

Quality Improvement Toolkit

This Quality Improvement Toolkit is a joint endeavor by USF GME, USF Health, and TGH. Our goal is to provide healthcare providers a resource to guide the formation of quality improvement initiatives. Many of the tools were adapted from existing tools, which are cited in document footers. We encourage teams to use these forms to facilitate discussion during each step of your initiative's development. We hope that you find this toolkit useful.

Please contact Maya Balakrishnan (mbalakri@health.usf.edu) with any suggestions to improve the Quality Improvement Toolkit.

1st edition: 10/20172nd edition: 6/20183rd edition: 4/2019

This QI workbook was developed with input from the quality departments of University of South Florida (GME and USF Health) and Tampa General Hospital.

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TABLE OF CONTENTS

#	SECTION	PAGE
1	Identifying the problem	4
2	Performing a gap analysis	5
3	Identifying key stakeholders	7
4	Creating a business case	9
5	Determining an aim statement	10
6	Mapping a process and defining scope	12
7	Developing a key driver diagram	15
8	Determining project measures	18
9	Documenting a project charter	22
10	Determining the next PDSA or DMAIC cycle	25
#	APPENDIX	PAGE
A	Problem statement example	28
B	Gap analysis example	29
C	Stakeholder analysis example	30
D	Business case example	31
E	Aim statement and scope example	33
F	Process map example	34
G	Key driver diagram example	38
H	Measurement grid example	39
I	Project charter example	41
J	PDSA/DMAIC cycle example	43
K	Prioritization matrix instructions and example	46
#	TOOLS TO IMPROVE INITIATIVE SUCCESS	PAGE
I	Idea generating techniques	49
II	5-Whys technique instructions	50
III	Fishbone technique instructions and example	52
IV	Tips for successful e-mail communication	54
V	Meeting minutes template	57
VI	Project dashboard	58
VII	Project planning form	59
VIII	Report template	62
VIII	Useful links and resources	64

SECTION 1: IDENTIFYING THE PROBLEM

Instructions: Use the following question prompts to facilitate group discussion about the problem that your team is trying to address. Use this information to develop a problem statement. Example is in Appendix A

What is the problem you are trying to address (i.e., importance, relevance, whom it affects, duration)?

What kind of data do you need to prove it is a problem (i.e., what is gap in care - current practice vs. evidence-based practice or standard of care)?

What fixing the problem solves (i.e., how does it impact the hospital, unit, or clinic site; are there potential cost or resource savings)?

A good problem statement will meet the following criteria

- Focuses only on one problem
- Represents a solvable problem, but does not offer solutions
- Clear and concise (i.e., 1-2 sentences)
- Devoid of assumptions

Our problem statement:

SECTION 2: PERFORMING A GAP ANALYSIS

Instructions

Complete the following:

1. List potential best practice(s) or accepted standard of care associated with your problem.
2. List current practice(s) associated with your problem and how they differ from the potential best practice(s).
3. Identify if there is a practice gap.

If applicable, for each identified practice gap:

1. Discuss barriers which affect consistent implementation of the best practice (e.g., issues related to systems, methods or procedures, people, environment, materials, equipment). Note that there may not be identified barriers.
2. Discuss if the potential best practice is feasible to implement for this project. If it is not feasible, please provide an explanation below the table.

Example is in Appendix B.

MUST COMPLETE			OPTIONAL	
Potential best practice(s)	Current practice(s)	Practice gap (Yes/No)	Barriers to consistent implementation of best practice(s)	Feasible (Yes/No)

Adapted from FPQC QI boot camp “Identifying the problem” and UHC “Gap analysis” worksheet

Gap analysis (continued)

MUST COMPLETE			OPTIONAL	
Potential best practice(s)	Current practice(s)	Practice gap (Yes/No)	Barriers to consistent implementation of best practice(s)	Feasible (Yes/No)

SECTION 3: IDENTIFYING THE KEY STAKEHOLDERS

Stakeholders can include a wide range of individuals and organizations, such as patients, caregivers, clinicians, advocacy groups, and policy makers. Benefits of including all stakeholders include ensuring a variety of perspectives are represented, increasing support for the project, empowering people to be involved in QI activities, promoting transparency and awareness of efforts, and improving coordination of QI efforts.¹

¹ Albritton E, Edmunds M, Thomas V, Petersen D, Ferry G, Brach C, Bergofsky L. Engaging Stakeholders to Improve the Quality of Children's Health Care, AHRQ Implementation Guide No. 1.

<https://www.ahrq.gov>

Instructions:

1. Determine the different actions or tasks that your project may involve and list them in the rows.
2. Decide who needs to be engaged in your project. Include anyone who may be impacted by the problem or affected by the solutions generated. List either their name or role (e.g., NICU nurse, Patient, Physician, Educator) in the columns headings.
3. For each stakeholder, designate them as:
 - **Responsible** (i.e., the person(s) who performs the action or task)
 - Note: pick the right number of people to be responsible for a task (i.e., not too many, not too few); sometimes the responsible person may also be accountable
 - **Accountable** (i.e., the 1 person held accountable for ensuring that the action or task is completed)
 - Note: pick only 1 person to be held accountable
 - **Consulted** (i.e., the person who is consulted before performing the action or task)
 - Note: too many consultants slow down getting a task completion
 - **Informed** (i.e., the person who is updated or informed after performance of the action or task).

Note: Only one person may be designated as Accountable, but more than one person may be designated as Responsible, Consulted, or Informed.

Example is in Appendix C.

Adapted from <https://www.isixsigma.com/tools-templates/raci-diagram/raci-diagrams-managing-six-sigma-information/>

SECTION 4: CREATING A BUSINESS CASE

Instructions: Use the following question prompts to facilitate group discussion about the problem that your team is trying to address. Use this information to develop a business case. Example is in Appendix D.

How is this problem hurting or affecting our patients (i.e., the cost of poor quality)?

What data do we need to prove this is hurting or affecting our patients (e.g., frequency of occurrence, severity)?

What are anticipated resources to address this problem?

A good business case will consider data, collaboration, and strategic goals.

Our business case:

SECTION 5: DETERMINING AN AIM STATEMENT

Instructions: Use the following prompts to facilitate group discussion about the problem that your team is trying to address. Use this information to develop an aim statement by completing the statement on the following page. Example is in Appendix E.

A good aim statement will be SMART (**S**pecific, **M**easurable, **A**ttainable, **R**elevant, and **T**ime-bound).

<p>Specific</p> <ul style="list-style-type: none"> • <i>Population or site of study</i> • <i>Who is being affected?</i> • <i>Where is it being tested (e.g., unit, department, locations)?</i> 	
<p>Measurable</p> <ul style="list-style-type: none"> • <i>Aim for quantitative over qualitative measures</i> • <i>How much improvement is predicted?</i> 	
<p>Actionable</p> <ul style="list-style-type: none"> • <i>Do team members agree this goal is realistic and actionable?</i> 	
<p>Relevant</p> <ul style="list-style-type: none"> • <i>What is issue is being tested or targeted for change?</i> • <i>Do team members agree this is a relevant problem?</i> 	
<p>Time-bound</p> <ul style="list-style-type: none"> • <i>Specify a time frame</i> • <i>When is it being tested?</i> • <i>What is the target date for achievement?</i> 	

Be as specific as possible as your team fills in the blanks for the below statement.

We will: Improve / Increase / Decrease / other indication of change (specify)

the: percentage or rate / number or amount / quality defined as (specify)

of: clinical problem / family-centered issue / team issue / other issue

in: patient population / family population / staff scenario / other (specify)

from: Baseline %age or rate / # or amount / quality define as (specify)

to: Target value %age or rate / # or amount / quality defined as (specify)

by: Target dates for achieving overall Project / SMART Aim

SECTION 6: MAPPING A PROCESS AND DEFINING SCOPE

Multiple types of process maps exist. Determine the type of process map the team will use (i.e., Suppliers-Input-Process-Output-Customer (SIPOC), high-level, detailed, swim lane, relationship, or value stream). We recommend using either a SIPOC, high level or detailed process map.

Process mapping: SIPOC

Instructions:

1. Ensure all key stakeholders are represented for discussion.
2. Define the “start” and “stop” of the process (i.e., process scope).
3. Identify high level steps (i.e., not more than 7-10 steps) in the process and write them in the “process” column.
4. For each step in the process, attempt to identify the “input” and “supplier” of each input. A supplier is the people or entities that provide inputs to the process. An input is the things that the process requires to normally function.
5. For each step in the process, identify the “output” and “customer” of each output. An output is the thing that the process produces. The customer is the people or entities that receive outputs from the process.
6. Review the SIPOC for accuracy and completeness.

Example is in Appendix F.

What is your process scope?

START of process	
STOP of process	

What is your project scope?

Locations or people included or affected	
Any exclusions	



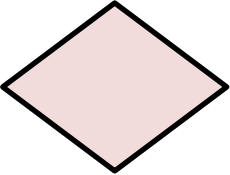
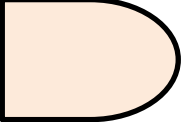
Process mapping: High-level and detailed

NOTE: The below process should be done twice. First, outline the current or actual process. Then, outline the desired process. This will allow the team to identify areas of opportunity.

High-level process maps provide an overview of a process and generally include less than 10 steps. Detailed process maps provide an in-depth view of different steps in the high-level process map.

Instructions:

1. Ensure all key stakeholders are represented for discussion.
2. Identify the start and stop of your process (i.e., scope).
3. Detail the tasks (or processes), decisions, and delays in each functional area. Note that decisions should be binary (yes or no).
4. Diagram the start, stop, tasks (or processes), decisions, and delays using the process map symbols.
5. Connect steps with arrows.
6. Review the completed process map with your team and consider “walking the process” to determine if it is an accurate reflection of the actual or desired process.

Process map symbols	
	Task or functional area of the process
	Start and stop of the process
	Decision point (Note: only 2 arrows should come out of a decision point)
	Delay or waiting before the next task or decision can occur

SECTION 7: DEVELOPING A KEY DRIVER DIAGRAM

A project's key driver diagram describes your team's theory of changes which will result in achieving the project aim. It also helps identify your project's measures (i.e., aim is the main outcome measure, primary and secondary drivers are often process measures). A key driver diagram is a living document and may change based on results obtained through testing interventions.

Instructions:

1. Enter your project title and date in the identified areas.
2. Write your SMART aim statement in the red box under "Aim".
3. Brainstorm for potential contributing factors with your team.
4. Group the factors into themes which will become your primary drivers. Write each theme in a yellow box under "Primary drivers (key drivers)".
5. Secondary drivers must be measurable and attainable. Write each individual factor in a green box under "Secondary drivers (interventions)".
6. Draw arrows from the secondary drivers (interventions) to each primary driver (key driver) that it influences. For strong relationships draw solid lines. For weaker relationships draw dotted lines.

Example is in Appendix G.

For idea generating techniques in a group see Tool I.

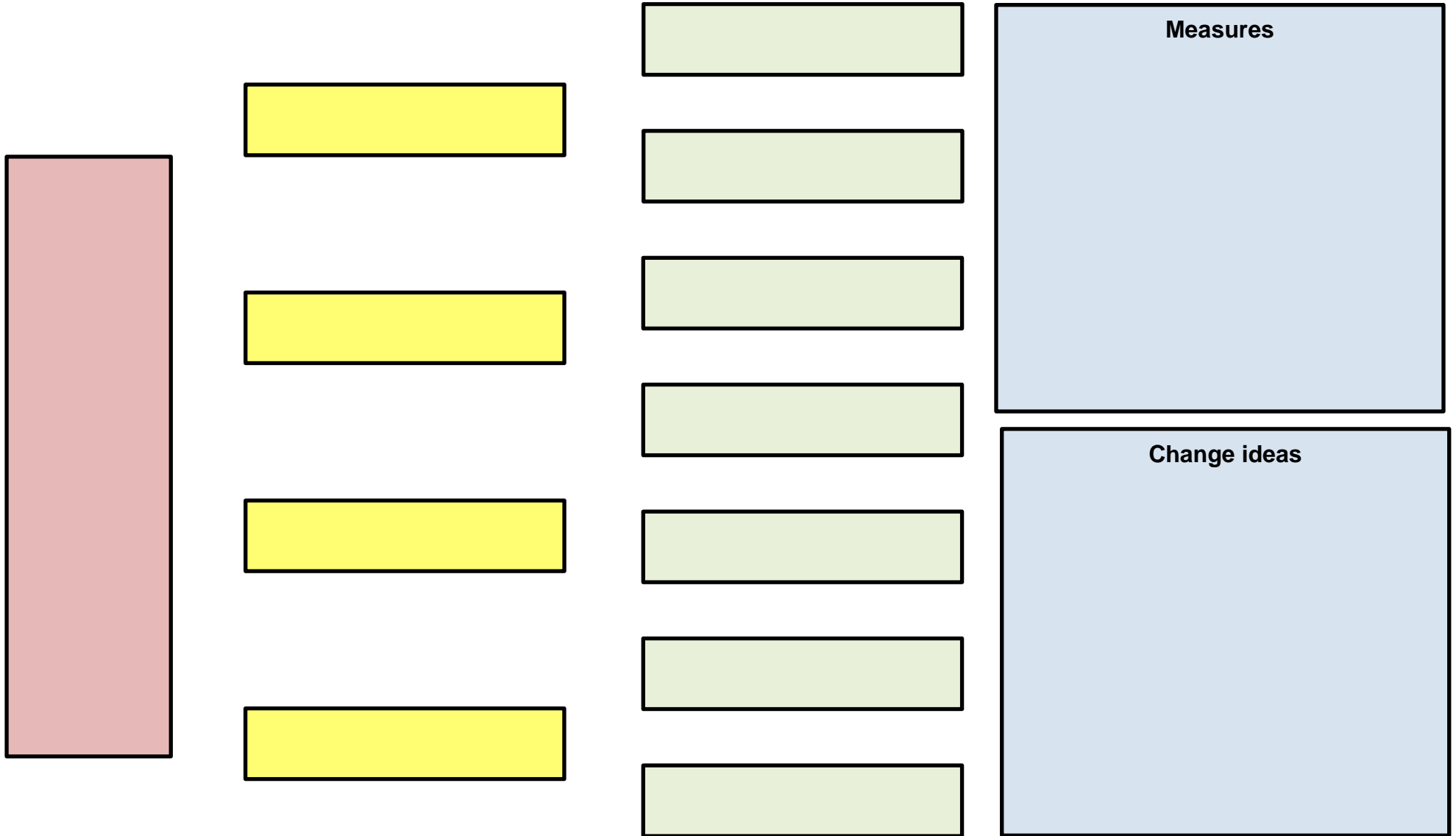
Project title / date:
AIM statement

Primary driver (Key driver)

Secondary driver (Interventions)

This extended version of the key driver diagram may be useful to summarize process measures and change ideas.

Project title / date:



SECTION 8: DETERMINING PROJECT MEASURES

Instructions:

1. Identify a name for each measure.
2. Discuss what you are trying to measure for each named measure. Come to a consensus on the operational definition (i.e., what you are measuring) for each measure. Include a numerator, denominator, and what should be included and excluded.
 - a. It is important for all data abstractors to be able to consistently collect accurate measures (i.e., having the same understanding about a measure and collecting data in the same way).
 - b. The operational definition is a clear, concise, detailed definition of a measure which is free from ambiguity (e.g., determining criteria for what is complete, defective, or an error). If the operational definition is not a percent or rate, determine how the calculation, score, or criteria is derived to determine accuracy of the measure.
3. Identify if each measure is a process, outcome, or balancing measure. The goal is to identify, at minimum, 1-2 process, 1-2 outcome, and 1 balancing measures for your project.
 - a. Process measure (i.e., Are the parts or steps in the system performing as planned? Are we on track in our efforts to improve the system?)
 - b. Outcome measure (i.e., How does the system impact the values of patients, their health, and wellbeing? What are the impacts on other stakeholders such as payers, employees, or the community?)
 - c. Balancing measure (i.e., Are changes designed to improve one part of the system causing new problems in other parts of the system?)
4. Identify the key quality characteristic(s) for each measure (e.g., accuracy, appropriateness, competency, efficiency, effectiveness, equity, safety, timeliness). If the quality characteristic is not listed, describe the it briefly.
 - a. Safety (i.e., avoid injuries to patients from the care that is intended to help them)
 - b. Effectiveness (i.e., match care to science by avoiding overuse of ineffective care and underuse of effective care)
 - c. Patient-centered (i.e., honoring the individual and respect choice)
 - d. Timeliness (i.e., reduce waiting for both patients and those who give care)
 - e. Efficiency (i.e., reduce waste)
 - f. Equity (i.e., close racial and ethnic gaps in health status)
5. Determine the data collection plan. Consider the audience receiving the data summary when determining data display, format, and frequency. Be specific and include the following:
 - a. Frequency (e.g., daily, monthly, quarterly, by shift)
 - b. Method (e.g., manual abstraction, EPIC or other automated data report). If sampling is being done, describe the sampling plan.
 - c. Sources of data (e.g., electronic medical record, log, survey, interview)
 - d. Person responsible for data collection
 - e. Data display method (e.g., table, bar chart, run chart, Pareto chart, pie chart, histogram)
6. Identify the current state (i.e., baseline) of each measure, if possible. If it is unknown, write NA in the column.
7. Identify the goal or benchmark for each measure, and if possible, describe the source. Example is in Appendix H.

Adapted from FPQC Boot camp “Measurement grid” worksheet, UHC “Measure development” worksheet, IHI (www.ihl.org), and R.Lloyd. *Quality Health Care: A Guide to Developing and Using Indicators*. Jones and Bartlett, 2004.

Measure name	Operational definition	Type of measure	Quality characteristic	Data collection plan	Current state	Goal
	<i>Numerator:</i>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<i>Frequency:</i> <i>Method:</i> <i>Source:</i> <i>Person:</i> <i>Data display method:</i>		
	<i>Denominator:</i>					
	<i>Numerator:</i>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<i>Frequency:</i> <i>Method:</i> <i>Source:</i> <i>Person:</i> <i>Data display method:</i>		
	<i>Denominator:</i>					
	<i>Numerator:</i>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<i>Frequency:</i> <i>Method:</i> <i>Source:</i> <i>Person:</i> <i>Data display method:</i>		
	<i>Denominator:</i>					
	<i>Numerator:</i>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<i>Frequency:</i> <i>Method:</i> <i>Source:</i> <i>Person:</i> <i>Data display method:</i>		
	<i>Denominator:</i>					

Adapted from FPQC Boot camp "Measurement grid" worksheet, UHC "Measure development" worksheet, IHI (www.ihf.org), and R.Lloyd. *Quality Health Care: A Guide to Developing and Using Indicators*. Jones and Bartlett, 2004.

Measure name	Operational definition	Type of measure	Quality characteristic	Data collection plan	Current state	Goal
	<p><i>Numerator:</i></p> <hr style="border-top: 1px dashed black;"/> <p><i>Denominator:</i></p>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<p><i>Frequency:</i></p> <p><i>Method:</i></p> <p><i>Source:</i></p> <p><i>Person:</i></p> <p><i>Data display method:</i></p>		
	<p><i>Numerator:</i></p> <hr style="border-top: 1px dashed black;"/> <p><i>Denominator:</i></p>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<p><i>Frequency:</i></p> <p><i>Method:</i></p> <p><i>Source:</i></p> <p><i>Person:</i></p> <p><i>Data display method:</i></p>		
	<p><i>Numerator:</i></p> <hr style="border-top: 1px dashed black;"/> <p><i>Denominator:</i></p>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<p><i>Frequency:</i></p> <p><i>Method:</i></p> <p><i>Source:</i></p> <p><i>Person:</i></p> <p><i>Data display method:</i></p>		
	<p><i>Numerator:</i></p> <hr style="border-top: 1px dashed black;"/> <p><i>Denominator:</i></p>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<p><i>Frequency:</i></p> <p><i>Method:</i></p> <p><i>Source:</i></p> <p><i>Person:</i></p> <p><i>Data display method:</i></p>		

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Measure name	Operational definition	Type of measure	Quality characteristic	Data collection plan	Current state	Goal
	<p><i>Numerator:</i></p> <hr/> <p><i>Denominator:</i></p>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<p><i>Frequency:</i></p> <p><i>Method:</i></p> <p><i>Source:</i></p> <p><i>Person:</i></p> <p><i>Data display method:</i></p>		
	<p><i>Numerator:</i></p> <hr/> <p><i>Denominator:</i></p>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<p><i>Frequency:</i></p> <p><i>Method:</i></p> <p><i>Source:</i></p> <p><i>Person:</i></p> <p><i>Data display method:</i></p>		
	<p><i>Numerator:</i></p> <hr/> <p><i>Denominator:</i></p>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<p><i>Frequency:</i></p> <p><i>Method:</i></p> <p><i>Source:</i></p> <p><i>Person:</i></p> <p><i>Data display method:</i></p>		

Any other data which will be collected (e.g., patient or demographic information):

SECTION 9: DOCUMENTING A PROJECT CHARTER

Instructions:

1. Use the previously developed project documents to complete the project charter.
 - Problem statement (Section 1)
 - Business case (Section 4)
 - Aim statement (Section 5)
 - Project and process scope (Section 5)
 - Identified gaps in care and potential barriers to success (Section 2)
 - Key metrics (Section 9). Include a maximum of 5 measures, 1 of which should be the outcome measure and the main key drivers.

2. Discuss the following issues with your team:
 - Communication plan including the purpose (e.g., share monthly or quarterly results, seek feedback), method(s) (i.e., e-mail, shared file), and scheduled meeting(s) frequency (e.g., every 2 weeks, every month).
 - Project deliverables or milestones
 - Budget and anticipated resources
 - Dashboard appearance and included metrics

3. List members of the core team and other key team members, including an e-mail address.
 - The Project champion may be a Physician in a clinical project or an Administrator in a non-clinical project.
 - The Project facilitator is generally responsible for data collection, reporting, and analysis.
 - Patients, caregivers, or family members are encouraged to be team members.

Example is in Appendix I.

Project title:			
Timeline: <i>Start date:</i>		<i>End date:</i>	
Problem statement:			
Business case:			
Aim statement:			
Project scope: <i>Included:</i> <i>Excluded:</i> <i>Patient areas or locations for testing:</i> Process scope: <i>Start:</i> <i>Stop:</i>			
Identified gaps in care:			
Potential barriers to success:			
Key metrics			
Measure name	Type of measure	Baseline	Goal
	Outcome		
Communication: <i>Purpose:</i> <i>Method(s):</i> <i>Scheduled meeting(s) frequency:</i>			
Project deliverables:			

Core team members		
Role	Name	E-mail
Sponsor		
Project champion		
Project facilitator		
Physician champion		
Resident or Fellow champion		
Other key team members:		
Conditions for Determination of QA/QI Status*		
The primary intent of this project is not peer-reviewed publication, and if publication of the results was prohibited, the project would still have merit as a QA/QI effort	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The purpose is to improve the quality of the program under investigation by assessing and encouraging standard medical care or educational goals.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The principal investigator has both clinical supervisory responsibility and the authority to impose a corrective plan based on the outcomes of the project.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The project does not involve prospective assignment of patients to different procedures or therapies based on a predetermined plan, such as randomization.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The project does not involve a "control group", in which therapeutic or study intervention is intentionally withheld to allow an assessment of its efficacy.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
The project does not involve the prospective evaluation of a drug, procedure, or device that is not currently approved by the Food and Drug Administration for general use (including "off-label" indications).	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Participants won't be exposed to additional physical, psychological, social, or economical risks or burdens (beyond patient satisfaction surveys) to make the results of the project generalizable.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Adequate protections are in place to maintain confidentiality of the data to be collected, and there is a plan for who can access any data containing participant identifiers.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Note: If all responses are "Yes", the project is approved as QA/QI status. If any answer is "No", the project must be submitted to the Institutional Review Board (USF and TGH) for approval.		
*Cioletti A, Marko K, Berger JS. <i>Institutional Review Board Checklist for Trainee Quality Improvement Project Approvals</i> . Journal of Graduate Medical Education, 2017: 371-72.		

SECTION 10: DETERMINING THE NEXT PDSA OR DMAIC CYCLES

PDSA stands for Plan-Do-Study-Act and is the model used by the Institute of Quality Improvement. DMAIC stands for Define-Measure-Analyze-Improve-Control and is the model used by Six Sigma methodology. These are comparable methods, and both are acceptable models to design, implement, and study interventions.

PDSA	DMAIC
Plan	Define Measure Analyze
Do	Improve
Study Act	Control

Instructions: Use the following question prompts to facilitate group discussion.

PDSA/DMAIC example is in Appendix J.

Determining interventions to target can be aided with the use of a prioritization matrix. Prioritization matrix instructions and example is in Appendix K.

Methods of root-cause analysis can be helpful when analyzing data or a problem. Useful techniques include the 5-Whys and Fishbone. Instructions and an example of 5-Whys technique is in Tool II and Fishbone technique is in Tool III.

PDSA/DMAIC WORKSHEET

Cycle: **Start date for cycle:** **End date for cycle:**

Project SMART aim:

What question will this test of change answer *(What are we trying to accomplish?)?*

What key driver does this change impact?

PLAN OR DEFINE-MEASURE-ANALYZE

What changes can we make that will lead to improvement?

Describe changes we plan to test

Who are stakeholders for this cycle?

Tasks needed to implement these changes *(How will we make this change happen?)*

Task	Who is responsible <i>Consider locations the changes will affect</i>	Due date

Measures for this cycle *(How will we know that a change is an improvement)*

Consider: balancing measures, measures to determine whether the prediction succeeds, and your goal is achieved, how data will be collected & who is responsible for collecting data. You may find it easier to cut and paste from your measurement grid.

DO OR IMPROVE

What happened when the test was conducted?

Was the cycle carried out as planned (yes, no)?

What did you observe (i.e., qualitative feedback from the team)?

What did you observe that was not part of the plan?

STUDY OR CONTROL

Did the measured results and observations meet your objective?

Was your goal achieved (yes, no)?

How do results of this test compare to previous performance?

If YES

- **Do you plan to expand the test** (yes, no)?
- **Will you expand the scale** (i.e., keep the same conditions, just test more)?
- **Will you expand the scope** (i.e., change the conditions)?
- **Will you expand the scale and scope** (i.e., change locations/units and conditions)?

If NO

- **What data do you have to distinguish if your method of testing the change failed or if the designed change was not effective?**

Were there any barriers with the cycles' implementation (yes, no)?

What else did you learn?

ACT OR CONTROL

Decide to Abandon, Adapt, or Adopt?

	ABANDON: Discard change idea testing. Describe what you will change.
	ADAPT: Improve the change & continue a larger scale. Develop an implementation plan for sustainability.
	ADOPT: Select changes to implement on & try a new one

APPENDIX A: PROBLEM STATEMENT EXAMPLE

A good problem statement will meet the following criteria

- Focuses only on one problem
- Represents a solvable problem, but does not offer solutions
- Clear and concise (i.e., 1-2 sentences)
- Devoid of assumptions

Compliance with sepsis-related guidelines at TGH is suboptimal, leading to increased patient mortality and cost. The Vizient database comparison of academic medical centers reports TGH's compliance with SEP-1 bundle was below average in performance, and Sepsis Mortality Index was in the lowest quartile (AY 2016).

Debriefings have many advantages including improved teamwork, communication, and improved patient survival. In 2015, TGH reported 261 Code Blue events. Debriefings are not consistently occurring after inpatient TGH Code Blue events.

The TGH NICU's VON 2015 data showed the average growth velocity at initial disposition for infants with a birthweight ≥ 1500 g or with a birth gestational age ≤ 30 weeks was 12.6 g/kg/day, which was below the VON mean growth velocity (12.8 g/kg/day).

APPENDIX B: GAP ANALYSIS EXAMPLE: Blood culture draw technique

MUST COMPLETE			OPTIONAL	
Potential best practice(s)	Current practice(s)	Practice gap (Yes/No)	Barriers to consistent implementation of best practice(s)	Feasible (Yes/No)
Culture drawn by specially trained phlebotomy team (Strength of evidence: moderate) ¹⁻⁷ <ul style="list-style-type: none"> o Significant decrease in contamination rates with dedicated, specially trained teams⁸ o Phlebotomy teams becoming more common (70% cultures obtained by teams in teaching hospitals, 85% in non-teaching hospitals)⁸ o Part of bundle demonstrated decrease in contaminated blood culture rate in Pediatric ER⁹ 	Not stated in TGH NICU policy	Yes	<ul style="list-style-type: none"> • Resources – staffing to support this model • Determining consistency of practice on all neonates throughout the hospital (i.e., NICU, Newborn Nursery, Pediatric floor, Pediatric ER) 	Yes
Hand hygiene prior to blood draw (Strength of evidence: high)	<ul style="list-style-type: none"> • Addressed in policy • Compliance audited by TGH Infection Prevention 	No	NA	NA
Monitor contamination rates and provide direct feedback (Strength of evidence: moderate) ^{1,7} <ul style="list-style-type: none"> • Demonstrated decrease in contamination rate⁹ • Used feedbacks as part of bundle¹⁰ 	Not done	Yes	<ul style="list-style-type: none"> • Difficult to ascertain who drew the blood culture (i.e., oftentimes RN who “status specimen” is not the person who drew the culture) • Need to find way to capture information in order to provide feedback 	Yes

¹ Bekeris et al, 2005. ² Mermel et al, 2009. ³ Mtnthama, et al, 2008. ⁴ Roth et al, 2010. ⁵ Schifman et al, 1998. ⁶ Synder et al, 2012. ⁷ CAP, 2008. ⁸ Hall and Ryman, 2006. ⁹ Marini and Truog, 2013. ¹⁰ Larkin, 2006.

APPENDIX C: STAKEHOLDER ANALYSIS EXAMPLE

Action or Task for accidental extubations project	Bedside RN (AM, PM shifts)	Transport RN	RT (AM, PM)	Medical team (Attending, Fellow, NP)	NICU Nurse manager	Medical director	Parents	OT				
Positioning & restraints	A		R	I	I	I	I	C				
Taping procedures	A/R	R	R	I	I	I						
Confirming ET tube depth	R	R	A/R	I								
Complying with extubation guidelines	I	I	A	R		I						
Managing patient agitation	R		I	A		I						
Assessing feeding tolerance	A			R	I							
Presence at bedside procedures: Imaging	A	I	I	R	I							
Presence at bedside procedures: LP, UVC, UAC	R	I	I	A								
Presence at bedside procedures: PICC	R	A	I	R								

R: Responsible, A: Accountable, C: Consulted, I: Informed

APPENDIX D: BUSINESS CASE EXAMPLE

There are number of ways to structure a business case. Below are a few examples.

Vanderbilt University Medical Center:

- **Cost savings:** Data from processes can be used to illustrate cost savings to payers and administrators. For example, the foot exam rate improved from 17% to 80%, thereby reducing amputation risk. These data can also support the argument that departmental results can be replicated system-wide, to whole patient populations, and across institutions.
- **Marketing:** Hospitals can use improved care data to market services to patients. For example, rates of blood pressure treated to target (systolic blood pressure less than 130 mmHg and diastolic blood pressure less than 80 mmHg), low density lipoprotein to target (less than 100 mg/dl), and A1C to target (less than 7%) were all improved in patients at Vanderbilt University Medical Center.

University of Cincinnati Academic Health Center

- **Uncompensated care is reduced.** The University of Cincinnati Academic Health Center's internal medicine team used hospital and clinic data gathered because of PDSA projects to demonstrate how the Chronic Care Model reduces emergency department visits and admissions for uninsured patients.
- **The Chronic Care Model aligns with key hospital objectives.** Cincinnati Children's Hospital Medical Center has a national reputation for its improvement work. The Chronic Care Collaborative was well aligned with the hospital's organizational strategy and viewed as a mechanism for further improving outpatient care and residency education.
- **The Chronic Care Model addresses ACGME requirements.** Residency programs are working under six ACGME competencies that include System-Based Practice and Practice-Based Learning and Improvement. A chronic care collaborative fits well within these aims and offers a proven approach for improving resident education.
- **Chronic Care Model projects enhance resident recruitment.** Increasingly, residents are interested in novel, forward-looking programs that will equip them with skills in leadership and quality improvement. One resident actively involved at Cincinnati's medicine-pediatrics team reported that her job interviews went particularly well when she explained her role in a successful performance improvement initiative.
- **Chronic Care Model projects can generate positive public recognition.** Project leaders at the University of Cincinnati Academic Health Center actively promoted their Chronic Care Model work locally and at national meetings.
- **The Chronic Care Model develops leadership in health care change.** Administrators at the University of Cincinnati Academic Health Center went out of their way to support Chronic Care Model work in part because they wanted to help a group of passionate residents and their faculty succeed.

On average, each hospitalized patient with a MRSA infection in 2004 resulted in a 10-day length of stay (vs. 4.6 days for all other stays) and cost was on average \$14,000 (vs. \$7,600 for all other stays).

An infection with MRSA costs between \$4,000-\$19,000 more than an infection with MSSA (methods and results vary between studies).

APPENDIX E: AIM STATEMENT AND SCOPE EXAMPLE

A good aim statement will be SMART (**S**pecific, **M**easurable, **A**ttainable, **R**elevant, and **T**ime-bound).

By 6/2019, we will improve TGH's compliance with the SEP-1 bundle¹ to the current average academic medical center performance of 35%.

¹ SEP-1 bundle includes the following: obtaining a lactate level and repeating the lactate if the initial measure is elevated; obtaining a blood culture before antibiotics are administered; providing broad-spectrum antibiotics in a timely manner; appropriate fluid resuscitation; appropriate management of hypotension; and documentation of response to interventions.

- Process scope start: any patient ≥ 18 years old at TGH identified with a sepsis diagnosis
- Process scope end: patient disposition (i.e., transfer, discharge, death)

By 4/2017, TGH Code Blue teams will improve compliance with having a documented Code Blue in $\geq 50\%$ of Code Blue events.

- Process scope start: time Code Blue notification is sent (i.e., pager, overhead alert)
- Process scope end: time the intern/resident completes the Code Blue debriefing documentation

By 5/2017, we will increase the growth velocity at initial disposition for $\geq 70\%$ of infants with birthweight < 1500 g or with a birth gestational age ≤ 30 weeks, to ≥ 13.2 g/kg/day (VON's top quartile).

- Process scope start: any infant admitted to TGH NICU
- Process scope ends: initial disposition (i.e., transfer, discharge, death)

APPENDIX F: Process map example – SIPOC

Supplier	Input	Process	Output	Customer
		Start: Patient arrives in ED		
Trauma Bay	Patient	Process steps	Patient diagnosis	Floor
ED			Treatment plan	Nursing home/LTAC
Doctor			Medication reconciliation	
EMS			Handoff	
Transfer hospital				
		End: Patient discharged from ED		

Emergency Room SIPOC				
Suppliers	Inputs	Process	Outputs	Customer
Patient	Medical Records	Patient Arrival to ED	Discharge Documents	Patient
Triage Nurse	Patient Symptoms	Triage patient	Prescriptions	ED Doctor/Hospitalist
Registration Clerk	Rx Information	Register Patient	Physician Notes	ED Manager
Nurse	Insurance Data	Assign Patient to Room	ED Activity Log	Orderly/Nurse/Aid
ED Doctor/Hospitalist	ED Activity Log	Assign Physician	Empty ED Room	Lab Personnel
	Room Data	Physician Examines Patient		
		Physician Orders Tests		
		Physician Treats Patient		
		Physician Discharges Patient		

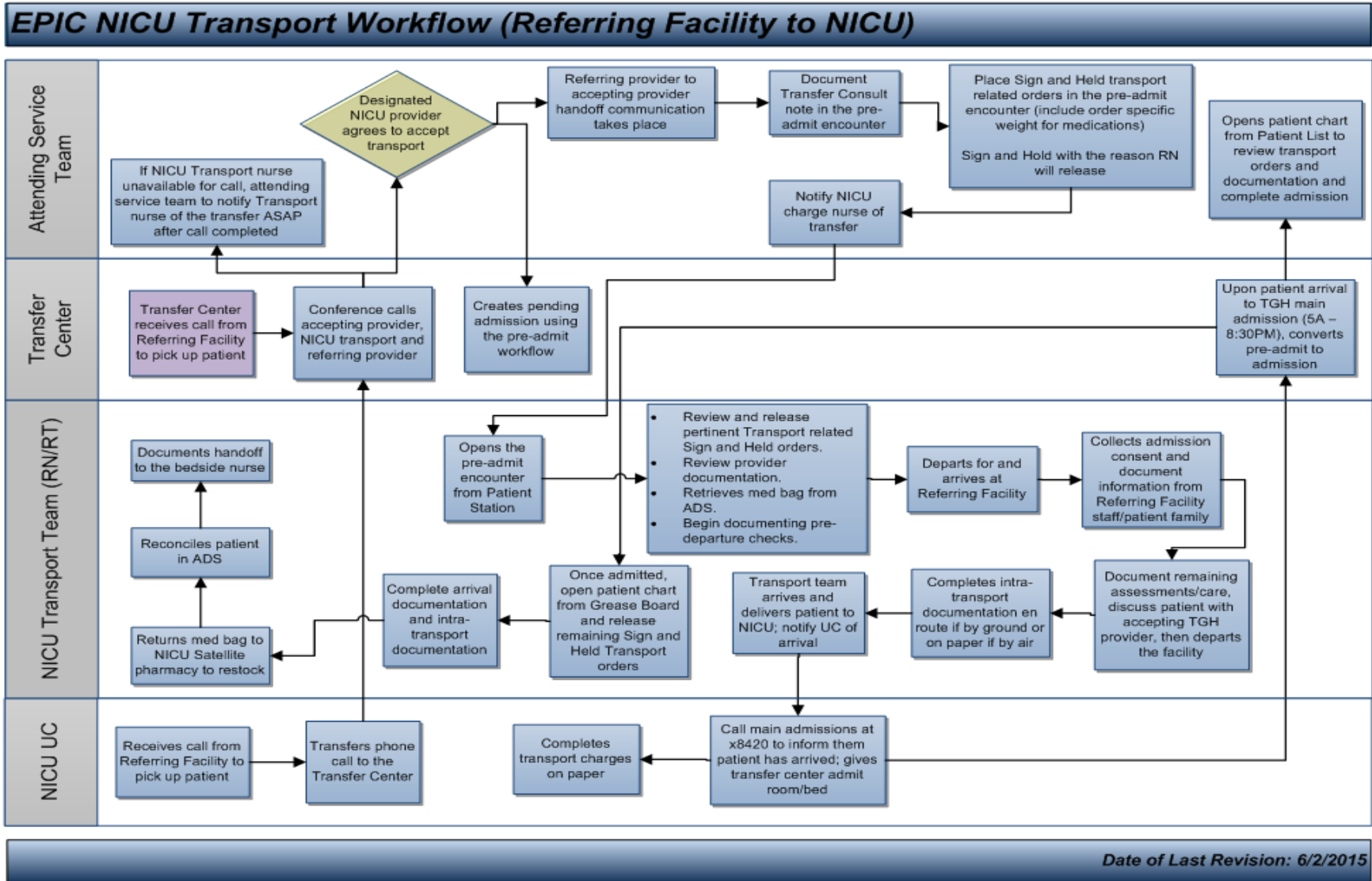
Example from: <https://www.slideshare.net/mfloriani/healthcare-six-sigma-project>

SIPOC example (continued)

Table 1: Sample SIPOC – Inbound Call Handling Process in a Call Center				
Supplier	Input	Process	Output	Customer
<ul style="list-style-type: none"> • Client • Call Center • End customer 	<ul style="list-style-type: none"> • Calls • Phones • Headsets with microphones • Standard scripts • Standard operating procedures (SOPs) • Call quality guidelines • Process training • Access to CRM and customer information • Empowerment to resolve issues 	<ul style="list-style-type: none"> • Start call with standard greeting • Understand the query/request/complaint • Verify the customer's identity • Check for relevant information • Provide solution while on call • Document call with appropriate codes • Provide reference number for requests/complaints • End the call 	<ul style="list-style-type: none"> • Resolution/assurance of resolution of customer issue • Good customer experience 	<ul style="list-style-type: none"> • End customer • Client • Organization

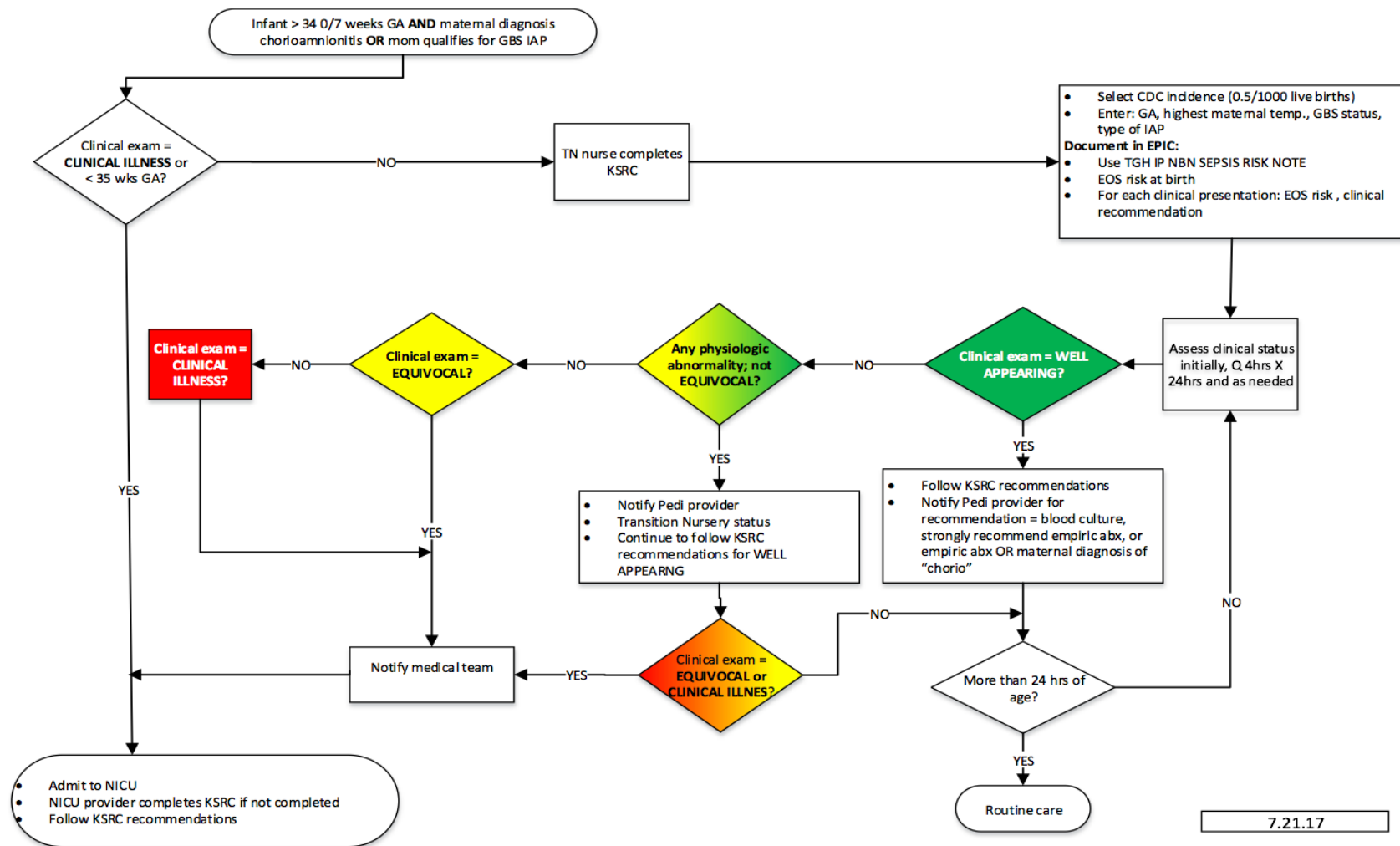
Example from: <https://www.isixsigma.com/tools-templates/sipoc-copis/sipoc-beyond-process-mapping/>

PROCESS MAP EXAMPLE – SWIM LANE

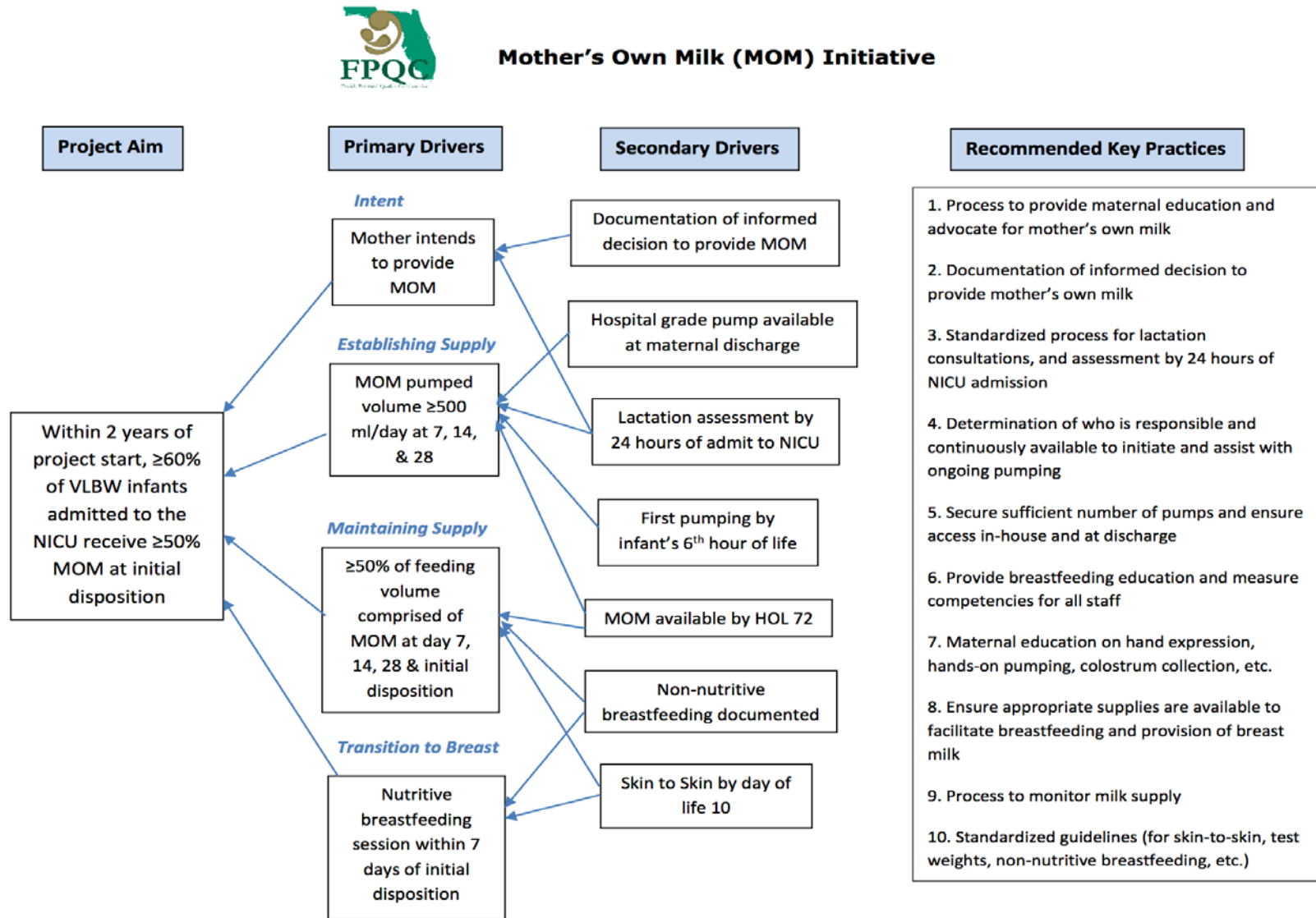


PROCESS MAP EXAMPLE – DETAILED

KAISER SEPSIS RISK CALCULATOR PROCESS FLOW



APPENDIX G: KEY DRIVER DIAGRAM EXAMPLE



APPENDIX H: MEASUREMENT GRID EXAMPLE

Measure name	Operational definition	Type of measure	Quality characteristic	Data collection plan	Current state	Goal
Mother's own milk pumped volume is >500 ml on day of life 7	<i>Numerator:</i> Number of infants whose mother's own milk pumped volume is >500 ml on day of life 7	<input checked="" type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input checked="" type="checkbox"/> Effectiveness <input checked="" type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<i>Frequency:</i> once per infant (day 7) <i>Method:</i> interview mother (in person or by phone) <i>Source:</i> mother <i>Person:</i> NICU Primary lactation specialist <i>Data display method:</i> Bar chart	unknown	>50% improvement from baseline (higher is better)
	<i>Denominator:</i> Total number of included infants					
Antibiotic mismatch	<i>Numerator:</i> Patient being treated with an antibiotic that identified organism is not susceptible to	<input checked="" type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input checked="" type="checkbox"/> Safety <input checked="" type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input checked="" type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<i>Frequency:</i> Weekly <i>Method:</i> Chart review <i>Source:</i> EMR, EPIC late-onset sepsis data report <i>Person:</i> NICU Antimicrobial stewardship committee <i>Data display method:</i> Pie chart	10%	<5% (lower is better)
	<i>Denominator:</i> All patients treated for culture positive late-onset sepsis					
Antibiotic usage	<i>Numerator:</i> Number of >34-week gestational age infants with maternal h/o chorioamnionitis \pm qualifying for intrapartum GBS prophylaxis AND receiving antibiotics in the first 3 days of life	<input type="checkbox"/> Process <input checked="" type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input checked="" type="checkbox"/> Safety <input checked="" type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input checked="" type="checkbox"/> Timely <input checked="" type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<i>Frequency:</i> weekly initially, then monthly <i>Method:</i> chart review <i>Source:</i> EMR, EPIC early-onset sepsis data report <i>Person:</i> Karen & Maya	unknown	>30% reduction from baseline (lower is better)
	<i>Denominator:</i> # of >34-week gestational age infants with a maternal chorioamnionitis \pm qualifying for intrapartum GBS prophylaxis			<i>Data display method:</i> Run chart		

Measure name	Operational definition	Type of measure	Quality characteristic	Data collection plan	Current state	Goal
Communicated with the family	<i>Numerator:</i> Number of yes debriefing survey responses to “notified family” per month	<input checked="" type="checkbox"/> Process <input type="checkbox"/> Outcome <input type="checkbox"/> Balancing	<input type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input checked="" type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<i>Frequency:</i> monthly <i>Method:</i> Review of documented debriefing survey <i>Source:</i> debriefing survey <i>Person:</i> Charlie <i>Data display method:</i> Table	20%	>75% improvement from baseline (higher is better)
	<i>Denominator:</i> Total number of debriefing surveys documented per month					
Mortality rate of C. difficile patients	Mortality rate of all patients with C. difficile lab ID positive events admitted to TGH in the specified period <i>Note: not all measures will have a numerator or denominator</i>	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input checked="" type="checkbox"/> Balancing	<input checked="" type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<i>Frequency:</i> Monthly <i>Method:</i> Electronic chart abstraction <i>Source:</i> Vizient database <i>Person:</i> TGH Quality department <i>Data display method:</i> Table	20%	<5% (lower is better)
% of resuscitated infants requiring chest compressions in the delivery room	<i>Numerator:</i> Number of included infants for whom the resuscitation team attended the delivery at your hospital and who required chest compressions in the delivery room	<input type="checkbox"/> Process <input type="checkbox"/> Outcome <input checked="" type="checkbox"/> Balancing	<input checked="" type="checkbox"/> Safety <input type="checkbox"/> Effectiveness <input type="checkbox"/> Patient-centered <input type="checkbox"/> Timely <input type="checkbox"/> Efficient <input type="checkbox"/> Equitable	<i>Frequency:</i> weekly initially, then monthly <i>Method:</i> chart review <i>Source:</i> EMR, Delivery room code record <i>Person:</i> NICU Transport Team nurse <i>Data display method:</i> Table	3%	≤3% reduction from baseline (lower is better)
	<i>Denominator:</i> Number of included infants for whom the resuscitation team attended the delivery in your hospital and who were admitted to your NICU					

Any other data which will be collected (e.g., patient or demographic information): Ordering unit, Date of admission, Date of event, Date of disposition (i.e., transport, discharge, death), Race, Ethnicity, Trigger tool method (e.g., BPA, nurse, physician)

APPENDIX I: PROJECT CHARTER EXAMPLE

Project title: Late-onset sepsis				
Timeline: Start date: 1/1/2017		End date: 6/1/2018		
Problem statement: Our NICU is not consistently compliant with our late-onset sepsis guidelines. This is important, as excessive or unnecessary use of antibiotics in neonates is associated with an increased incidence of late-onset sepsis, necrotizing enterocolitis, and the emergence of resistant microbes.				
Business case: There are multiple benefits for decreasing the use of antibiotics, including: 1. Altering the microbiome – antibiotic use has implications for immune and metabolic function; 2. Resource utilization – the process of administering antibiotics is resource-intensive (e.g., obtaining blood cultures/labs, initiating and maintaining IV access, drug preparation and administration); 3. Safety – decreased risk of extravasation injury and/or medication error; 4. Patient-centered care – decreased painful procedures (i.e., less IV access), which are upsetting to patients and families; 6. Policy – antibiotic stewardship aligns with the Joint Commission accreditation standard, which is effective 1/1/17.				
Aim statement: We will improve the compliance with the TGH NICU late-onset sepsis guidelines, for any infant with late-onset sepsis evaluation initiated at >3 days of life and admitted to our NICU. By 6/2018, we will have 50% improvement in compliance with all 4 elements of our late-onset sepsis bundle ¹ . ¹ Late-onset sepsis bundle = documented indication for evaluation, appropriate initial antibiotic selection, appropriate initial evaluation considered based on documentation, and appropriate de-escalation of antibiotics.				
Project scope: Infant's NICU admission from >3 days of life to initial disposition <i>Included:</i> any infant with late-onset sepsis evaluation initiated >3 days of life and admitted to TGH's NICU <i>Excluded:</i> infants with major congenital anomalies or requiring pre-operative/post-operative antibiotics <i>Patient areas, locations for testing, or units impacted:</i> NICU, Pharmacy, Lab (micro), IT support, Pediatric Infectious Disease, Family				
Process scope: <i>Start:</i> Infant >3 days of life and admitted to NICU <i>Stop:</i> Initial disposition				
Identified gaps in care: documented indication for evaluation, appropriate initial antibiotic selection, appropriate initial evaluation considered based on documentation, and appropriate de-escalation of antibiotics Potential barriers to success: Resistance (medical team, nursing), knowledge gaps, fear of patient harm by not continuing antibiotic administration				
Key metrics				
	Measure name	Type of measure	Baseline	Goal
	Compliance to all 4 elements of the late-onset sepsis bundle	Outcome	?	>75%
	Documented reason for evaluation	Process	20%	>90%
	Appropriate initial antibiotic selection	Process	50%	>90%
	Appropriate evaluation considered based on documentation	Process	?	>90%
	Appropriate de-escalation of antibiotics	Process	60%	>95%

Communication:

Purpose: Communicate detailed results to core team for analysis, discussion, and generation of PDSA cycles; Communicate general results and next selected interventions to all stakeholders

Method(s): In person, e-mail, Skype

Scheduled meeting(s) frequency: NICU Best Practice (monthly), Core team meeting (initially every 2 weeks, then monthly), Pediatric CPIT

Project deliverables: Compliance with all 4 elements of the late-onset sepsis bundle, Antibiotic stewardship team effectiveness (compliance with weekly interprofessional team meetings, # of recommendations made, % of recommendations followed)

Core team members

Role	Name	E-mail
Sponsor	Maya Balakrishnan	mbalakri@health.usf.edu
Project champion	Terri Ashmeade	tashmead@health.usf.edu
Project facilitator	Karen Fugate	kfugate@tgh.org
Physician champion	Laura Haubner	lhaubner@tgh.org
Resident or Fellow champion	Linda Smith	lsmith@health.usf.edu

Other key team members: Pediatric ID physician, NICU Pharmacist, EPIC Information Technology support, TGH Business Intelligence

Conditions for Determination of QA/QI Status*

The primary intent of this project is not peer-reviewed publication, and if publication of the results was prohibited, the project would still have merit as a QA/QI effort	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
The purpose is to improve the quality of the program under investigation by assessing and encouraging standard medical care or educational goals.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
The principal investigator has both clinical supervisory responsibility and the authority to impose a corrective plan based on the outcomes of the project.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
The project does not involve prospective assignment of patients to different procedures or therapies based on a predetermined plan, such as randomization.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
The project does not involve a "control group", in which therapeutic or study intervention is intentionally withheld to allow an assessment of its efficacy.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
The project does not involve the prospective evaluation of a drug, procedure, or device that is not currently approved by the Food and Drug Administration for general use (including "off-label" indications).	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Participants won't be exposed to additional physical, psychological, social, or economical risks or burdens (beyond patient satisfaction surveys) to make the results of the project generalizable.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Adequate protections are in place to maintain confidentiality of the data to be collected, and there is a plan for who can access any data containing participant identifiers.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Note: If all responses are "Yes", the project is approved as QA/QI status. If any answer is "No", the project must be submitted to the Institutional Review Board (USF and TGH) for approval.

*Cioletti A, Marko K, Berger JS. *Institutional Review Board Checklist for Trainee Quality Improvement Project Approvals*. Journal of Graduate Medical Education, 2017: 371-72.

APPENDIX J: PDSA/DMAIC WORKSHEET**Cycle:** 4**Start date for cycle:** 8/1/14**End date for cycle:** 8/31/14

Project SMART aim: By 12/2017, infants born at >34 weeks gestational age who are admitted to TGH's NICU will have a decreased average length of hospital stay 50% over baseline (from 30 days to 15 days).

What question will this test of change answer (*What are we trying to accomplish?*)?

Decrease methadone initiation dose and encourage weans by 20-25% of the total daily methadone dose.
Rationale: Based on current pharmacologic algorithm, the minimum length of stay is 15 days, which we have successfully sustained. Infants are tolerating the current pharmacologic management strategy without complications.

What key driver does this change impact?

Standardize pharmacologic management

PLAN OR DEFINE-MEASURE-ANALYZE

What changes can we make that will lead to improvement?

Describe changes we plan to test

- Person responsible for implementing changes: NICU Medical team
- Due date for implementing change: 8/5/17
- Educate NICU medical team, nurses, & pharmacists regarding change in pharmacologic strategy
- Interview representatives from each stakeholder group to determine if there are any concerns with the proposed intervention
- Update NAS pharmacologic management algorithms (initiation and weaning)
- Update NAS Best Practice guideline

Who are stakeholders for this cycle? All included NAS infants, Nurse, NICU Medical team, Pharmacist

Tasks needed to implement these changes (*How will we make this change happen?*)

Task	Who is responsible <i>Consider locations the changes will affect</i>	Due date
Educate NICU medical team, nurses, & pharmacists regarding change in pharmacologic strategy	Karen	8/5/17
Interview representatives from each stakeholder group to determine if there are any concerns with the proposed intervention	Karen	8/4/17
Update NAS pharmacologic management algorithms (initiation and weaning)	Maya	8/2/17
Update NAS Best Practice guideline	Maya	8/2/17

Measures for this cycle (*How will we know that a change is an improvement*)

Consider: balancing measures, measures to determine whether the prediction succeeds, and your goal is achieved, how data will be collected & who is responsible for collecting data. You may find it easier to cut and paste from your measurement grid.

- Length of hospital stay
- Cumulative methadone dose received (mg/kg)
- Compliance with proposed methadone initiation dose
- Compliance with proposed methadone weans by 20-25% total daily dose

DO OR IMPROVE

What happened when the test was conducted?

Was the cycle carried out as planned (yes, no)? Yes

What did you observe (i.e., qualitative feedback from the team)?

- Nurses were happy, overall, with this implementation
- Physicians who were initially resistant to this implementation, were pleased to see that there were no adverse effects associated with the change in initiation dose

What did you observe that was not part of the plan?

- Infants were subjectively felt to be less sleepy during the “capturing” phase
- Physicians report difficulty in remembering to wean by 25%
- Pharmacists often had to remind physicians that a 25% wean was acceptable

STUDY OR CONTROL

Did the measured results and observations meet your objective?

Was your goal achieved (yes, no)?

How do results of this test compare to previous performance?

- Length of hospital stay decreased to 13 days
- Cumulative methadone dose received (mg/kg) – pending analysis
- Compliance with proposed methadone initiation dose was 75%
- Compliance with proposed methadone weans by 20-25% total daily dose was 50%

If YES

- **Do you plan to expand the test** (yes, no)? Yes
- **Will you expand the scale** (i.e., keep the same conditions, just test more)? Yes.
- **Will you expand the scope** (i.e., change the conditions)? No
- **Will you expand the scale and scope** (i.e., change locations/units and conditions)? No

If NO

- **What data do you have to distinguish if your method of testing the change failed or if the designed change was not effective?** NA

Were there any barriers with the cycles’ implementation (yes, no)?

- Need to change the pre-checked methadone dose selection in the EPIC NAS order set to improve compliance with the proposed initiation dose (0.05 mg/kg/dose Q12 hours based on an order-specific weight)
- Physician resistance

What else did you learn?

- We need to continue to focus on these proposed changes to increase compliance. There is potential to further decrease length of stay without adverse consequences to patients.

ACT OR CONTROL*Decide to Abandon, Adapt, or Adopt?*

	ABANDON: Discard change idea testing. Describe what you will change.
X	ADAPT: Improve the change & continue a larger scale. Develop an implementation plan for sustainability.
	ADOPT: Select changes to implement on & try a new one

APPENDIX K: PRIORITIZATION MATRIX

Instructions:

1. List each secondary driver (intervention) under “Driver name”
2. The team should select 2-6 positive and negative characteristics to prioritize each driver and list them in the green boxes. It is important to include both positive and negative characteristics. Circle if the selected characteristic is positive (+) or negative (-).
 - a. Examples of positive characteristics may include importance, mandate, value to the patient/customer, or strategic alignment.
 - b. Examples of negative characteristics may include resource intensity, resistance, or complexity.
3. Determine a scale of importance for each characteristic (e.g., 1-10, 1-5). Characteristics may be weighed using different scales based on the importance of the characteristic.
4. Discuss each column and with its driver (i.e., weigh the drivers against each other). Remember to note if it is a positive (+) or negative (-) number on the scale.
5. After each driver has been discussed, sum the results for each driver and list the total in the yellow box for score. Note that it is possible to have a negative score.
6. Prioritize the drivers based on the highest score (i.e., #1 is the highest score).
7. Identify the top 3 prioritized drivers to help the team determine which driver their next PDSA cycle should focus on.

PRIORITIZATION MATRIX		Characteristic: Scale:	Characteristic: Scale:	Characteristic: Scale:	Characteristic: Scale:	Score	Priority Rank
Driver #	Driver name	+ or -	+ or -	+ or -	+ or -	+ or -	#
	+ or -	+	+	-	-		
1							
2							
3							
4							
6							
7							
8							

PRIORITIZATION MATRIX EXAMPLE

PRIORITIZATION MATRIX		Characteristic: Importance Scale: 1-10	Characteristic: Customer value Scale: 1-5	Characteristic: Resource intensity Scale: 1-10	Characteristic: Resistance Scale: 1-10	Score	Priority Rank
Driver #	Driver name	+ or -	+ or -	+ or -	+ or -	+ or -	#
	+ or -	+	+	-	-		
1	Patient education	+ 8	+ 4	- 5	- 2	+ 5	2
2	Treatment within 1 hour of identified hypertension	+ 10	+ 4	- 2	- 4	+ 8	1
3	Debriefings	+ 7	+ 1	- 6	- 8	- 6	3

Priority:

1. Treatment within 1 hour of identified hypertension
2. Patient education
3. Debriefings

TOOL I: IDEA GENERATING TECHNIQUES

Prior to attempting an idea generating technique:

- Choose a clear problem that is focused (i.e., not too complex or multi-faceted). If the problem is big, consider dividing it into sub-problems.
- Create a list of leading questions to facilitate the idea generating session.
- Gather 3-10 participants.
- Explain ground rules for the idea generating session (e.g., no criticisms, no negative judgements, aim for quantity not quality, no talking over others, turn off cell phones).
- Ensure all participants understand the same problem.

Consider any of the following techniques to assist in brainstorming with a team:

- Brainstorming (individual, group, round robin, electronic)
- Nominal group technique
- Group passing technique
- Affinity grouping
- Multi-voting technique
- SWOT analysis

See Tool IX for useful links and resources.

TOOL II: 5 WHYS TECHNIQUE

Instructions: Use the following prompts to facilitate group discussion about a problem that your team is trying to analyze.

The problem our team has noticed is:

Why do we think this is happening (1)?

Why do we think this is happening (2)?

Why do we think this is happening (3)?

Why do we think this is happening (4)?

Why do we think this is happening (5)?

Countermeasures we will try implementing are:

List measures to evaluate the effect of implemented countermeasures:

Example of 5 WHYS TECHNIQUE

The problem our team has noticed is:

A patient's intravenous run rate is wrong

Why do we think the patient's intravenous run rate is wrong (1)?

The previous nurse didn't change the run rate

Why do we think the previous nurse didn't change the run rate (2)?

The doctor's order had gone to the pharmacy and the medication administration record (MAR) was not updated

Why do we think the MAR was not updated (3)?

The MAR is updated only once per day.

Why do we think the MAR is updated only once per day (4)?

The hospital has chosen to use oral instructions for updates that happen more frequently

Why do we think the oral instructions are used (5)?

The process was constructed a decade ago, when medication orders changed less frequently due to longer lengths of stay. Upon further study, the hospital determines that 40-50% of its medications changes every day.

Countermeasures we will try implementing are:

1. Determine if an automated method of updating the MAR can be included in the new electronic medical record implementation.
2. Discuss a more immediate solution with key stakeholders, including Pharmacy, Nursing, and the Medical staff, which may be implemented in one unit and then spread system-wide.

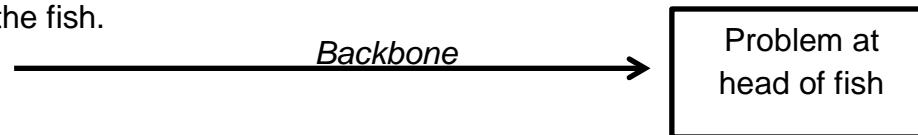
List measures to evaluate the effect of implemented countermeasures:

1. Number of medication errors which occur due to MAR not being up-to-date and accurate
2. Compliance with new MAR reconciliation method to the chosen unit.

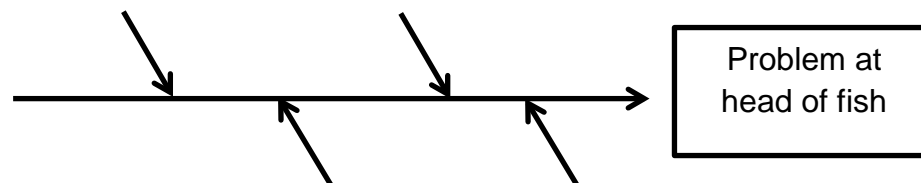
TOOL III: FISHBONE TECHNIQUE

Instructions: A team can use this technique to help identify and display potential causes of a problem.

1. Identify the problem being investigated. Be specific and ensure all team members agree about the problem. Name it as the “head” of the fish.



2. Gather any stakeholders who may have input on this problem.
3. Agree on categories or themes to investigate your process or procedure. Use these as “ribs” connected to the backbone. Commonly used themes in healthcare include:
 - a. 6 M's: Material, Machine, Man/People, Method/Process, Measurement, Mother nature
 - b. AHRQ: Institutional/Regulatory, Organizational, Work environment, Team environment, Staffing, Task-related, Patient characteristics
 - c. Healthcare: Organizational/Strategic, Working condition/Environment, Team, Staff/Individual, Task, Patient, Communication, Education/Training, Equipment/Resources

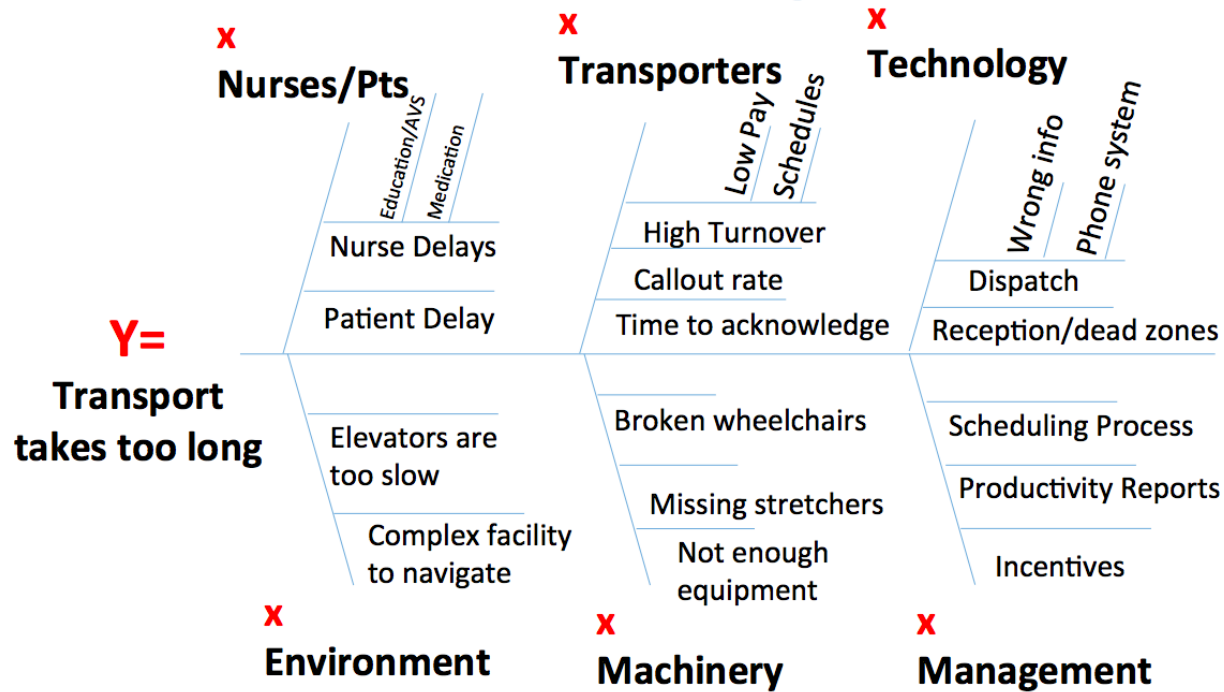


4. Brainstorm for contributing factors to the problem with the team. Some factors may fit into more than one category or theme. We suggest placing the factor under any category or theme that it fits under. After all factors have been added to the fishbone diagram, decide as a team if one factor belongs under multiple categories or not.
5. Review the fishbone as team and complete a 5 Whys analysis on important factors that your team decides to focus on.

<http://www.health.state.mn.us/divs/opi/qi/toolbox/fishbone.html>.

<http://asq.org/learn-about-quality/cause-analysis-tools/overview/fishbone.html>

Patient Transport Fishbone Diagram



TOOL IV: TIPS FOR SUCCESSFUL E-MAIL COMMUNICATION

1. Keep e-mails to a minimum – don't over-communicate. Some things are best discussed at meetings or via phone.
2. Be as clear as possible to avoid confusion.
3. Be concise – people don't want to read through paragraphs of information.
4. Proofread the e-mail before sending it.
5. Be positive, but real. You can always find something positive to say.
6. Start with intent so the reader knows what to expect.
7. Make good use of subject lines – make sure your e-mail subject line has enough information, so the reader will want to know what is contained in your e-mail. You want them to open your e-mail.
8. Make good use of bold font, underlines, bullet points, tables, etc. within your message for emphasis or to help clarify items.
9. Consider “chunking” information into small, well-organized sections so as not to overwhelm your reader.
10. Include graphs or visuals if applicable

Consider using a structured format:

- **SBAR:** Subject, Background, Assessment, and Recommendation
- **What, How, Why:** What to do, how to do it, and why it is important

Example 1: E-mail communication in SBAR format

Good morning all,

S: We evaluate all Code Blues for opportunities – both in management of the code and documentation. Recent codes have been missing the dose and route of code drugs. See the example below. The volume for NS is recorded in the comment section but there is no volume for Sodium Bicarb or Epi. This documentation is frequently missing from our Code Blue records.

B: The actual dose in mL and the route is important documentation on a Code Blue record. This documentation is essential when evaluating a code – was the dose appropriate for the infant's weight? Was the dose increased (if appropriate) for response, i.e. increased epi dose? Since code drugs are not recorded on the MAR, documentation of dose and route on the Code Blue record is the only place this information can be found.

A: A Code Blue cannot be thoroughly evaluated without code drug dosage and route.

R: If you are scribing, please document dosage in mL in “comment” section. There is a specific column for “route”. Please document “IV, IO, or ET tube”.

Example 2 is a communication of QI project results. There is a table with the “what, how, and why” of the steps. It never hurts to remind folks of “why” they are being asked to change their practice or behavior.

Good morning all,

The graph depicts compliance with four steps in the “rounding recap” process – Announcing “recap”, summarizing the plan for the day, order read back, and asking if there are any issues.

There were 43 observations in July on 4 separate days. Each observation day was a different attending. To increase reliability, other people are conducting observations since I am not a “secret shopper” at this point.

Our goal is to be 90% for all four steps. We dipped a bit in “announcing recap” and “order read back”. Please take a moment to review the table below for the “What, How, and Why” for each step.

What can we do to improve?

Important steps, key points, and the rationale to support each step		
Step (what)	Key Points (how)	Rationale (why)
Announce RECAP	<ol style="list-style-type: none"> 1. Attending or designee says, “now we are going to recap” 2. Make sure bedside nurse is present 	<ol style="list-style-type: none"> 1. Get team’s attention 2. Everyone on same page
Stay with current patient	Do not move or drift to next patient	Focus on this patient until recap is complete
Summarize plan of care for day	<ol style="list-style-type: none"> 1. Presented by resident/ARNP assigned to patient 2. Be concise and cover only key points 	<ol style="list-style-type: none"> 1. Resident/ARNP is most familiar with patient 2. Patient has already been presented in detail
Verify daily plan of care	<ol style="list-style-type: none"> 1. Attending or designee role 2. Clarify or correct if needed 	<ol style="list-style-type: none"> 1. Attending supervises care of NICU patients 2. Ensure plan is clear and confirmed
Read back all orders	<ol style="list-style-type: none"> 1. Provider entering orders does “read back” 2. Read exactly as entered in EPIC 3. Correct orders if needed 	Read back is an important safety tool and has been shown to decrease order entry errors.
Speak up	Attending physician or designee asks, “What questions or concerns do you have.”	Empowering people to speak up, breaking down hierarchy, soliciting feedback from all disciplines and families.
Move to next patient	<ol style="list-style-type: none"> 1. Attending or designee signals ready to move to next patient 	Close the loop

TOOL V: MEETING MINUTES TEMPLATE

Meeting name:

Date:

Attendees:

Excused:

Handouts/LCD:

Meeting Goals:

Updates since the last meeting

Agenda items/New business

Action items for next meeting:

Action item	Person responsible	Expected due date

Next meeting

Date:

Time:

Location:

Next meeting's goals:

TOOL VII: PROJECT PLANNING FORM

The Project Planning Form is a useful tool to help teams think systematically about their improvement project. By tracking a list of changes that the team is testing – including all the Plan-Do-Study-Act (PDSA) cycles, the person responsible for different aspects of each test, and the timeframe for each phase of work – the form allows a team to see at a glance the full picture of a project.

Instructions:

1. Use the form at the beginning of an improvement project to initiate planning.
2. In the top left corner, create a numbered list of the drivers on which the team will focus. Use the key driver diagram to determine these drivers.
3. Next to each driver, identify a process measure and goal as follows:
 - a. Process measure: Define in specific terms how you will measure the driver, to evaluate the results of your tests of change.
 - b. Goal: State a measurable goal for that driver (i.e., define in specific terms what you want the results to be after your changes).
4. Fill out the grid for each driver using the following questions to prompt you:
 - a. Change idea: What idea for improvement will you test?
 - b. Tasks to prepare for tests: Who is responsible for each task you've identified?
 - c. PDSA: What are the details of your test?
 - d. Timeline: How many weeks do you expect to need for each phase of the improvement cycle (Testing, Implementation, and Spread)? Indicate where each phase will end with the letter T, I, or S.
5. As the project continues, update the Project Planning Form regularly with your ongoing tests of change.

Project title:
Team:

	Drivers	Process measure	Goal
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			

Driver #	Change idea	Tasks to prepare for tests	PDSA	Person(s) responsible	Timeline (weeks)											
					Test			Implement			Spread			10	11	12
					1	2	3	4	5	6	7	8	9	10	11	12
1.																
2.																
3.																
4.																
5.																
6.																
7.																
8.																
9.																
10.																
11.																
12.																

TOOL VIII: REPORT TEMPLATE

Reporting period:

Prepared by:

REPORT OF PROJECT PROGRESS

QI PROJECT NAME:

Core team members	Project role	Title	E-mail
	Physician lead		
	Nursing lead		
	Administrative lead		
	Data lead		

Other team members:

Interventions
1.

Reporting period:

Prepared by:

Results

Measure	Type of measure	Goal	Last month	This month
	Outcome			
	Balancing			
	Process			
	Process			
	Process			

Current PDSA cycle #

Stage of PDSA cycle:

Intervention being tested:

Successes during this PDSA cycle	Challenges during this PDSA cycle

Is there any assistance this committee, TGH, or GME could provide your team?

Is there any additional assistance that TGH IT can provide your team?

TOOL IX: USEFUL LINKS AND RESOURCES

Section	Attachment, video, and example
QI general	<ul style="list-style-type: none"> Institute of Healthcare Improvement (IHI) Open School [http://www.ihl.org/education/ihlopenschool/Pages/default.aspx] IHI Improvement Capability certificate modules [http://www.ihl.org/education/IHIOpenSchool/Courses/Pages/OpenSchoolCertificates.aspx] The Model for Improvement Part 1 (IHI) [[https://www.youtube.com/watch?v=JSOr4wXdMuQ&list=PLwpWmQpRN38NDtFr0HI22zqnteusAtZKC] The Model for Improvement Part 2 (IHI) [https://www.youtube.com/watch?v=Tc3wLOEnCBo&index=2&list=PLwpWmQpRN38NDtFr0HI22zqnteusAtZKC] Quality improvement vs Quality assurance [https://www.youtube.com/watch?v=q9kDZw-4p6A] SQUIRE 2.0 guidelines [http://squire-statement.org/index.cfm?fuseaction=Page.ViewPage&PageID=471]
Gap analysis	<ul style="list-style-type: none"> Challenges improving safety in clinical systems (Dixon-Woods) [https://www.youtube.com/watch?v=3hrvUgll99c] Gap analysis [https://www.youtube.com/watch?v=efzvXvG2dSs]
Business case	<ul style="list-style-type: none"> Business case (HBR) (https://hbr.org/2014/07/the-right-way-to-present-your-business-case) Business case sepsis (Knych) [https://www.thepcpi.org/pcpi/media/Webinar-Recordings/QI%20Program/Aug3_16_PCPIWebinar_recording.mp4] The Toolkit Project: Business Model Canvas (http://thetoolkitproject.com/tool/business-model-canvas#sthash.bKUnherG.hKad2FPc.dpbs)
Problem statement	<ul style="list-style-type: none"> Lean learning starts with a good problem statement [https://www.youtube.com/watch?v=sXWQoA4QGB8] Lean Six Sigma Problem Solving: Creating the Problem Statement [https://www.youtube.com/watch?v=mDiYRehCTOE]
Aim statement	<ul style="list-style-type: none"> SMART Goals: Quick overview [https://www.youtube.com/watch?v=1-SvuFIQjK8] All About Aims [https://www.youtube.com/watch?v=Q6QJS9t9IO0]
Scope	<ul style="list-style-type: none"> Dilbert Why projects fail [https://www.youtube.com/watch?v=Mp7BPj839hg] Addressing the triple constraint of time, cost, and quality [https://www.youtube.com/watch?v=1G40P2_HoUU]
Stakeholder analysis	<ul style="list-style-type: none"> AHRQ Stakeholder Implementation Guide [“Engaging stakeholders to improve the quality of children’s healthcare”] Understanding Responsibility Assignment matrix (RACI) [https://project-management.com/understanding-responsibility-assignment-matrix-raci-matrix/] RACI explained its simple yet powerful [https://www.youtube.com/watch?time_continue=281&v=1U2gngDxFkc]
Key driver diagram	<ul style="list-style-type: none"> Don Goldman: How do you use a driver? (IHI) [https://www.youtube.com/watch?v=yfcE_Q-IRFg] Whiteboard: Driver Diagrams (IHI) [https://www.youtube.com/watch?v=A2491BJcyXA]
Deliverables	<ul style="list-style-type: none"> Defining deliverables [https://www.youtube.com/watch?v=4OPLvCITzRo] What are project deliverables – Project management [https://www.youtube.com/watch?v=YRiS5moPBTw]
Measures	<ul style="list-style-type: none"> Whiteboard: Family of Measures (IHI) [https://www.youtube.com/watch?v=uow7mzrFif4&t=190s] Nominal, ordinal, interval, and ratio: How to remember the differences [https://www.youtube.com/watch?v=LPHYXPBK_ks]

Data analysis	<ul style="list-style-type: none"> • Whiteboard: Pareto Analysis (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard20.aspx] • Whiteboard: Run Charts Part 1 (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard7.aspx] • Whiteboard: Run Charts Part 2 (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard8.aspx] • Whiteboard: Control Charts Part 1 (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard13.aspx] • Whiteboard: Control Charts Part 2 (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard14.aspx]
SIPOC	<ul style="list-style-type: none"> • Lean Six Sigma – From SIPOC to Process mapping [https://www.youtube.com/watch?v=atzJvjSHRhl] • Lean Six Sigma: Using a SIPOC to Define a Process [https://www.youtube.com/watch?v=2CSNXPVLLcc]
Process mapping	<ul style="list-style-type: none"> • 6 Process maps you should know and how to choose the right one [https://goleansixsigma.com/6-process-maps-know-choose-right-one/] • Tom Wujec: Got a wicked problem, first tell me how you make toast (TED Talk) [https://www.youtube.com/watch?v=_vS_b7cJn2A] • Whiteboard: Flowcharts 1 (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard11.aspx] • Whiteboard: Flowcharts 2 (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard12.aspx]
PDSA cycles	<ul style="list-style-type: none"> • Whiteboard: PDSA Cycles Part 1 (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard5.aspx] • Whiteboard: PDSA Cycles Part 2 (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard6.aspx] • Why is planning such an important part of PDSA (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/Activities/WilliamsPlanPDSA.aspx] • What are rules for doing concurrent PDSA cycles (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/Activities/WilliamsMoreThanOnePDSA.aspx] • How long should a PDSA last (IHI) [http://www.ihl.org/education/IHIOpenSchool/resources/Pages/Activities/Provost-HowLongShouldAPDSACycleLast.aspx]
Sepsis	<ul style="list-style-type: none"> • https://www.vox.com/2017/10/23/16387300/hospital-policy-saved-thousands-lives-central-line-infection • http://people.com/human-interest/nurse-survived-sepsis-raises-awareness/ • HIIN Sepsis [http://www.hret-hiin.org/resources/display/severe-sepsis-and-septic-shock-top-ten-checklist-date-of-last-septic-event]

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