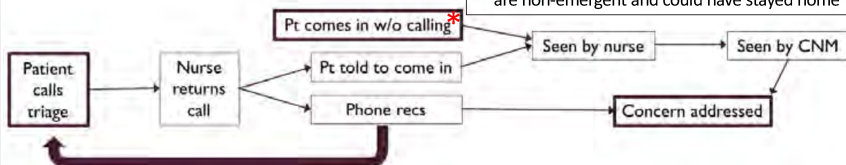
TITLE: DECREASING CONGESTION IN OB/GYN TRIAGE

DATE: 2/20/18      OWNER: M3 Student YY

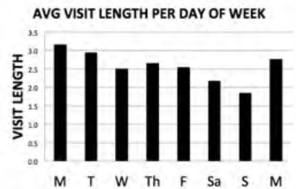
BACKGROUND

OB/GYN triage is a dedicated resource for obstetric emergencies + L&D overflow.  
OB/GYN triage is frequently congested, and visits may take over 2 hours.

CURRENT SITUATION



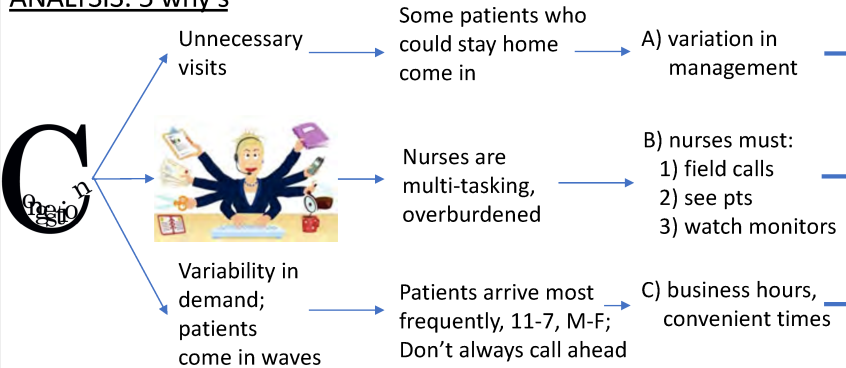
**Problem statement:**  
Congestion is a problem in OB/GYN triage.



GOAL

Our goal is to decrease non-emergent visits by Increasing the percentage of patients calling ahead for triage from 60% to 80% by end of Week 5 of plan implementation.

ANALYSIS: 5 why's



RECOMMENDATIONS

- A) Variation in phone management re: whether patient needs to come in  
Rec: create standard protocol for most common complaints (e.g. nausea)
- B) Workflow requires switch-tasking by nurses  
Rec: dedicate one nurse to calls and monitoring, other to seeing pts
- C) Uneven flow of work; most pts arrive afternoon/early evening  
Rec: instruct all pts to call ahead to: 1) forestall unnecessary visits, and 2) create potential to level arrival times if visit is needed, but not time critical
- D) Patient-centered care  
Rec: redecorate triage waiting area to be more appealing to patients

PLAN: **Start Date March 1, 2018**

Action	Week 1	Week 2	Week 3	Week 4	Week 5
YY and MG to get nurses and CNMS on board.					
YY, MH, and MJG create protocols & surveys.					
Division of labor implemented.					
"Call ahead" implemented by Ob/Gyn.					
Protocol implemented.					

➤ YY will monitor progress to plan and report Red/Green status of items weekly.

FOLLOW-UP



MJG will measure progress, and report the following data at weekly project team meetings:

- 1) % emergent and % non-emergent visits
- 2) Call ahead rates
- 3) Average visit length

revised 1/28/20

## Assessment Tool for a Problem-Solving (Proposal) A3

**A3 Title:** (Ex. 3) Decreasing Congestion in Ob/Gyn Triage

**Author:** XXXXX

**Reviewer:** XXXXX

**Date:** XXXXX

Items (based on A3 Template) and Rating Scale	Rating
<b>Background</b> <i>Why is the problem important?</i>	
<p>1. <b>Negative consequences</b> (e.g., harm, frustration, waste): how specific is the clearest statement of a negative consequence of the problem?</p> <p>0. Not addressed      1. Unclear      2. General (eg, "harm," "difficulties," "waste")      3. Specific type of consequence</p>	<b>1</b>
<p><u>Rating.</u> 1. Unclear</p> <p><u>Explanation.</u> The Background refers to a problem of "congestion" but the negative consequences of congestion are not clear. While the Background states that "visits may take over 2 hours," it is unclear if this is the usual expected visit time and whether congestion has a negative consequence of lengthening visit time.</p> <p>Would be "2. General" if negative consequences were at least stated in general terms, e.g., problems with patient care due to congestion or long visit wait times.</p> <p>Would be "3. Specific type of consequence" if a specific consequence of congestion were listed such as longer visit time, clinically significant delay in diagnosis, patients leaving without being seen, lower patient satisfaction with care, providers experiencing increased work stress.</p>	
<p>2. <b>Individuals/groups</b> impacted by the negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement identifying an impacted individual, group/unit, or organization?</p> <p>0. Not addressed      1. Unclear      2. General (eg, "staff," or "patients," but not which)      3. Specific individual, group, or organizational unit</p>	<b>1</b>
<p><u>Rating.</u> 1. Unclear</p> <p><u>Explanation.</u> The unclear statement of negative consequences makes it difficult to understand who is impacted by the negative consequences. The Background notes that congestion occurs in the "OB/GYN triage" unit, but does not indicate that congestion is resulting in negative consequences for that unit.</p> <p>Would be "2. General" if a more general wording were used to describe who is impacted, e.g., "affects everyone."</p> <p>Would be "3. Specific individual, group, or organizational unit" if negative impacts and who is impacted by them were specified, e.g., patients who have longer visit times, OB/GYN triage area staff who are stressed.</p>	
<p>3. <b>Severity</b> of the negative consequences (e.g., harm, frustration, waste): how specific is the clearest statement of the severity (e.g., extent/amount) of at least one negative consequence?</p> <p>0. Not addressed      1. Unclear      2. General (eg, significant harm)      3. Specific extent/amount</p>	<b>0</b>
<p><u>Rating.</u> 0. Not addressed</p> <p><u>Explanation.</u> The Background does not address severity of negative consequences of the OB/GYN triage congestion.</p> <p>Would be "1. Unclear" if a statement were made about negative consequences of congestion, but their severity is unclear, e.g., "causes problems" with no indication of the nature of the harm or its impacts.</p> <p>Would be "2. General (e.g., significant harm)" if the severity/extent impact were described in general terms, e.g., "congestion may result in lower quality care and increased dissatisfaction," but the extent of negative impact on relevant individuals is only generally communicated as negative.</p> <p>Would be "3. Specific extent/amount of at least 1 consequence" if the extent of impact were communicated: e.g., ob-gyn triage congestion problems result longer visit times that can lead "to delay in emergent diagnoses with increased clinical complications" and "to staff dissatisfaction and turnover."</p>	
<p>4. <b>Frequency</b> of the negative consequences (e.g., harm, frustration, waste): how specific is clearest statement of the frequency (# events/unit of time) of at least one negative consequence?</p> <p>0. Not addressed      1. Unclear      2. General (eg, rare, often)      3. Specific frequency (eg, events per unit of time)</p>	<b>0</b>
<p><u>Rating.</u> 0. Not addressed</p>	

revised 1/28/20

**Explanation.** The Background does not address how often that congestion leads to negative consequences in the OB-GYN triage area. While the Background does indicate that the problem of congestion occurs frequently, congestion may not always result in negative consequences such as longer visit times or inefficiency (downstream effects of congestion).

Would be “1. Unclear” if the background included a statement about negative consequences, but their frequency is not clear, e.g., lengthened visit times may occur.

Would be “2. General (e.g., rare, often)” if only a relative sense of frequency of the resulting harm were stated, e.g., “usually results in longer visits,” “occasionally results in critical delay of emergent diagnosis,” “sometimes affects staff morale.”

Would be “3. Specific frequency (events per unit of time)” if the background specifies the frequency of one or more negative consequences: e.g., “clinically significant delay in diagnosis occurs on average 4x/month”, “on average, each week 20 patients leave without being seen due to frustration with the triage delays”, or “the last 5 staff members who transferred to other areas cited work stress due to congestion as one of the reasons for leaving.”

➤ **Extent to which important negative consequences (e.g., harm, frustration, waste) are identified?**

None

Inadequate

Adequate

Thorough

Cannot assess

Cannot assess

*Background – reviewer comments:*

**Current Situation** *What is actually happening?*

5. **Current level of performance**

0. Not addressed

1. General words, but no data

2. Some data

3. Thorough and robust data

2

**Rating.** 2. Some data

**Explanation.** In Background, there are statements of how many patients do not call (40%), and how many are non-emergent and could stay home (50%). Also, a bar graph illustrates the average visit length in ob-gyn triage per day of week.

Would be “1. General words, but no data” if the bar graph were not shown and a general comment were made about long visit length.

Would be “3. Thorough and robust data” if more granular data were given, e.g., the length of time waiting before being assessed and the actual number of patients involved.

6. **How is work done (process/workflow)?**

0. Not addressed

1. Addressed, but unclear

2. Illustration/ description somewhat clear

3. Illustration/ description very clear

2

**Rating.** 2. Illustration/description somewhat clear

**Explanation.** In Current State: The process map shows the general process steps, their sequence, and who carries out each step. However, problems are not highlighted and delays in the process are neither identified nor quantified.

Would be “1. Addressed, but unclear” if the process steps or other description were difficult to understand.

Would be “3. Illustration/description very clear” if the process map showed the process steps, identifying the points with problems.

7. **Clear identification of who is involved in performing the work?**

0. Not addressed

1. Unclear

2. Somewhat clear

3. Very clear

3

**Rating.** 3. Very clear

**Explanation.** The process map in Current State includes who is involved in performing each step of the work (e.g., nurse, CNM).

Would be “2. Somewhat clear” if individuals (e.g., nurses, CNM) involved in performing the work were indicated for some parts of the work, but not for other parts of the work.

8. **Performance problem/gap?**

0. Not addressed

1. Unclear

2. Partially specified

3. Clearly specified/quantified

1

2

39

revised 1/28/20

**Rating.** 1. Unclear**Explanation.** The problem statement ("Congestion is a problem in ob/gyn triage") does not communicate a clear problem. For example, the performance gap may be the time patients wait in the triage area.

Would be "2. Partially specified: if the performance problem/gap were written with some general language (e.g., "...average time from check-in to provider evaluation is increasing each year").

Would be "3. Clearly specified/quantified" if the performance gap was clear, e.g., "OB patient emergencies cannot be managed safely or efficiently given that the average time to be seen from check-in to completed provider evaluation is currently 2.5 hours."

➤ **Extent to which the A3 author demonstrates direct observation of the work process?**

Not observed      A little      Some      All      Cannot assess

Cannot assess

➤ **Extent of demonstration of learning from the people involved in the process?**

None      A little      Some      All      Cannot assess

Cannot assess

*Current Situation – reviewer comments:***Goal** *What target condition or specific performance is desired? By when?*9. **How specific is the goal?**

0. Not addressed      1. Vague      2. Somewhat specific      3. Very specific

3

**Rating.** 3. Very Specific**Explanation.** In Goal: "Decrease non-emergent visits by increasing the percentage of patients calling ahead for triage from 60% to 80% by the end of week 5 of plan implementation."

Would be "2. Somewhat specific" if the goal were stated qualitatively in relative terms (e.g., "decrease non-emergent visits") without specifying a target.

10. **Is the goal measurable?**

0. Not addressed      1. Not measurable      2. May be measurable      3. Clearly measurable

3

**Rating.** 3. Clearly measurable**Explanation.** In Goal the measure is: "... increase the % of patients calling ahead from 60 to 80%. Since the authors of this A3 previously measured the number of patients who did not call ahead (see Current Situation: 40% of patients do not call ahead), this goal is clearly measurable.

Would be a "2. May be measurable" if use of the measure were not demonstrated in the Current Condition, the measure were not commonly used, and the reader is uncertain whether measurement could be performed.

➤ **How achievable is the goal?**

Not achievable      Unlikely      Possibly      Probably      Cannot assess

Cannot assess

11. **How relevant is the goal to addressing the problem?**

0. Not addressed      1. Not relevant      2. Somewhat relevant      3. Very relevant

3

**Rating.** 3. Very relevant**Explanation.** The Goal states "increase the % of patients calling ahead from 60% to 80%" which would result in some patients being advised to stay home and therefore directly relates to the stated problem of decreasing the "congestion in OB/GYN triage" (see Problem Statement.)

Would be "2. Somewhat relevant" if the goal were only generally related to the problem statement (e.g., goal discussed improving some aspect of patient experience when the problem statement focused on "managing OB patient emergencies efficiently.")

revised 1/28/20

12. How time-bound (clear timeframe for accomplishment) is the goal?

0. Not addressed    1. Unclear    2. Somewhat clear (eg, relative timeframe)    3. Very clear (eg, date specified)

2

Rating. 2. Somewhat clearExplanation. The Goal: states "...by end of Week 5 of plan implementation." This sets a somewhat clear deadline.

Would be "3. Very Clear" if an exact date were added (e.g., "...by the end of week 5 of plan implementation, i.e. April 5, 2020)

*Goal – reviewer comments:***Analysis** *What is contributing to the problem? What are its root causes?*13. Is the display of method(s) for analyzing root causes easy to understand? (e.g., fishbone diagram, "5-whys"/root cause tree diagram, Pareto chart)

0. Not displayed    1. Not understandable    2. Partially understandable    3. Easy to understand

2

Rating. 2. Partially UnderstandableExplanation. At the left side of the root cause tree diagram is capital "C" with the word "congestion" jumbled inside of it. Reading this word is somewhat difficult and therefore the display is rated "partially understandable."

Would be "3. Easy to understand" if the beginning of the root cause tree diagram said "Too many non-emergent visits in Ob-Gyn triage."

14. How clear are the identified root causes?

0. Not addressed    1. Unclear    2. Somewhat clear    3. Very clear

3

Rating. 3. Very clearExplanation. In the Analysis section is a root cause tree diagram that identifies 3 major contributing factors (unnecessary visits, nurses who are multi-tasking, and patients coming in waves to the triage area). The root cause tree further identifies the underlying causes of these three major contributing factors by asking at least 2 more "whys" to get to the underlying root causes.

Would be "2. Somewhat clear" if from the written statements and visuals you could understand some of the indicated root causes, but not others. For example, if the root cause tree only listed the 3 major contributing factors and did not illustrate the underlying reasons for the unnecessary visits, multi-tasking nurses, and patients coming in waves.

➤ Extent to which important root causes are identified?

- None    Inadequate    Adequate    Thorough    Cannot assess

Cannot assess

*Analysis – reviewer comments:***Countermeasures** *What options/alternatives were considered? What countermeasures/strategies are proposed?*15. How many options for countermeasures were considered?

0. None    1. One    2. Two    3. Three or more

3

Rating. 3. Three or moreExplanation. In Recommendations: 4 recommendations are listed, labeled A-D.

Would be "2. Two" if the author had included only two countermeasures.

revised 1/28/20

16. Identify the strongest countermeasure considered. How strong is it?

- |                        |   |   |   |
|------------------------|---|---|---|
| 0. No counter-measures | 1. Weak (eg, policy change, education and training) | 2. Intermediate (eg, standard work/roles, just-in-time reminders, or visual/cognitive aids) | 3. Strong (eg, "forcing function" that ensures work done right way) |
|------------------------|---|---|---|

2

**Rating.** 2. Intermediate (eg, standard work/roles, just-in-time reminders, or visual/cognitive aids)**Explanation.** In Recommendations: Standard protocols, changes in workflow and leveling of workflow are included as recommendations A, B, and C

Would be "1. Weak" if only educational interventions were proposed, or if redecorating the triage area was the only countermeasure proposed

Would be "3. Strong (e.g., 'forcing function' that ensures work is done the right way)" if it were hypothetically possible to error proof the process by requiring patients to call in before coming to triage, and to only see patients who had been first triaged as appropriate. Not likely to be feasible in this context.

*Note: Although strong countermeasures are not always feasible, combining two or more weak or intermediate countermeasures may be sufficient.*17. How many of the proposed countermeasures are linked to identified root causes? (Review each countermeasure and see if it addresses a root cause identified in the Analysis Section.)

- |                          |                              |                              |                         |
|--------------------------|------------------------------|------------------------------|-------------------------|
| 0. None linked to causes | 1. Minority linked to causes | 2. Majority linked to causes | 3. All linked to causes |
|--------------------------|------------------------------|------------------------------|-------------------------|

2

**Rating.** 2. Majority linked to causes**Explanation.** In Recommendations: Items A-C are clearly and visually linked to identified causes. Recommendation D, Redecorate the waiting area, is not clearly linked. Since 3 out of 4 recommendations are linked, the "majority are linked to causes."

Would be "3. All Linked" if either all 4 proposed countermeasures were explicitly linked to a root cause, or if only the three linked countermeasures had been proposed. .

➤ To what extent are countermeasures feasible to carry out?

- |              |          |          |               |               |
|--------------|----------|----------|---------------|---------------|
| Not feasible | Unlikely | Possibly | Highly likely | Cannot assess |
|--------------|----------|----------|---------------|---------------|

Cannot assess

➤ How likely will countermeasures result in achieving the goal?

- |              |          |          |               |               |
|--------------|----------|----------|---------------|---------------|
| Not possible | Unlikely | Possibly | Highly likely | Cannot assess |
|--------------|----------|----------|---------------|---------------|

Cannot assess

*Countermeasures – reviewer comments:***Action Plan** *To pilot & implement the selected countermeasures: what, who, when?*18. For the action plan on the A3, how clearly are activities described (i.e. "what" is to be done)?

- |                  |            |                   |               |
|------------------|------------|-------------------|---------------|
| 0. Not addressed | 1. Unclear | 2. Somewhat clear | 3. Very clear |
|------------------|------------|-------------------|---------------|

2

**Rating.** 2. Somewhat clear**Explanation.** The Plan lists 5 activities (left column of the GANTT chart). However, the description of some tasks is only somewhat clear to the reader. For example, "will get nurses and CNMs on board" does not communicate what "on board" means, for example, simply agreeing or actively engaged with the subsequent tasks. Further, Recommendation D (Redecorate the waiting area) has no associated task(s).

Would be "1. Unclear" if the statements of what is to be done were vague and non-specific, e.g., "will engage others."

Would be "3. Very clear" if all of the recommendations described tasks with sufficient clarity that the reader understood what was to be accomplished.

19. Are individuals identified to be responsible for each action item to be carried out (i.e. "who")?

- |                  |                     |                     |            |
|------------------|---------------------|---------------------|------------|
| 0. Not addressed | 1. For the minority | 2. For the majority | 3. For all |
|------------------|---------------------|---------------------|------------|

1



revised 1/28/20

**Rating.** 1. For the minority**Explanation.** For the 5 actions listed in the Plan, only 2 actions have responsible individuals (e.g., "YY and MH will...") identified.

Would be: "0. Not addressed" If none of the action steps had an identified owner.

Would be "2. For the majority" if at least 3 out of 5 action steps had an identified owner.

20. Are estimated completion dates identified for each action item (i.e. "when")?

0. Not addressed

1. For the minority

2. For the majority

3. For all

3

**Rating.** 3. For all**Explanation.** In Plan: the header of the GANTT chart lays out a 5-week timeframe for the action starting from whenever the actions are to begin. For each action (row) in the chart, the estimated beginning and ending weeks are indicated.*Note: If the implementation time frame were known, inserting the specific dates would be clearer than the relative dates from an as yet undetermined start date.*

Would be "2. For the majority of action items" if the author had listed multiple action plan activities and estimated time frames were identified for the majority (but not all) of the listed activities (e.g., 3 of the 5 activities).

21. How clear is the plan for monitoring the implementation of actions in 18-20 above (what will be monitored, by whom, when)?

0. Not addressed

1. Plan unclear (no or minority of actions monitored – what, who, when)

2. Plan partially clear (majority of actions monitored – what, who, when)

3. Plan clear (all actions monitored – what, who, when)

3

**Rating.** 3. Plan clear**Explanation.** The Plan states that YY (who) will be monitoring progress of plan actions (what) and will report weekly (when).

Would be "2. Partially clear" if only 2 of the 3 "what, who, when" elements were specified. For example, if "weekly" were not stated (no "when"), and only who and what were specified.

➤ How adequate is the action plan?

Not adequate

Possibly

Probably

Very likely

Cannot assess

Cannot assess

Action plan – reviewer comments:**Follow-up Plans** *Checking whether desired goal(s) was achieved?*22. Is follow-up planned to measure achievement of the desired goal(s) (what will be measured, by whom, when)?

0. Not addressed

1. Plan unclear (no more than one of "what, who, when")

2. Plan partially clear (two of "what, who, when")

3. Plan clear ("what, who, when")

3

**Rating.** 3. Plan clear**Explanation.** Follow up: It states that MJG (who) will be tracking 4 metrics (what), and will report weekly (when).

Would be "1. Plan unclear", if only one of the "what, who, when" elements were addressed, or if what was being measured did not correspond to the purpose of the initiative.

Would be "2. Partially clear", if only 2 of the 3 "what, who, when" elements were specified.

**Across A3 Sections**

revised 1/28/20

23. How clearly does the title identify the problem to be addressed?

0. No title      1. Unclear      2. Somewhat clear      3. Very clear

2

Rating. 2. Somewhat clearExplanation. The title identifies a somewhat vague problem (congestion) and where it is occurring (OB/GYN triage area). However, why "congestion" is a problem is not clear to the reader.

Would be "1. Unclear" if less information were in the title, e.g., no statement of where the problem is occurring.

Would be "3. Very clear", if the title identified a clear problem, for example, a clearer title could be "Decreasing Congestion in Ob/Gyn Triage to Reduce Delays in Assessing OB Patient Emergencies."

> How often does the logic flow clearly from one section of the A3 to the next section?

Not at all      Occasionally      Majority      Always      Cannot assess

Cannot assess

> In general, how informative are the visual illustrations?None used or not  
informative      Not very  
informative      Somewhat  
informative      Very  
informative      Cannot assess

Cannot assess

Across A3 Sections – reviewer comments:**OVERALL RATING** (items 1 – 23)

Total points (max = 69)

47

Mean (divide total by 23 items)

*Note: check that all 23 numbered items have been answered. Missing answers are coded "0."*

2.0

10/20/19

## Feedback Form: Assessment Package for Proposal A3s

Please provide your feedback on all aspects of the A3 assessment package. As you review these documents and try out assessing A3s, please take notes of your impressions, questions, and suggestions. We will use this outline for prompts when we discuss your feedback in person.

Orientation to the pilot study		
a.	Was the memo providing information for piloting the assessment of A3 clear?	
b.	Was the orientation phone call adequate?	
Self-instruction package		
Instructions for Assessing Problem-Solving A3s		
a.	What suggestions do you have for how to make the overview and learning steps clearer for an individual such as yourself?	
A3 Template and A3 Content Guide		
a.	What suggestions do you have for making one or both of these documents easier to understand?	
b.	Was there anything important missing?	
Practice assessing A3s – example A3s and standard ratings/explanations		
a.	How helpful were the standard ratings and explanations? Would you make any suggestions to improve them?	
Self-instruction package – overall		
a.	Approximately how long did it take you to complete the training package (reviewing materials, practicing the assessment of example A3s, checking ratings)?	
b.	Any comments about the self-instruction package as a whole?	
Assessing six A3s		
a.	Approximately how long did it take you to assess all six A3s?	
b.	Did you find this assessment form easy to use? Why or why not?	
c.	What if anything frustrated you about the form?	

10/20/19

d.	Any feedback on the layout or format of the assessment form?	
e.	Any feedback on specific items or rating scales and their use?	
f.	Any other comments or suggestions regarding performing the assessments?	
<b>Overall experience and usefulness</b>		
a.	Did you find that learning and applying this approach to assessing A3s was easy or hard? In what ways?	
b.	Did utilizing the A3 instructional package help prepare you better to evaluate an A3?	
c.	Do you have any other suggestions on how to improve the assessment of A3s?	
d.	Any other comments on this A3 instructional package?	