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Introduction to Quality Improvement in Urology

Developed by the American Urological Association

How to Use This Slide Deck

- **Audience:** educators teaching QI methods and principles; faculty and staff involved in QI work; anyone leading teams in QI work
- **Goal:** provide an introductory foundation in QI methods and principles necessary to carry out quality/process improvement interventions
- Modeled after AUA's Quality Improvement Project Guide (follows the Model for Improvement)

AUA's Quality Improvement Project Guide

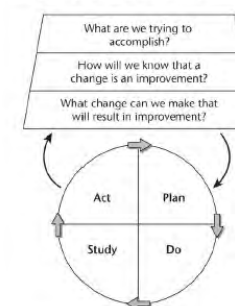
- Designed to provide anyone involved in urologic care delivery with a foundational understanding of QIPS methods and principles
- Walks through each phase of a quality improvement project – Plan, Do, Study, Act – using a urology case study to illustrate each step
- Four accompanying podcast episodes released on Inside Tract platform
 - [Introducing AUA's New Resource](#)
 - [Planning a QI Intervention](#)
 - [Implementing and Studying a QI Project](#)
 - [Acting on the Results of and Sustaining a QI Project](#)

FOUNDATIONAL CONCEPTS

HEALTHCARE QUALITY

While there is no universal definition of healthcare quality, the Institute of Medicine (IOM) defines it as the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge. In addition, the IOM outlined six domains of healthcare quality in its landmark publication *Crossing the Quality Chasm: A New Health System for the 21st Century*.¹ According to this report, quality healthcare should continually strive to be: safe, timely, effective, efficient, equitable, and patient-centered (STEEP). In the context of these widely adopted aims of healthcare quality, it is commonly accepted that quality improvement (QI) initiatives should strive to improve on one or several of the STEEP aims.

FIGURE 1. THE MODEL FOR IMPROVEMENT



Source: The Improvement Guide: A Practical Approach to Enhancing Organizational Performance, 2nd Edition | © 2009, John Wiley and Sons



The Model for Improvement will be integrated throughout the document, along with a case study intended to provide tangible examples of how health professionals can approach, design, and ultimately implement care improvement efforts using this framework.





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Quality Improvement Background

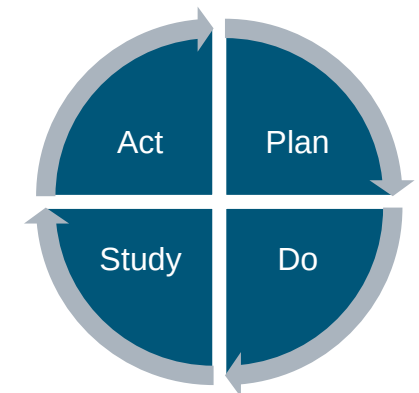
- The Institute of Medicine defined six domains of healthcare quality in its landmark publication *To Err Is Human: Building a Safer Health System*
- Quality healthcare should continually strive to be:
 - **Safe**
 - **Timely**
 - **Effective**
 - **Efficient**
 - **Equitable**
 - **Patient-centered**
- QI initiatives should strive to improve on one or several of these aims

Quality Improvement vs. Research

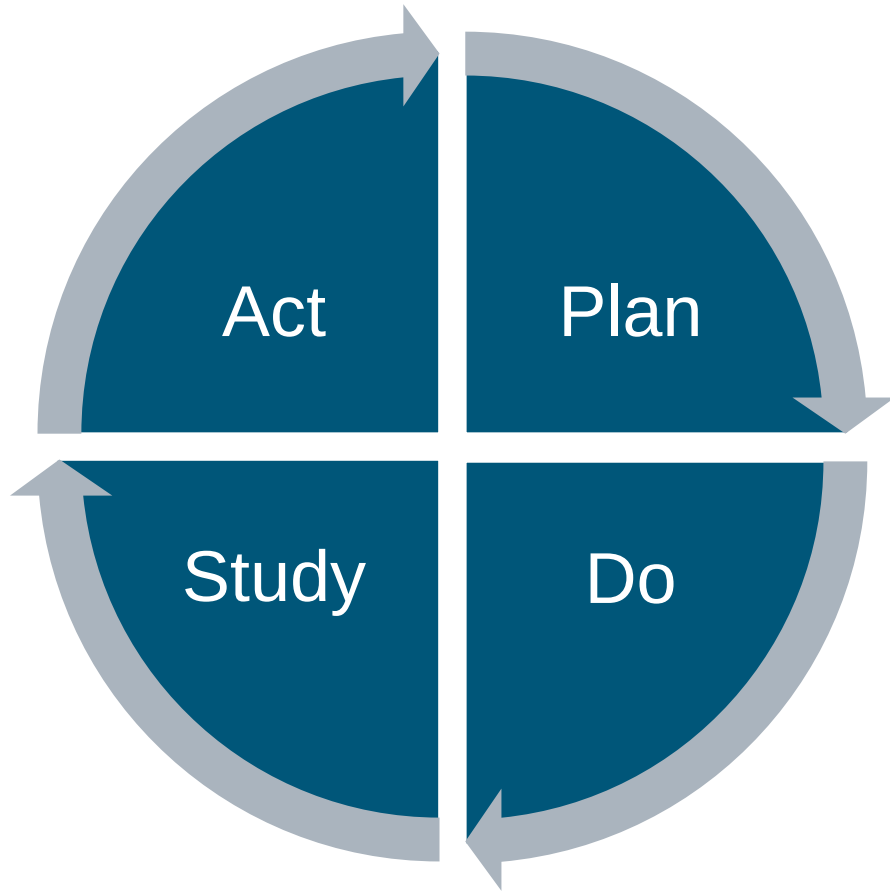
	Quality Improvement	Research
Goal	Implement best practices in a local setting	Generate or generalize knowledge that applies beyond research setting
Focus	Standardize processes, reduce variation, improve outcomes	Test hypotheses and discover new knowledge
Design	Small tests of change (PDSA cycles); iterative and adaptive	Fixed protocol; standardized and controlled
Data and Analysis	Data guides improvement and informs next steps; collected in real-time and displayed visually	Data used to test hypotheses and produces evidence; used to test for statistical significance
IRB Approval	May not be required	Typically required
Example	Implementing a standardized workflow to improve post-discharge follow-up to reduce hospital readmissions following surgery	Randomized control trial – effectiveness of a structured post-discharge follow up program to reduce hospital readmissions following surgery

The Model for Improvement

- One framework to guide and accelerate improvement work
 - Developed by Associates in Process Improvement
- The Model has two parts:
 - **3 fundamental questions** can be answered in any order. Answering the questions should be an iterative process
 - 1. What are we trying to accomplish?
 - 2. How do we know change is an improvement?
 - 3. What change can we make that will result in improvement?
 - **Plan-Do-Study-Act (PDSA) cycle** to test changes to ensure they result in the desired improvement



The Model for Improvement



- **Plan** the Intervention

- Understand the Problem
- Draft a Problem Statement
- Assess Stakeholder Engagement
- Assemble a Team
- Draft an Aim Statement
- Select Measures
- Prioritize Opportunities for Improvement

- **Do** the Intervention

- Finalize a Plan for the Intervention
- Carry Out the Intervention
- Collect the Data
- Audit the Intervention

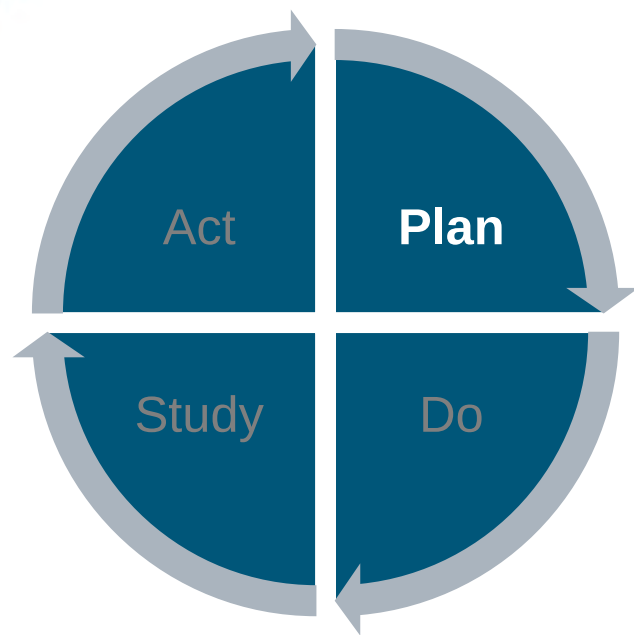
- **Study** the Intervention

- **Act** on the Results of the Intervention



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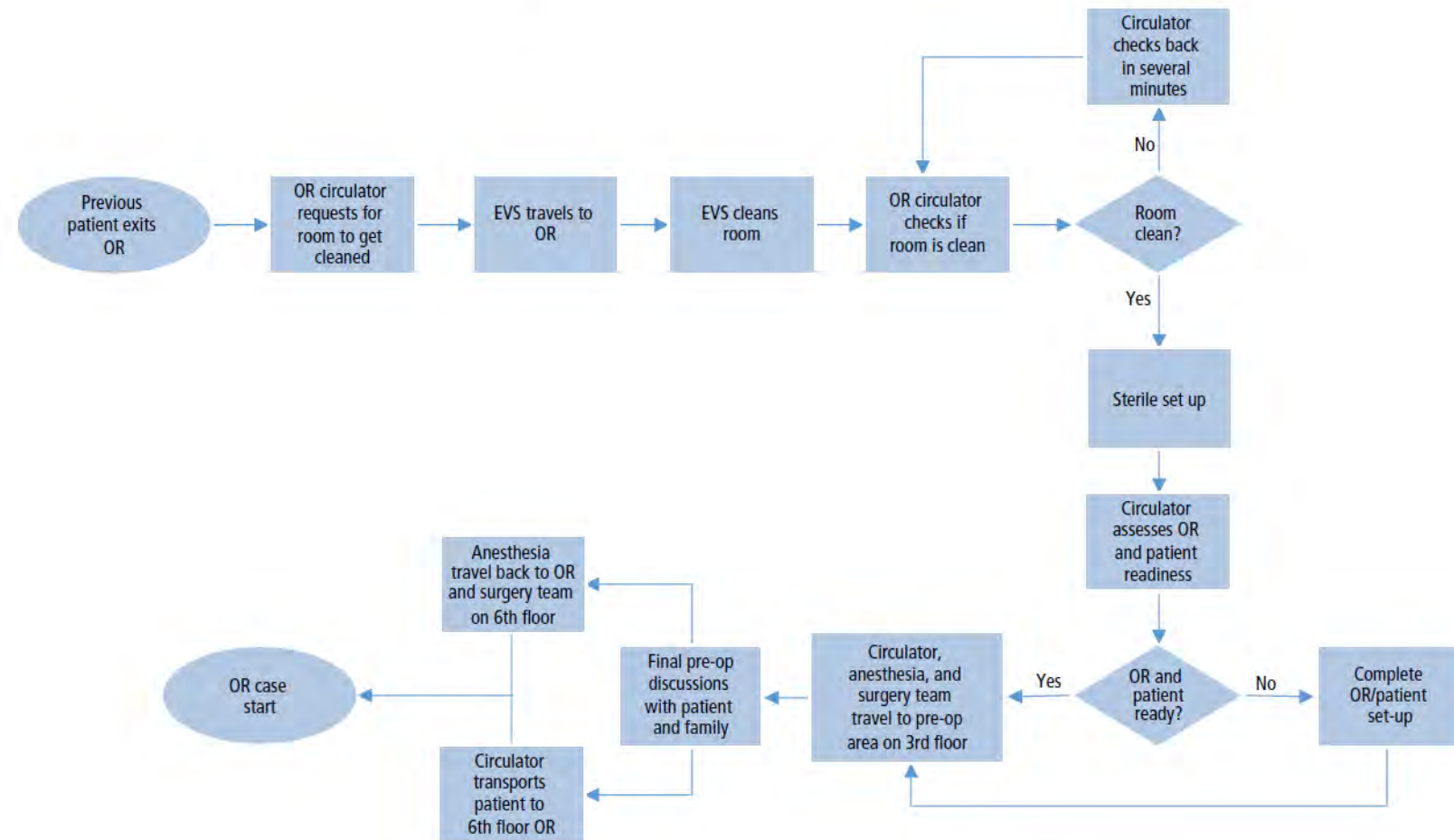
Plan the Intervention

Understand the Problem

- Choose a problem that is within your team's influence
- Focus on a “bite-sized” problem
- Tools to get a better understanding of the process:
 - **Process maps:** visualize workflows within a process and identify steps that lead to delays and/or other issues
 - **Fishbone diagram:** cause and effect diagram
 - **Pareto chart:** help identify the highest impact issues to address

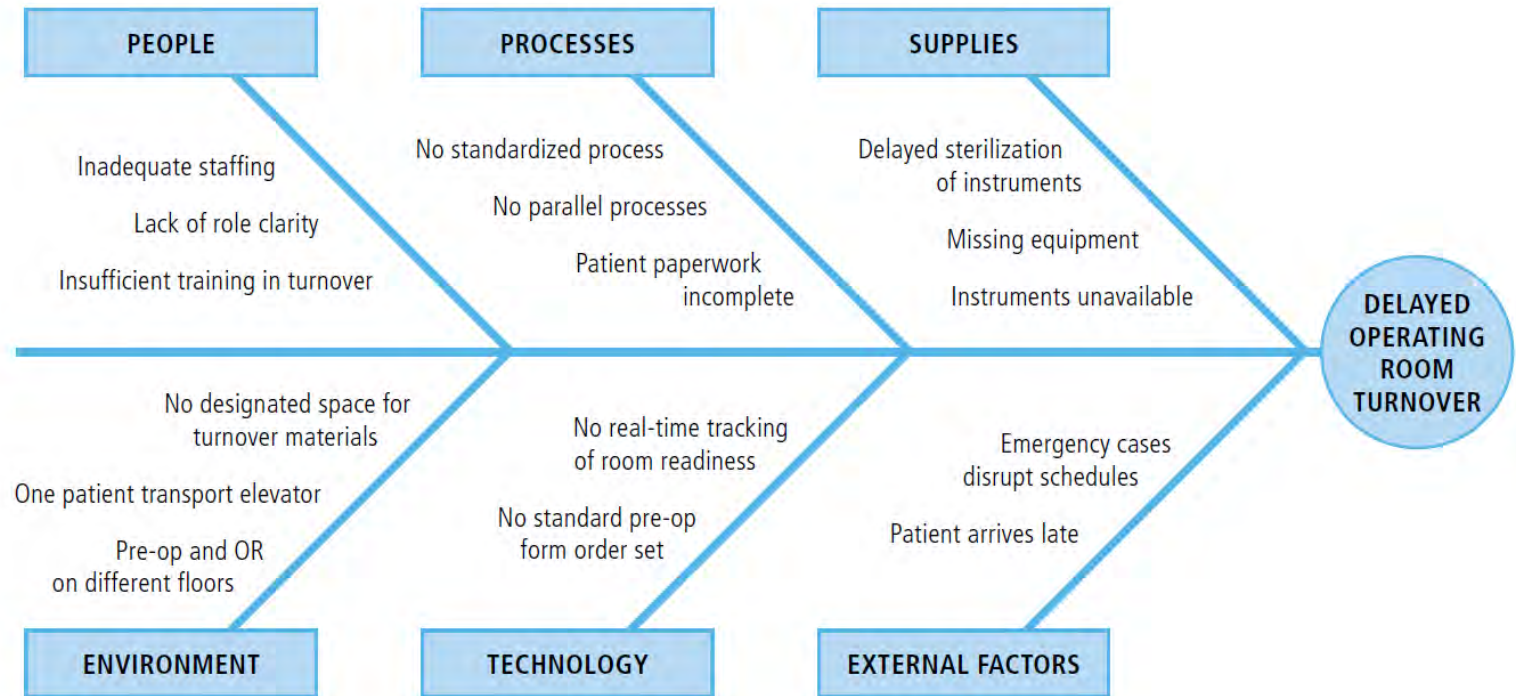
Process Maps

- Illustrates the workflow of the current state of the OR turnover process
- Serves as a foundation to identify areas in which to enhance efficiency



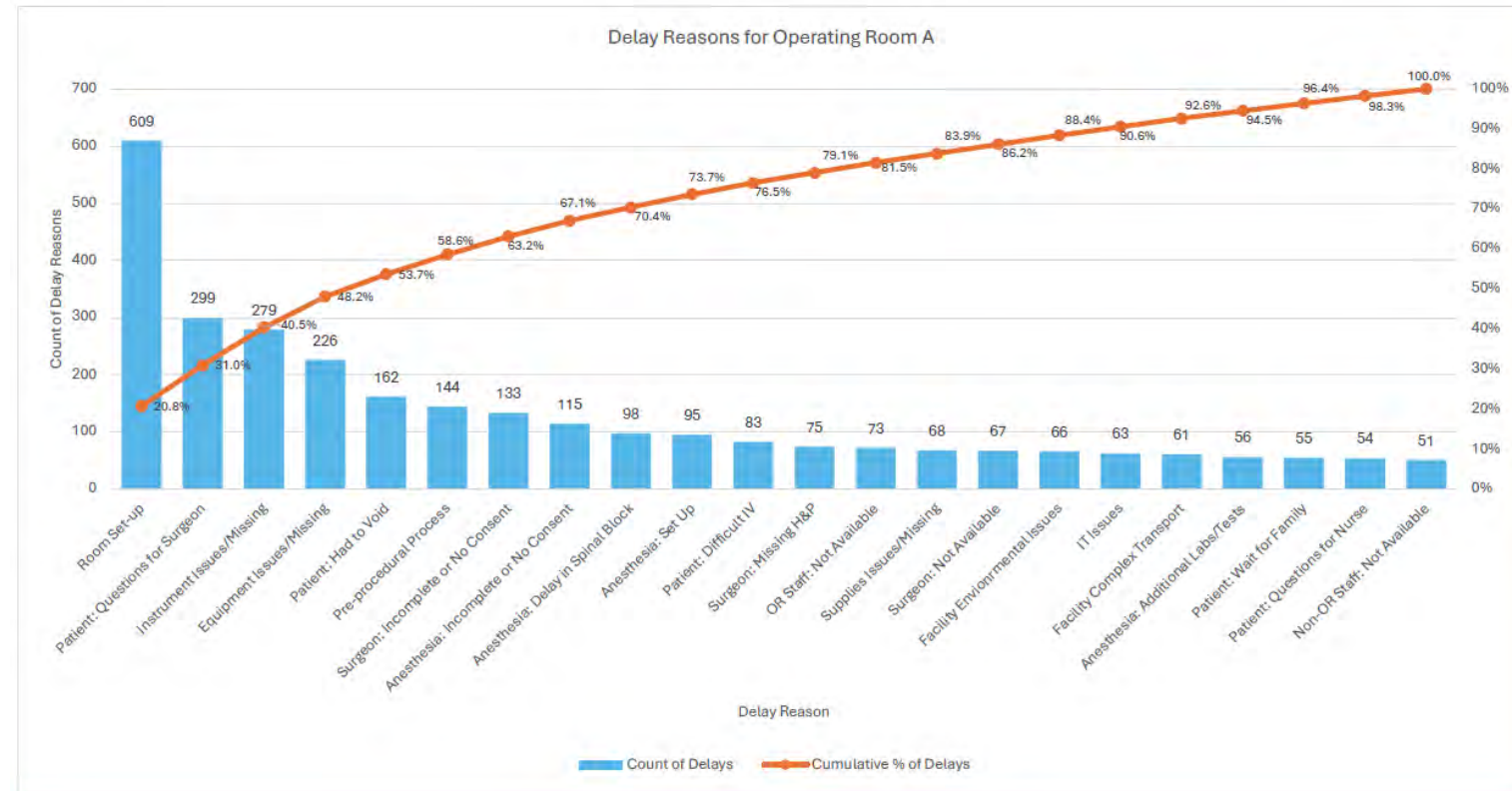
Fishbone Diagram

- Also referred to as a cause-and-effect diagram or an Ishikawa diagram
- The problem is displayed at the “head” of the diagram
- Possible contributing causes are listed on the smaller “bones” under various cause categories



Pareto Chart

- Identify what may be the highest impact issues to address
- Pareto Principle: 80% of problems are often the result of only 20% of causes
- Contributing factors are listed in decreasing order from greatest impact to lowest



Draft a Problem Statement

- 1-2 sentences that outline the issue or problem the QI project is seeking to address
- Answer these questions to help formulate the problem statement:

Questions	Example Responses
What is the problem?	OR turnover is slow
Who does it affect?	Patients and staff
How does this problem make you feel?	Tired
When is it a problem?	Daily
Why should I care?	Patients and staff are frustrated
How does it affect the patient or customer?	Makes them run behind in their day

The OR schedule runs behind daily, causing OR start times to be delayed and staff to stay after their workday is scheduled to end.

Assess Stakeholder Engagement

- Anyone with an interest in the QI project, involved in the targeted process, or who can have an impact on the project's success or failure
- Get buy-in from all stakeholder groups **early**
- Identify who the project will impact, who will be doing the work, whose work will be impacted by the project, who will resist the change, etc.
- Engage the most with stakeholders who will have the most impact on the project's success
- Consider the underlying aims or goals of each stakeholder and to highlight their motivations (e.g., staff may care about time savings and leadership may care more about cost savings)

Assemble a Team

- The team should consist of:
 - A project sponsor (e.g., service line leader in the OR)
 - The day-to-day process owner or team leader
 - Someone with experience in improvement science
 - Someone with technical or clinical experience
 - Someone with knowledge of the system or process
 - Someone who can represent the point of view of the patient
- Should include individuals with different skills, perspectives, and roles proximate to the given problem
- Represent multiple stakeholder groups



Draft an Aim Statement

- Answers the first question in the Model for Improvement:
 - **“What are we trying to accomplish?”**
- May use the six domains of healthcare quality (safe, timely, effective, efficient, equitable, and patient-centered) to develop the aim statement
- Aim statement should be SMART (specific, measurable, achievable, relevant, timely)



Improve the timeliness of urology OR turnover by increasing the number of OR cases starting on time by 25% within the next 6 months

- Answers the second question in the Model for Improvement:
 - **“How do we know a change is an improvement?”**
- When selecting measures, consider:
 - What data need to be collected?
 - How will data be collected?
 - How often will data be collected?
 - Who will collect the data?
 - Who will analyze the data?
 - How often will the data be analyzed?
 - How will the data be shared with team members and/or stakeholders?

Select Measures (cont.)

- Select different types of measures to measure project success

Type of Measure	Example
Outcome measures - assess impact on patient health; link back to the aim statement	OR turnover time
Process measures - assess if the parts of the system are performing as anticipated	Time between critical room set up and patient arrival; time from patient exiting OR to next patient entering OR
Balancing measures - ensure improvement in one measure does not result in detriment to another area	Safety events; infection rates; turnover time in other ORs
Structural measures - assess accessibility, availability, and quality of resources	Number of environmental services staff available to clean ORs

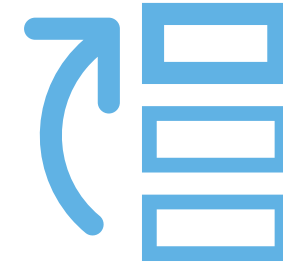
- Collect qualitative data to:
 - Gain a better understanding of obstacles to change
 - Identify why improvement may not be occurring
 - Understand how the change is impacting patients and/or clinicians



Prioritize Opportunities for Improvement

- Answers the third question in the Model for Improvement:
 - **“What change can we make that will result in improvement?”**
- An idea for change may come from:
 - Reviewing published research and best practices
 - Gathering input from staff involved in the process
 - Incorporating feedback from patients and their families.
- A change idea may focus on:

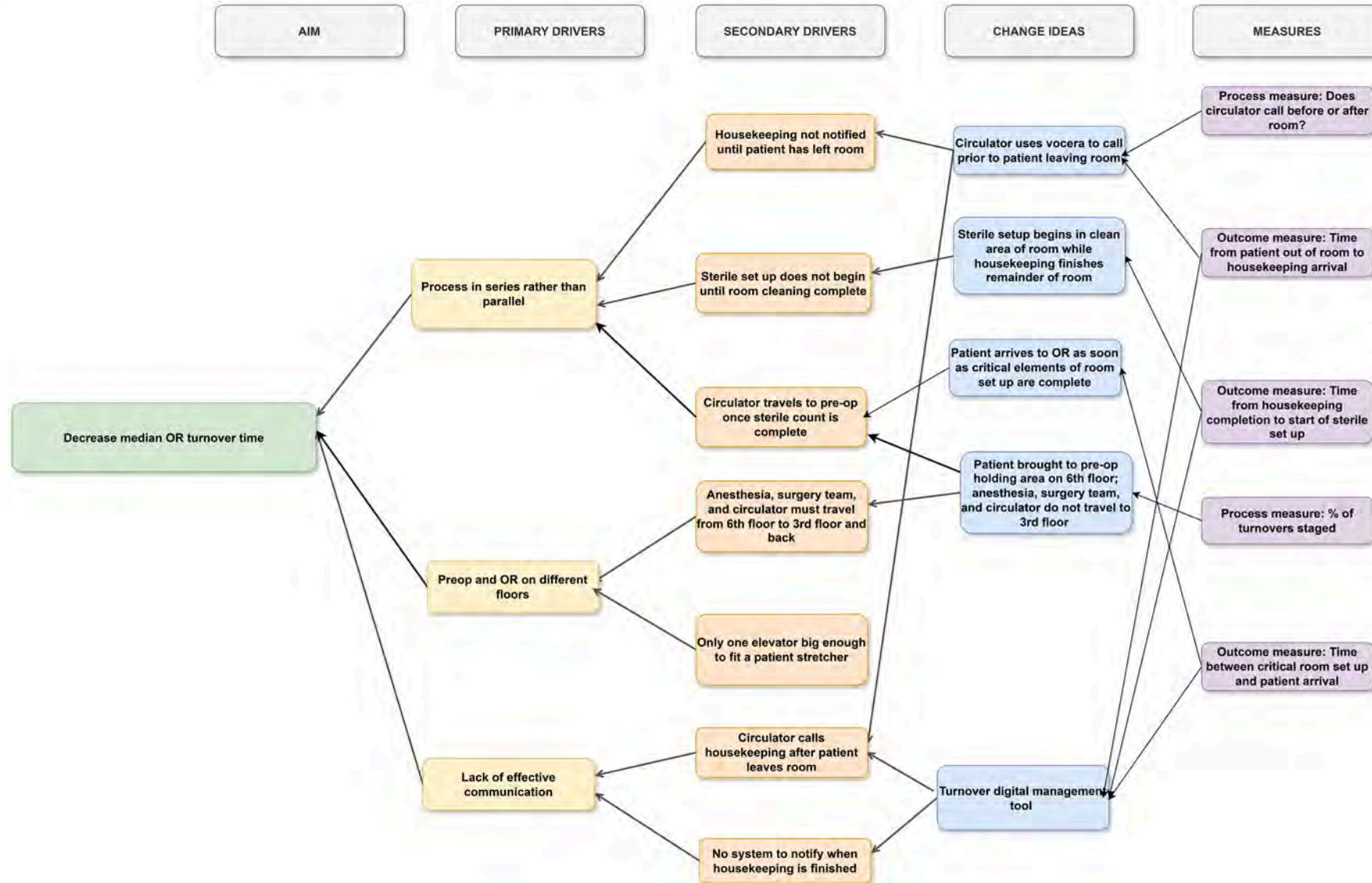
• Eliminating waste	• Improving the work environment
• Minimizing variation	• Improving patient/caregiver and staff experiences
• Streamlining workflows	• Reducing errors
- The **driver diagram** and **impact-effort matrix** are helpful tools to help prioritize potential ideas for change



Driver Diagram

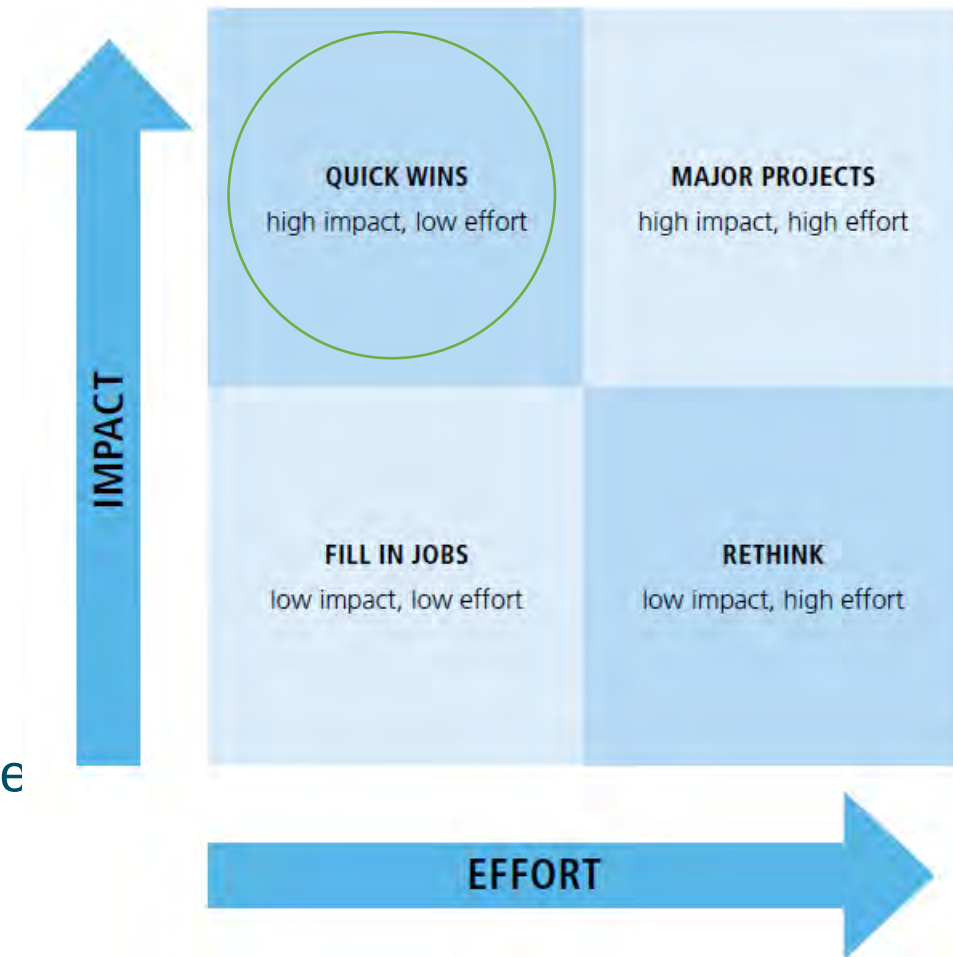
- Used to identify and prioritize the major factors (“drivers”) to influence an outcome or goal
- Areas of focus should come from issues identified in process map or fishbone diagram
- Developing a driver diagram:
 - Identify primary or “key” drivers of the outcome
 - Identify the “secondary” drivers (i.e., elements that influence or result in primary drivers)
 - Identify “change ideas” that might influence the secondary drivers and can be tested
 - Link specific drivers to measurable outcomes

Driver Diagram (cont.)



Impact-Effort Matrix

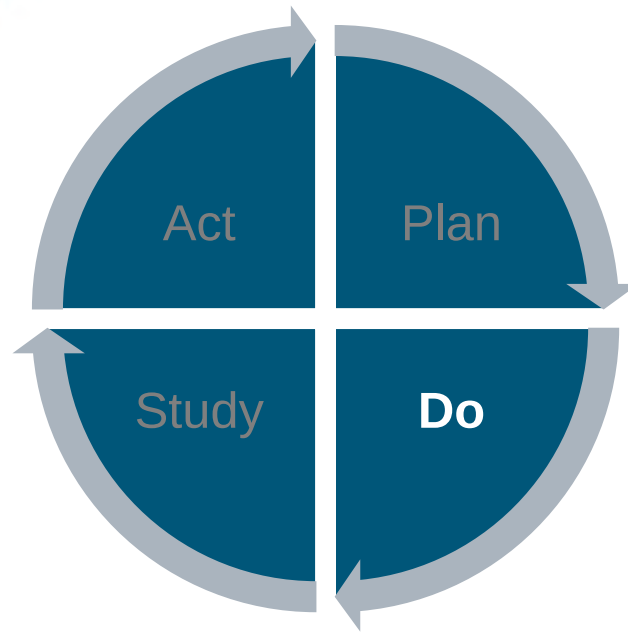
- Compile a short list of problems that are within your team's influence
- Focus on interventions that are most likely to yield “quick wins” and potentially enhance stakeholder engagement by identifying “where might you make the most impact?”
- Ideas are sorted into four categories:
 - **Quick wins** (high impact, low effort) – “low hanging fruit”
 - **Major projects** (high impact, high effort) – requires more strategy and planning
 - **Fill in jobs** (low impact, low effort) – consider if there are no good alternatives
 - **Rethink** (low impact, high effort) – unclear that the idea will be worth implementing





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Do the Intervention

- Develop an **implementation plan**:
 - Describe the intervention and predict what will happen
 - Tasks that are necessary to implement the change
 - Who is responsible for carrying out the tasks
 - When and where the intervention will occur
 - Explain the measurement plan
 - Meeting schedule to assess the intervention
 - How long to run the test of change (should be in accordance with the size of the intervention)



Carry Out the Intervention

- Communicate the details of the intervention to the staff and other individuals impacted by the change **before** the intervention is implemented
- Allow opportunities for staff to raise questions and/or concerns
- May require staff training, changes to EHR documentation flows, changes to policies, changes in staff members/responsibilities



Collect Data

- Ensure the data are being consistently collected as outlined (correct person is collecting the correct data in the correct way)
- Collect data in real time, if possible
- Monitor the balancing measures to ensure unintended consequences are not happening in another part of the system
- Remember to collect qualitative data to identify barriers/challenges and to learn more about the impact on patients and/or staff



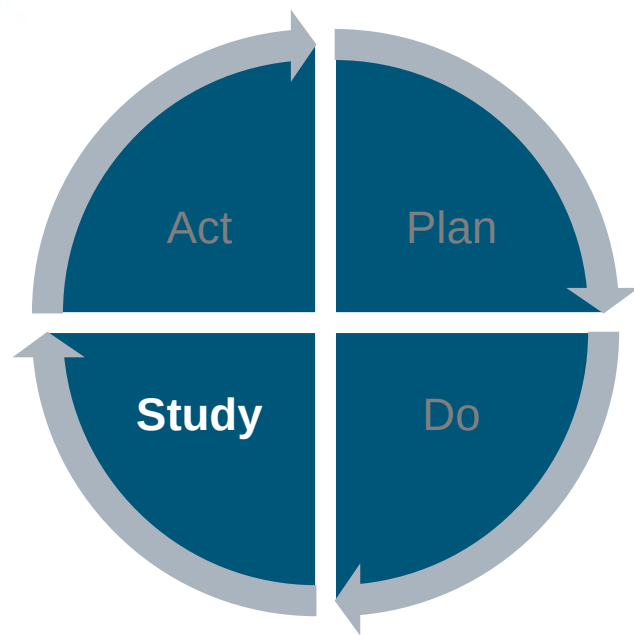
Audit the Intervention

- Did the intervention go as intended?
- What worked well? Were there any surprises? What barriers did we have? What should we change before the next PDSA cycle?
- Small tests of change allow the teams to learn from their failures and refine the process while minimizing disruption
 - “Failures” = Learnings
- Conduct a “Gemba walk”
 - Visit the setting of the intervention to observe changes, ensure the process is happening as planned, and engage with individuals involved in or impacted by the change to collect feedback



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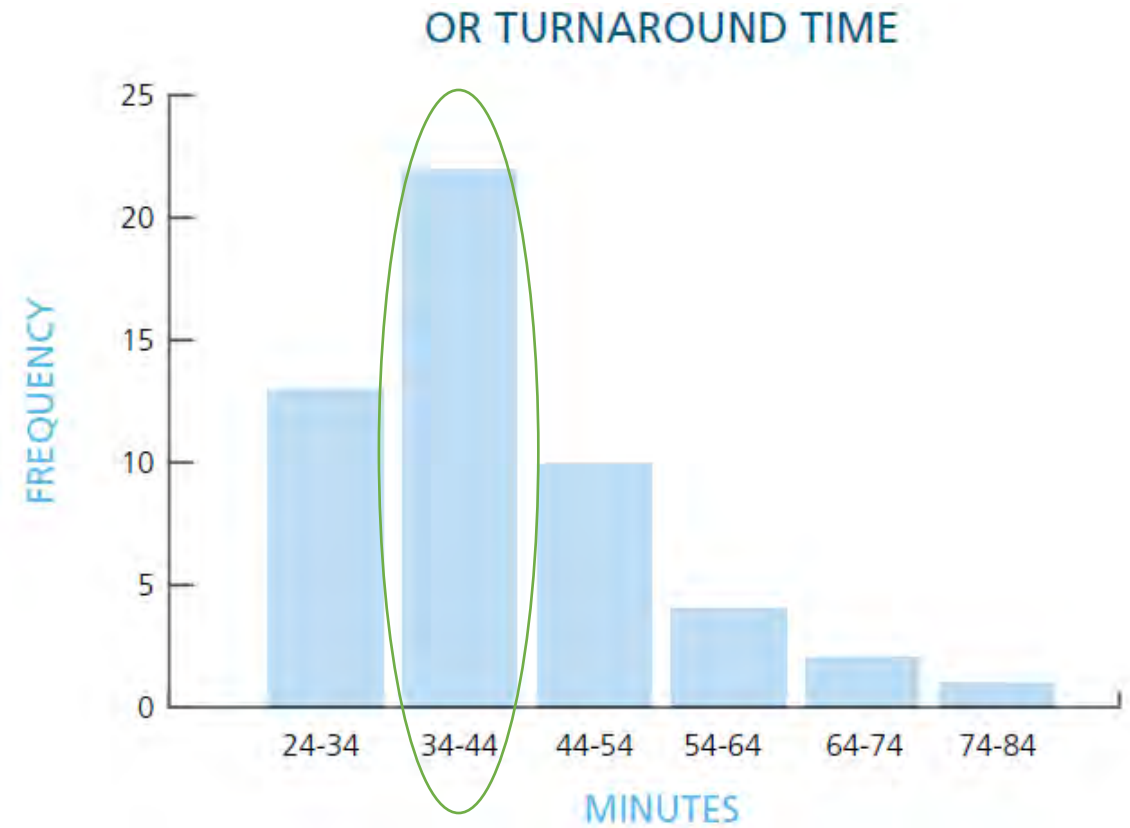


Study the Intervention

- Data may be collected on a daily, weekly, monthly, or quarterly basis
- QI analytics lean toward nimble, dynamic charts that show the impact of process changes over time
- Tools to assess project activity, progress, impact, and sustainability
 - Histogram
 - Scatter Diagram
 - Run Chart

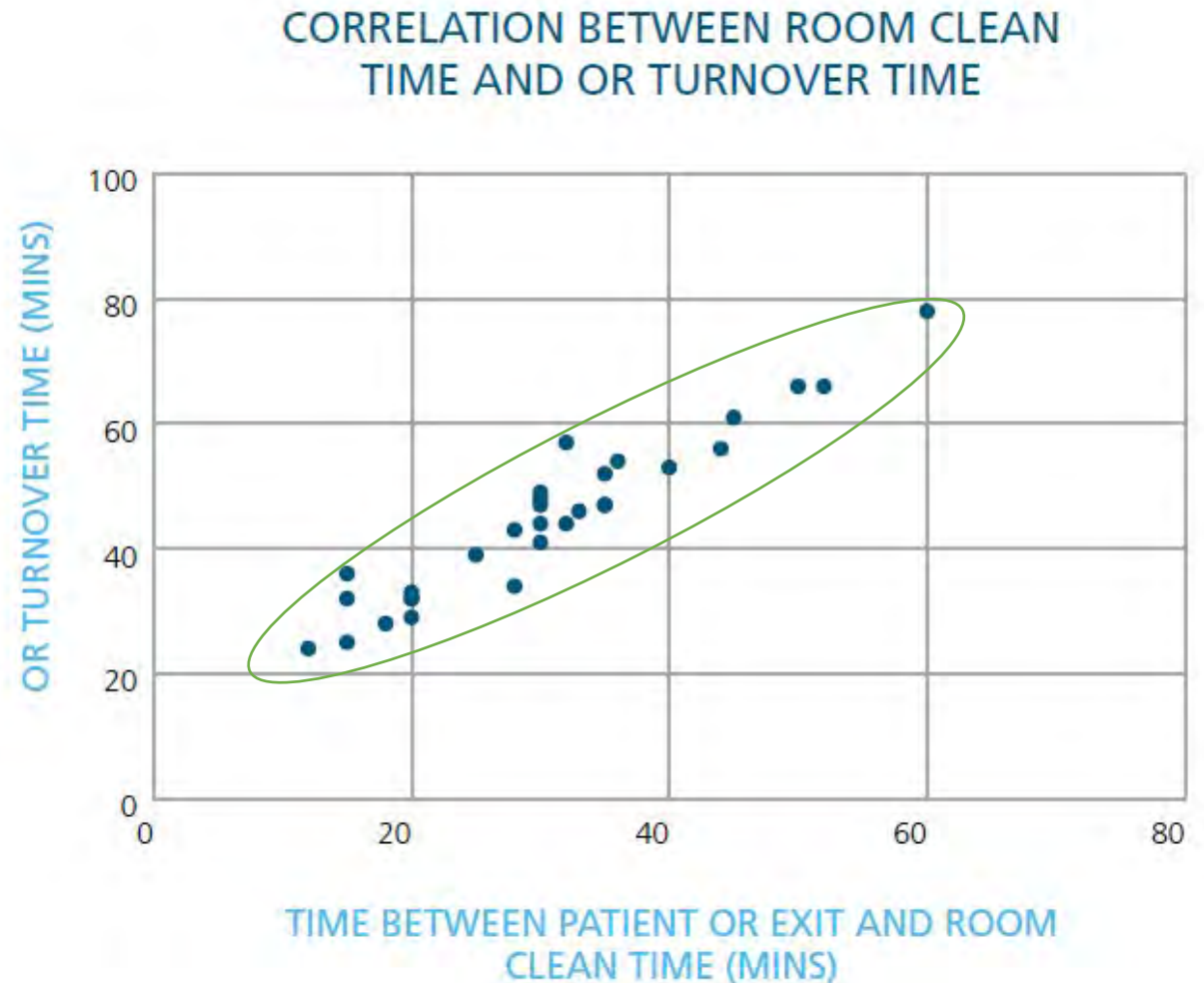
Histogram

- Type of bar chart that effectively shows variation within a process
- When there is substantial variation in a process, reducing that variation is a critical component of the improvement effort



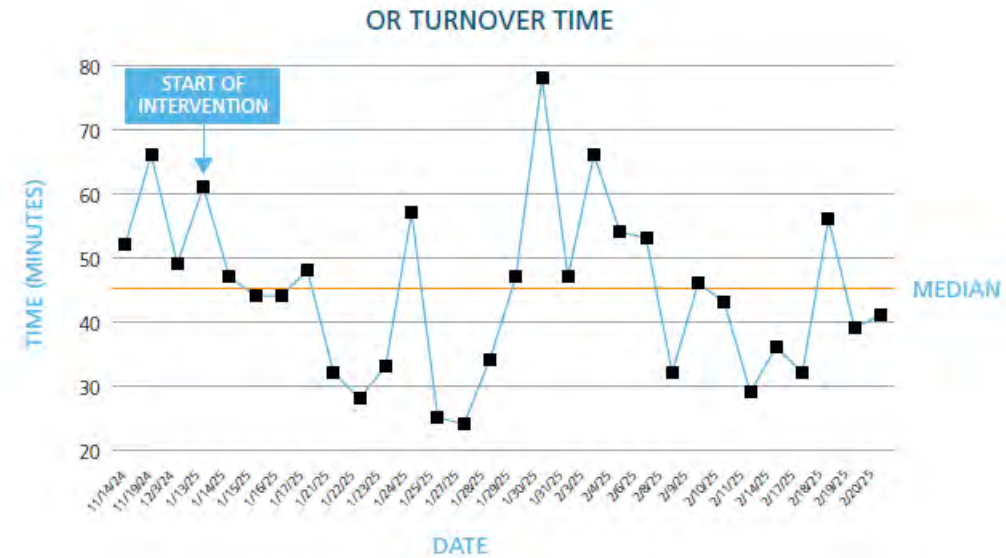
Scatter Diagram

- Shows the relationship between two variables
 - Correlation $\neq$ Causation
- Positive correlation: both values increase/decrease together
- Negative correlation: one value decreases when the other increases



Run Chart

- Visualize data over time and show the impact of process changes
- Can understand the magnitude of change in fewer data points compared to traditional statistical analysis
 - Typically, run charts require 5+ pre-intervention and 5+ post-intervention data points
- Drawing a run chart:
 - Plot value of interest on the y-axis and time on the x-axis (days, weeks, months, quarters, etc.)
 - Draw lines to connect the data points
 - Draw the median and the “goal” line
 - Annotate the chart to indicate when process changes occurred or when an external event may have impacted the process

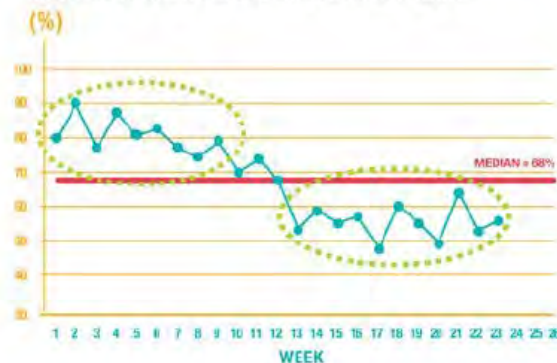


Run Chart (cont.)

- It is normal for data in run charts to look like a sawtooth rather than a straight line
- Four major run chart “rules” or interpretations can allow for quick identification of when a process is improving (or degrading) as a result of the intervention
 - Helpful for further process improvement, providing positive feedback to teams, or reporting to stakeholders

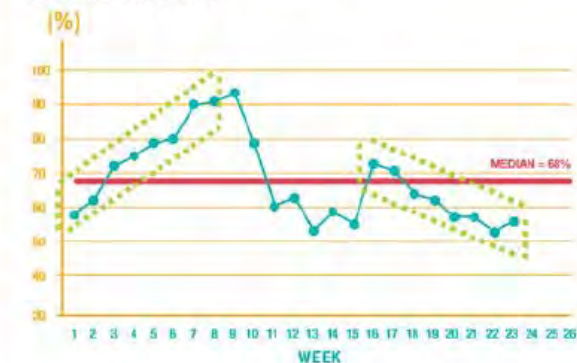
#1: SHIFT

Six or more consecutive data points that are either all above or below the median constitute a **shift**.



#2: TREND

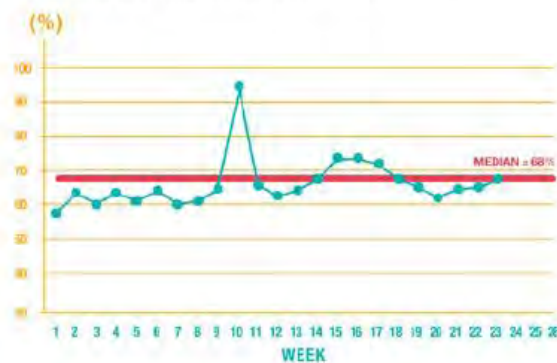
Five data points all going up or down constitutes a **trend**.



#3: ASTRONOMICAL VALUE

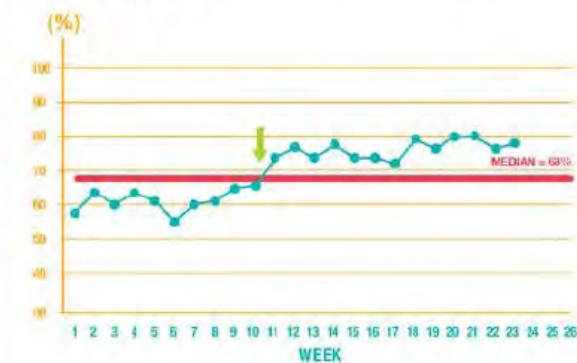
An **astronomical value** is a data point that is blatantly different from the rest, and everyone studying the chart agrees that it is unusual.

Remember: Every data set will have high and low values, but these data are not necessarily astronomical.



#4: RUN

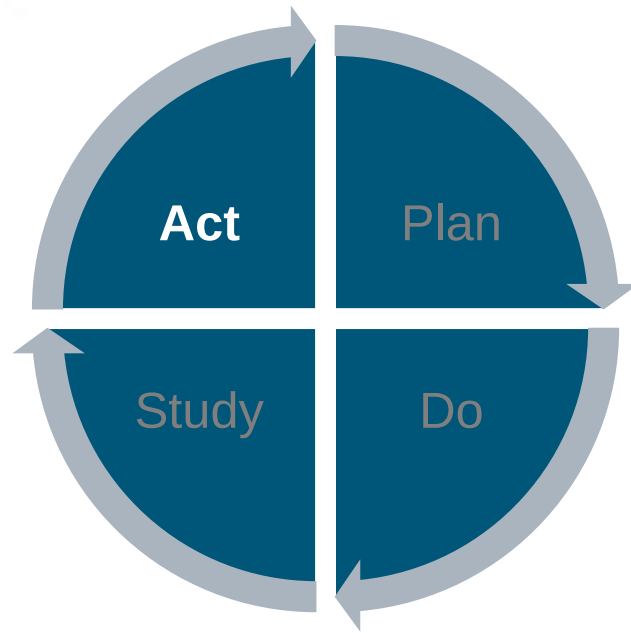
A series of points in a row on one side of the median constitutes a **run**. A helpful trick to determine the number of runs is to count the number of times the data line crosses the median and then, add one. Statistically significant change is signaled by too few or too many runs.





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Act on the Results of the Intervention

Act on the Results of the Intervention

- Based on what you learned in the study phase, consider the 3A's – adopt, adapt, or abandon
- **Adopt**
 - The data shows that the change resulted in improvement
 - The balancing measures did not show unintended consequences
 - Begin scaling the change to practice outside of the improvement team
- **Adapt**
 - The change did not go as improved, but the data suggests that further modifications may result in improvement
 - Redesign the change, change procedures to improve implementation, or change the measurement plan
- **Abandon**
 - The data did not show that the change resulted in improvement and there is not promising data to suggest further changes would result in improvement

- **Projects are too big**
 - Start small then scale
 - Focus on processes that are within the scope of your team
- **Lack of stakeholder buy-in**
 - You cannot do it alone
 - Buy-in helps secure necessary resources, reduces resistance to change, aligns the group toward a common goal
- **Lost momentum**
 - Refocus the team to the aim statement
 - Celebrate small wins with the team
 - Visualize the process and data
- **Burnout from poorly scoped work**
 - Make sure there are clear and targeted goals
 - Avoid scope creep: uncontrolled expansion of project goals and tasks
- **Data paralysis**
 - Gather enough data to make the next small step → next PDSA cycle
 - Focus on the key metrics identified in the measurement plan



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Sustainability and Scale

- Is the **process hardwired in the system**?
 - Does the action force the person to get it right? Does it remove the chance to select the wrong option?
- How much will the **change affect the average person's work** and **how many people the change will impact**?
- **How durable is the effect**?
 - Determine how long to continue monitoring data to see if things are still working
- Should the **work be expanded or “scaled”** to other areas, patient populations, etc.?
 - Systems adopting the change will need guidance on how to adapt the change to their environment.
- What is the **communication strategy back to stakeholders** to share the results of the work and next steps?

- **Go to the Gemba**
 - Go to the place where the work is happening to observe the process and ask questions
- **Consider a one-to-one versus group interview**
 - Ask “What didn’t work well? Why didn’t we succeed? Is there anything that did work well?”
 - Answers will inform what can be done differently in the next PDSA cycle
- **Refer to the process map**
 - Uncover problematic steps and/or unnecessary complexity
- **Review potential causes of the problem**
 - Both fishbone diagrams and Pareto charts can be employed to show potential causes of the problem

Scale

- Share successful changes to new departments, areas, units, teams, etc.
- Understand that each area is unique and may require modifications when implementing the change
 - The scale effort will benefit from the use of PDSA cycles, but the cycles can be accelerated
- Develop a “change packet” to assist the new area in implementing the change
 - Provide a background on the initiative, suggest what should not or can be changed, identify tools and infrastructure needed to implement the change
 - Identify the measures, how they were collected, at what frequency were they collected, what visuals were displayed
 - Identify roadblocks and lessons learned
 - Identify how to standardize workflow and processes





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Additional QI Resources

Engage with Quality Improvement and Patient Safety (E-QIPS)

- Repository of quality improvement and patient safety projects from members of the urological community

ENGAGE WITH QUALITY IMPROVEMENT AND PATIENT SAFETY (E-QIPS) Using Lean Methodology to Increase Clinic Efficiency

pg 1

QUALITY OR SAFETY PROBLEM

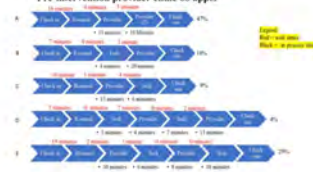
The urology clinic at this location has erratic workflows leading to inefficient patient visits and wait times. This leads to agitated patients and busy hurried visits which introduce quality of the patient encounter.

BACKGROUND

5 different workflows were found. The most inefficient workflows were D and E on the fig involved multiple technician (medical assistant) and provider encounters with the patient. A patient is seen with lower urinary tract symptoms, the technician gets a urinalysis and the provider request PVR/PS, patient goes with technician to do this and returns to the provid with dysuria, gets examined by the technician, provider request urinalysis, patient goes with technician to the provider, and then sees the tech on the way out of the clinic for a PVR, flow.

Lean methodology has been used in multiple fields including medicine to map processes, it implement improvements to decrease waste. This work was guided by process mapping an order to develop Plan, Do, Study, Act cycles to improve upon identified parameters.

Pre-intervention provider clinic 68 appts



PROJECT OBJECTIVES

To use process mapping to identify waste in the current clinic flows to devise improvement identified waste.

Specific aims:

- To identify and process map clinic workflows.
- Use process maps to identify areas of lost efficiency.
- Develop improvements in identified areas to increase visit efficiency.

ENGAGE WITH QUALITY IMPROVEMENT AND PATIENT SAFETY (E-QIPS)

Non-Opioid Pathway Post Ureteroscopy and Ureteral Stent Placement

pg 1

QUALITY OR SAFETY PROBLEM

Over-prescription of opioids in the post-operative setting contributing to the growing opioid epidemic in the United States. 6-8% of opioid-naïve patients develop long term dependence and unusual opioids risk dispersion into the community.

BACKGROUND

Opioids are not required by the majority of patients after endourologic surgery- specifically ureteroscopy with ureteral stent placement. While stent pain is a significant morbidity, NSAID's and other adjunct medications manage these symptoms as well as opioids and avoid the above risks.

PROJECT OBJECTIVES

- To decrease opioid prescribing after ureteroscopy.
- To evaluate patient outcomes calls to the office for concerning symptoms, need for additional pain medication prescriptions, visits to the Emergency Department and determine whether these outcomes were impacted by receiving an opioid prescription.

INTERVENTION

Pathway developed consisting of patient education (surgery-specific and symptom expectations), intraoperative NSAID use, and discharge with discharge and adjunct medications and no opioids. Education provided to the urology faculty and the resident staff. Resident education was key as post-operative disposition and prescriptions are usually under resident control. Information provided to additional stakeholders including anesthesia staff and post-operative recovery room nursing.



QIPS Insights Podcast Series

- Interview leads of quality improvement and patient safety projects, exploring how they got started, what worked, and key lessons learned



- **Agency for Healthcare Research and Quality (AHRQ)**
 - [QI Toolkits](#)
- **American College of Surgeons**
 - [Quality Improvement Resources](#)
 - [Six Steps to Engage Residents in Quality Improvement Education](#)
- **Institute for Healthcare Improvement (IHI)**
 - [Quality Improvement Essentials Toolkit](#)
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- **National Association for Healthcare Quality (NAHQ)**
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