

Lean Six Sigma in the Clinical Laboratory

Introduction

Lean is a management philosophy and methodology that originated from the manufacturing industry and focuses on creating more value for customers while minimizing waste in processes. Six Sigma is a data-driven methodology and quality improvement approach that aims to identify and eliminate defects, errors, and variability in processes. Together, lean Six Sigma can be applied to many industries.

Laboratory services leverage 60 to 70% of all critical decision making such as admittance, discharge, and medication (Rodney W. Forsman, "Why Is the Laboratory an Afterthought for Managed Care Organizations?" *Clinical Chemistry*, 1996, Vol. 42, No. 5, pp. 813-816). For this reason, it's important for the clinical lab to operate effectively but also efficiently. Applying lean Six Sigma within the clinical lab can aid in these goals.

Key lean Six Sigma tools/methods and application by Accumen:



Value Stream Mapping

Solution: Different process levels exist in an organization, and recognizing these process levels is important. There are high-level processes which need to be broken down into sub-processes, containing increasing amounts of detail which document every step in a process. This allows for a flowchart or diagram to be created to increase understanding of each level and how it contributes to the overall value required by the customer. Value Stream Mapping is a fundamental Lean tool to identify waste, decrease cycle times and lead time, and implement process improvement.

Benefit: To gain a complete understanding of current workflows, Accumen uses client data in combination with onsite observation of the laboratory. Utilizing Value Stream Mapping and other Lean tools to map current state processes, the team determines which steps are value added, non-value added, and critical to the process. This then allows for the design of a process which eliminates non-value-added activities, and the team provides recommended workflow adjustments and works with the client to implement them.

Lean Six Sigma in the Clinical Laboratory



Lean Daily Management

Solution: Lean Daily Management is derived from principles of Lean Manufacturing to eliminate waste and improve efficiency in processes. It is a system to know on a daily basis whether on track or off track to meet goals, to take corrective action, and to check that past actions and improvements are being sustained. There are many practices related to Lean Daily Management System, including daily huddles, visual management, standard work, “gemba” walks, problem-solving, and continuous improvement. Lean Daily Management is also key for employee engagement, by allowing staff to implement daily routines to manage operational performance.

Benefit: Accumen can create a structured framework that enables client lab leaders and teams to monitor their performance daily, identify problems or variation, and take immediate corrective action. This will actively involve both frontline staff and managers in the process, fostering a culture of accountability. Problems are identified and solved quickly, and performance metrics are transparent and visible to all. By implementing this methodology, Accumen will both drive efficiency and increase quality, all while improving teamwork in the lab.



Daily Huddles

Solution: In Lean management, daily huddles are a key component of continuous improvement. A huddle is a short, regular meeting where a team comes together to discuss progress, identify problems, and plan for the day. Team members typically stand in a circle and take turns sharing updates on their work, highlighting any issues or obstacles. Staff may seek input from their colleagues or leadership, but the huddle should be brief and focused on actionable items. Its main purpose is to keep everyone on the same page, promote transparency and accountability, and ensure that everyone is working together toward a common goal.

Benefit: Huddles are important in lab for several reasons – communication (allowing all team members to stay informed), problem-solving (acting as a forum for challenges and solutions), efficiency (taking a few minutes each day to discuss priorities, thereby improving efficiency), and safety (reinforcing safety procedures as well as allowing team members to share any safety concerns or incidents). Accumen support of daily huddles implementation includes observation to identify whether daily huddles exist, are standardized, and meet needs; training for leaders and staff on effective huddles; and onsite participation in implementation to provide guidance. Daily review of performance metrics may also be incorporated.

Lean Six Sigma in the Clinical Laboratory



Process Standard Work

Solution: Process Standard Work and Leader Standard Work are both concepts commonly used within Lean management. They focus on establishing standardization and consistency in processes and in leadership practices. Process Standard Work refers to the documented and agreed-upon set of instructions or guidelines for performing a specific task or process. It should be developed through a collaborative effort involving the individuals who perform the work, as well as leadership and subject matter experts. The purpose of Process Standard Work is to establish the baseline for how work should be performed, to ensure consistency, quality, and efficiency.

Benefit: During onsite assessments, Accumen will identify processes needing Standard Work, due to inconsistency between coworkers or shifts, inefficiency, or opportunity to improve quality. Accumen provides templates for written Process Standard Work, facilitates drafting and revising to identify the single best practice process, and works with leadership to ensure buy-in from all staff. Process Standard Work will include sequence of steps, details of each task, quality criteria, and ideal cycle time. Accumen can also assist with training to then roll-out the standard workflow. The leave-behind document continues to serve as a reference for employees, with opportunity to continually develop.

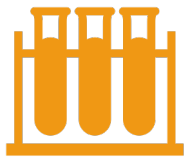


Leader Standard Work

Solution: While Process Standard Work helps employees understand how to perform their tasks correctly and consistently, reducing variation and waste in the process, Leader Standard Work refers to the set of routines or behaviors that leaders must practice at different levels to support and sustain the Lean principles in their lab. Leader Standard Work aims to ensure that leaders are actively engaged and set the example for continuous improvement. It typically includes many of the elements of Lean Daily Management such as “gemba” walks, team huddles, performance reviews, coaching and development, and problem-solving.

Benefit: Leader Standard Work is crucial to lab operations excellence transformations, as it ensures that leaders are involved in driving and sustaining improvement efforts. It also fosters a positive culture for the lab department. During leader assessments, Accumen will identify practices needing added to leaders’ standard work, provide tools to document the Leader Standard Work, collaborate with leaders to customize, provide coaching or mentoring if needed, and ultimately leave behind a system for leaders to continue to develop their Leader Standard Work.

Lean Six Sigma in the Clinical Laboratory



First in First Out (FIFO)

Solution: First In First Out (FIFO) is a Lean method of organization where items that are received first are the ones that are processed first. It is commonly used in processes as well as inventory management of expiration dates. Overall, it is a simple and effective method for managing items based on their order of arrival.

Benefit: In the laboratory, FIFO can be implemented in specimen receiving and processing in order to optimize the turnaround time of samples. Stat specimens are prioritized first, with FIFO in place within the priority. Routine specimens are prioritized second, with FIFO in place within the priority. Accumen support includes observation of workflows and data analysis of TATs to identify the need, training of support staff on FIFO, creation of process Standard Work, onsite implementation, and ongoing monitoring of success.



Kanban Inventory Management

Solution: Kanban, moving to “pull production” versus traditional “push production,” is a key Lean fundamental used to decrease waste. This creates an environment where each process takes what it needs from the preceding process, exactly when it needs it. “Pull production” links naturally to the concept of “Just in Time,” providing only what is needed, when it is needed, in the quantity needed. In inventory, having excess is considered a form of waste; having too little inventory can also lead to waste. When applied to inventory, Kanban is a visual control system and can be quite beneficial in the laboratory.

Benefit: Accumen assesses the current method of inventory management within the laboratory and presents recommendations for the next steps. This will typically begin with conducting a full inventory count and evaluating par levels for adequacy. Par levels for each item are set based upon minimum stock level, product lead time, and maximum stock level. Organization, storage, and creation of trigger points are also key features. Accumen works with the client to determine the most effective system, create the tool(s), provide training, pilot the change, standardize, and monitor for success.

Lean Six Sigma in the Clinical Laboratory



5S – Training and Execution

Solution: 5S is a workplace organization methodology which includes 5 key steps, each beginning with “S” - Sort, Straighten/Set, Shine (clean), Standardize, and Sustain. The purpose of 5S is to create and maintain an organized, clean, safe, and high-performing workplace. It is a foundational Lean methodology and is used to systematically improve the workplace through employee involvement, organization, standardization, and elimination of time spent tracking down needed tools or supplies.

Benefit: Following an onsite assessment, a schedule is outlined to target each area of focus. Key to the overall outcome is to “red tag” items which are unneeded or in disrepair. Remaining items are then organized according to efficient workflows and standardized into their placement going forward, and the workspace is thoroughly cleaned. Maintaining the area in the newly clean, organized state is key to success, so checklists are created for daily or weekly use. Staff and leadership auditing tools are also developed which aids in hardwiring the process.



A3 Improvement Approach

Solution: “A3” is a problem-solving and continuous improvement methodology used in Lean management. It involves creating a standard “A3” report that captures the current state of a process, the desired state, root cause analysis, and an action plan for improvement. The A3 typically contains standard sections including background and a problem statement, current state analysis, root cause analysis, a goal statement, countermeasures or action plan, implementation plan, and follow-up and evaluation. This process is used to help organizations develop a structured approach to problem-solving.

Benefit: In laboratory continuous improvement, Accumen emphasizes the use of data, collaboration, and visual communication to ensure that everyone involved understands problems, their root causes, and proposed solutions. A3 problem-solving is a great fit for this emphasis, and Accumen has a standard A3 tool available for client use. As needed, Accumen support to clients can include provision of the tool and any modifications needed, training for leaders and staff on A3 problem-solving, implementation of the methodology, and coaching/mentoring for teams creating A3s.

Lean Six Sigma in the Clinical Laboratory

Root Causes Analysis (RCA)

Solution: A Root Cause is a factor that causes a nonconformance and should be eliminated through process improvement. Root Cause Analysis is a collective term that describes a wide range of approaches and tools which uncover the true root causes of problems and address them. It is an in-depth problem-solving methodology that focuses on identifying the underlying driving factor(s) of a problem, and it can be an influential tool for organizational improvement. Organizations can shift from treating the symptoms of a problem, which usually leads to short-term solutions, to fixing the root cause of a problem and proactively preventing an error from occurring again.

Benefit: Various Lean tools may be utilized in the lab within RCA. Accumen works with the client to identify the focus of the RCA as well as the tools which could be most effective to visualize the occurrence. Accumen assists with the development of a plan of correction. Communication, follow-up, and sustainability are additional key components where the Accumen team provides support and guidance throughout the process.

SWOT Analysis

Solution: SWOT analysis is a strategic planning tool used to assess the strengths, weaknesses, opportunities, and threats of a business or project. It helps identify internal factors (strengths and weaknesses) that can be leveraged or improved upon, as well as external factors (opportunities and threats) that can impact success. By understanding these factors, organizations can make informed decisions and develop effective strategies. A structured approach to conducting a SWOT analysis involves several steps to ensure a comprehensive and insightful assessment of the organization.

Benefit: Accumen will identify:

- Strengths: Evaluate the lab's internal resources and capabilities
- Weaknesses: Assess internal factors that hinder lab performance
- Opportunities: Analyze external trends that present favorable conditions
- Threats: Evaluate external factors and challenges that negatively impact the lab

After identification, Accumen will analyze any inter-relationships to explore connections between identified items. For example, a strength in advanced laboratory equipment could be leveraged to capitalize on emerging opportunities or to mitigate potential threats. Accumen and the client will together prioritize the most significant items based on impact and likelihood, and develop strategies around each to leverage strengths, address weaknesses, capitalize on opportunities, and mitigate threats.