Overview of Lean Principles in Histology: Patient Safety, Efficiency, and Workflow

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Learning objectives

After this webinar, you will be able to:

• Evaluate histology laboratory operational challenges
• Define waste and discuss the ways of identifying it in histology
• Identify common practice risks in the histology laboratory process
• Describe basic lean fundamentals that support patient safety, efficiency, and workflow in histology
Anatomic Pathology Laboratory Challenges

- Laboratory automation is present but still manual processes make it hard to scale without adding staff
- Human touchpoints and decision points make it difficult to error proof processes
- Nature of processes tend to create bottlenecks that set the pace of production
- Reduction of process steps are critical to creating efficiency and safety
- Striking a balancing between the “art” of histology and automation
Anatomic Pathology Operational Challenges
Mislabeling Errors

18 month study on specimen labeling errors in surgical pathology\(^1\)
  o 0.25% (75) of cases involved labeling errors
    – 73% (55) patient name
    – 24% (18) specimen/site

• Process step-location of majority of mislabeling
  o 69% in gross room
• 73% (55/75) downstream error of slides assigned to an incorrect patient
• Recommendation was to implement barcode tracking or RFID technology

College of American Pathologists Study of 136 Institutions-Q-Probes Study\(^2\)
  o 1811 mislabeling occurrences
  o Mislabeling rates: Cases 0.11%, blocks 0.17%, slides 0.11%
  o Lean processing techniques noted as valuable
  o Recommend control of 3 process points due to pattern of errors: Accessioning, transfer of tissue into block, and cutting and slide mounting
  o Batch work and insufficient segregated at points of tissue transfer source of error

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\(^1\) Am J Clin Pathol. 2010 Sep; 134(3):466-70
\(^2\) Arch Pathol Lab Med. 2011 Aug; 135:969-74
Histology Process and Practice

Manual Tasks → Influence the Accuracy of the Outcome

“Common Histology Practice”

✓ Hand labeling
✓ Hand typing
✓ Handwritten orders
✓ Visual matching of paper with patient artifacts
Histology Process and Practice

Opportunities to Improve Efficiency and Patient Safety

“Common Histology Practice”

✓ Batching
✓ Human Error Risk
✓ Duplication
✓ Excessive motion

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Lean Benefits

- Eliminating waste and operational expense
- Continuous flow of value added activities
- Visual management
- Improving on time performance
- Increasing productivity with the same resources
- Supports continuous process improvement
Lean Six Sigma Toolbox

✓ Lean
- 5 whys (cause and effect or Ishikawa)
- 5S
- Kanban
- Poka Yoke (error proof)
- Standardized Work
- Value Stream Mapping
- Cell Design
- Kaizen (continuous improvement)
- Pull Scheduling
- Quick Changeover (SMED)

✓ Six Sigma
- Process Flowchart
- Pareto Chart
- ANOVA
- Process Capability
- Measurement System Analysis
- Statistical Process Control
- Design of Experiments
- FMEA

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Foundations of Lean

Waste \[\equiv\] Value of Product

\[\equiv\] Value to Customer
Impact of Identifying Waste

• Helps identify the non-value added steps in a process
• Determines where there are bottlenecks and waste
• Increases the understanding of the process and support improvement initiatives
• Helps to streamline process

8 Types of Waste

- Over Production
- Transportation
- Motion
- Waiting
- Over Processing
- Excess Inventory
- Defects
- Unrealized Talent
Process Waste Identification

• Create a process map
• Evaluate each process step
• Identify process value
  o NVA (Non value add)
    – Duplicate labeling
    – Transfer of patient data
  o VA (Value add)
    – Cutting slides
    – Slide staining
  o Bottlenecks
    – Batch handling
    – Cut off time
Lean Principles – Value of Process Mapping Process Steps (IHC Instrument A)

42 Touch points
24 Non-value added steps
456 hrs. annual tech time
Lean Principles – Value of Process Mapping
Process Steps (IHC Instrument B)

14 Touch points
6 Non-value added steps
66 hrs. annual tech time

Instrument B
66% Reduction in touch points
85% Reduction in Tech Time
Reallocate staff to value add
Lean Principles
Work Cell Design Drives Efficiency

- U shaped process
- Mitigate return paths
Lean Principles
Work Cell Design Drives Efficiency

- Operator placement to reduce process motion
- Strive to operate using a pull system - not push system
- Highest volume activity (H&E) closest to EXIT point
- “Runners” non-technical personnel move patient artifacts (specimen, cassettes, slides, blocks)
Lean Principles - Driving Standard Practice at the Work Bench

Visual Cues
- Posters
- Reagent management
- Taping bench top for slide hand off point

Color Coding
- Cassette Color-Routine vs. Stat
- Slide color to drive process and handling
- Pull Station-Color coded visual cues to correlate with next process to drive downstream efficiency
Lean Principles
Driving Standard Practice at the Work Bench

• Error proofing (Poka Yoke)
  o Eliminate human error risks through technology
    – Lab information system (LIS) generated barcodes
      ▪ Cassettes, Slides, and Specimen protocols
    – Scanning and Barcoding at Process Steps
      ▪ LIS or Middleware
  o Instrument technological features, barcode slides & reagents
Key to Sustaining Lean Practice

- Continuous Improvement
- Culture
- Leadership to Bench

Arrows:
- Long Term Organizational Wins
- Everyday Practice
- Empowering Staff
Performance Metrics
Benchmark-Driving Continuous Improvement Goals

• Evaluate results daily, employee huddles and weekly review for continuous improvement
  o Kaizen

• Monitor and evaluate pattern of occurrence
  o Pareto Charts

• Root cause analysis
  o Cause & Effect Diagram
Summary
Implementing Lean into Everyday Practice

- Engage all staff and leadership in implementation ownership
- Evaluate current operational state
- Identify non-value add activities
- Plan & Prioritize a strategy for implementation
- Train staff on new techniques prior to execution
- Visual cues & error proofing to drive standard practice
- Implement standardized processes complemented by technology
- Benchmarks & display board to share status and success
- Daily team huddles review data results – real time
- Continuous process review to sustain changes
Questions?

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