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Creating the Ideal Core Lab Layout from Existing Space: Lessons from Lean Lab Innovators



Argent Global Services Lean Training Series

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Background



- Steve Stone, Managing Director, Argent Global Services
- Process-engineering and management consulting firm
- With 18-years experience, Argent pioneered many engineering services for the health care diagnostics industry
- Skill Set & Methodology include:
 - Industrial Engineering
 - Lean Enterprise & Six Sigma
 - Data Collection & Information Gathering
 - Process Design & Layout
 - Management Tools & Software
 - Implementation Support
 - Performance Measurement & Coaching



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Realistic Solutions For Success

Today



What We Will Learn

- Begin to see existing lab space as an opportunity and not a barrier to efficiency

Key Objectives

- Understand how Lean experts view the laboratory and how to see layout opportunities
- Discuss the lean concepts that will give you the most mileage with your layout challenges
- How continuous flow is a key part of an efficient layout

Agenda



- What is a Core Lab
- Core Lab Execution
- Lean Review
- Summary



What is a Core Lab

Bringing similar testing or functions together to a centralized area

The Goal (*in Lean terms*)

- Create an efficient combination to maximize value-added content while minimizing waste



What is a Core Lab

- AKA: Central Lab, Automation Lab, Main Lab, Capacity Lab, Open Lab, etc.
- First thought is Clinical, but Core Labs can be implemented anywhere
 - Same concepts, different parts
- Typically includes centralized receiving and specimen processing

Purpose of a Core Lab



Purpose (Objectives)

- Reduce TAT (faster testing)
- Greater utilization of people and assets
- Reduce unattended work (waiting)
- Reduce floor space requirements
- Improve visibility of testing (manage work)
- Gain economies of resources

Existing Space



- Core labs can be created in existing space
- Don't compare your space to other labs
- Compare your potential to your past
- Lean is about incremental improvements



Core Lab Space

- The size and shape of your space is not critical to the success of your lab
- Visibility, communication and flow is critical for Core Labs
- Layout and placement is critical for visibility, communication and flow



Lesson

People with too much space create waste

- They find ways to fill the space
- They create redundancies
- They create their own silos, usually away from others
- They may be lax with housekeeping
- They may not get rid of things (hoarders)



Lesson

An Issue

- We make assumptions on how much space we need based on...
 - our current way of doing things
 - history – how we have always done it
 - pre-conceived ideas
 - inefficient processes
 - the amount of space that is given to us



Execution

- You can get more done with what you have or even less space
- How to create an efficient Core Lab with my existing space?

Steps for execution of a Core Lab:



Which Tests?

- Similar testing – Similar people
- Prioritize testing based on customer expectations (TAT goals) and demand (volume)
- Automation – load and go instruments can be kept together
- Automation – shared specimens



Which Tests?

- Don't exclude a type of testing based on preconceived ideas
- Most of your choices could be obvious
- But, you may be able to merge areas not previously together



5S System

5S: Workplace Standardization & Organization

- Used to create organized, clean and functional work areas

- Used to control supplies and materials
- Create efficient workstations
- Facilitates standardization
- Reduces unused items
- Saves space

1. SORT
2. SET IN ORDER
3. SHINE
4. STANDARDIZE
5. SUSTAIN



5S System

Outcomes

- Best place to start for most projects
- Clean baseline to work with
- Starting with an organized and standardized area will lead to better decision making
- You will know how much space you really need
- Good Core Labs should only contain the bare essentials – be clutter free

Evaluate the Existing Space



- What barriers are movable – benches, instruments, cubicle walls, partitions, desks, storage cabinets, non-load bearing walls, doors, cut pass-through windows, etc.
- Can this space be opened-up?
- *Always check your local fire codes before removing doors or cutting windows.*

Tips



- Consider operating with fewer benches – benches become places to set things down and build clutter
- With continuous flow, you should not allow specimens to wait on benches
- Create controlled staging locations as needed (kanban)
- Create reagent and specimen prep areas as needed with a limited amount of bench space
- Create administrative areas with a limited number of benches – but do not let these areas interfere with the flow of specimens



Layout

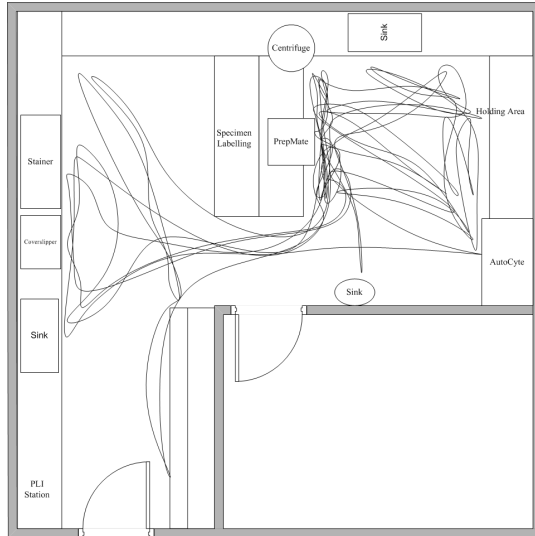
- Typical layouts are based on: work cells, semi-circles, pods
- But, few Core Labs end-up having a perfect symmetrical layout
- Focus on line-of-site and unobstructed travel
- Staff should be able to see and operate multiple stations



Work Cell Concepts

- Serial vs. Parallel activities
- Functions that are in serial (example, Histology) are good places for more traditional work cells
- Testing in parallel (example, clinical), need a more open, flexible area

Layout Example



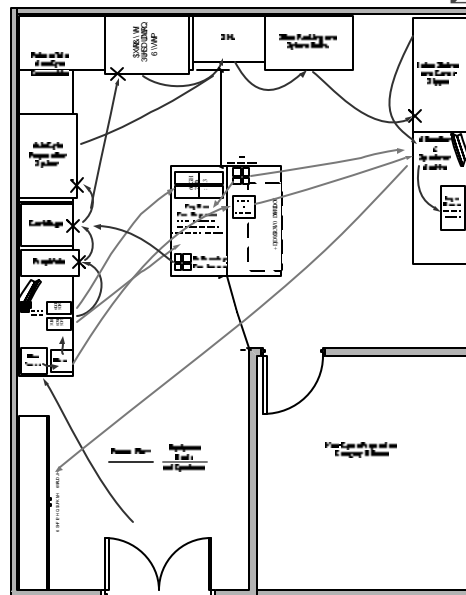
- Cytology lab with a poor layout
- Evolved over time
- Spaghetti diagram shows CT travel for 30 min.

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Layout Example



This is the future state of the same lab.
Notice the travel has been greatly reduced due to a more efficient layout.



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Front-end

- Core Labs should include front-end processes
- The front-end can dictate flow, batch sizes, quality

Look for:

- Proximity – front-end close to the core
- Loading racks in processing
- Batch sizes (flow control)
- Handling all pre-analytical steps



Standardization

- Standardization is a key part of creating and managing a core lab
- Especially, if you are combining different areas

What to Standardize

- Look at processes and rules
- Look at batch-sizes
- Look at training

Lean Review



Would like to review the Lean concepts that best support efficient Core Lab

The Lean Tie-In



- Even before Laboratories used Lean, Core Labs were created to reduce waste and facilitate continuous flow (reduce turnaround times)
- Now with Lean, we can explore ways to further improve the Core Lab concepts

What is Lean?



*The goal of Lean is waste reduction
in order to achieve continuous flow*

The Wastes of Lean



- Waiting
- Travel / Transportation
- Motion
- Defects
- Overproduction
- Inventory
- Excess Processing

Waste – Deeper Dive



- Waiting is the number one waste in diagnostics
- Many of the other wastes will lead to additional waiting
- Includes specimens, staff, equipment, results, customers, etc.
- An outcome of the Core Lab is to reduce waiting and get the result sooner
- Look for examples of waiting and what causes this to happen in your labs

Continuous Flow



- Processes that focuses on moving specimens with minimal batching and queuing
- Why?
 - Reduces waiting
 - Eliminates double handling of specimens
 - Improves speed
 - Requires less space

Continuous Flow



Continuous flow is created by

- The right sized batches
- Efficient layout or work cells
- Signals and visual controls
- Processes and training

Batch Size Reduction



Single Piece Flow is a goal of Lean

- Good concept for hand-on processes
(accessioning and labeling)
- If work arrives in large volumes or batches, this
concept can create more problems than it solves
- Doesn't apply well to moving specimens
(transportation)

Batch Size Reduction



Optimal Batch Size

- Sets attainable and realistic batch sizes for the environment. Based upon:
 - Arrival patterns
 - Capacity of instruments, racks and trays
 - Instrument cycle times
- Core Lab should focus on optimal batch size

Balanced Work



- To manage batches and queues and reduce waiting, process stations will need to be balanced
- Balanced work requires the process stations to be in pace and harmony
- How is this accomplished?
 - Shift work elements – redistribute responsibilities
 - Utilize multiple work stations
 - Look for flexibility



Visual Controls

- Use visual controls to manage batch sizes and flow
- They are signals for moving specimens
- Both the rack and the tape are visual controls



Review

1. Which tests – what goes in the core lab?
2. 5S – used to tell how much space you really need
3. Examine existing space – what barriers can be moved?
4. Layout – work cell concepts
5. Front-end – part of the core
6. Standardization
7. Lean concepts – used to improve efficiencies and help manage continuous flow

Summary



- Focus on what is important for you
- Key on waste reduction
- Look for incremental improvements
- Forget your preconceived ideas about Core Labs

Closing



- Q&A
- Thank you
- Remember...
“Learning is not compulsory, neither is survival”
- W. Edwards Deming

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