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

CHRISTA HLADIK CAPPELLANO, B.S.
HT(ASCP)QIHC, LSSBB

CEO, COLABRATION CONSULTING™, LLC

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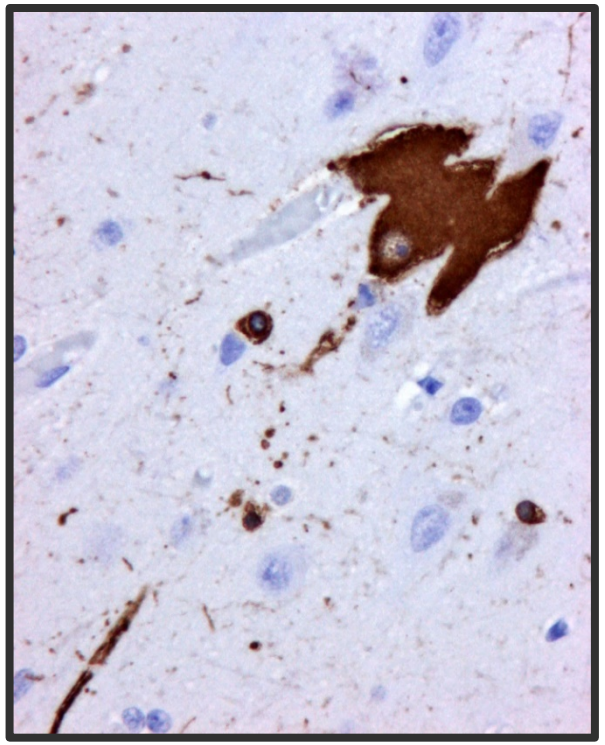
Learning objectives

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]

- 0.25% (75) of cases involved labeling errors
  - 73% (55) patient name
  - 24% (18) specimen/site

- Process step-location of majority of mislabeling
  - 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]

- 1811 mislabeling occurrences
- Mislabeling rates: Cases 0.11%, blocks 0.17%, slides 0.11%
- Lean processing techniques noted as valuable
- Recommend control of 3 process points due to pattern of errors: Accessioning, transfer of tissue into block, and cutting and slide mounting
- Batch work and insufficient segregated at points of tissue transfer source of error

[1] Am J Clin Pathol. 2010 Sep; 134(3):466-70
[2] Arch Pathol Lab Med. 2011 Aug; 135:969-74

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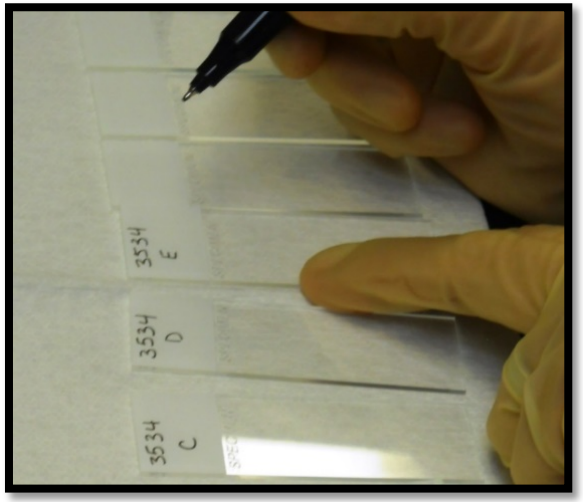
Histology Process and Practice

Manual Tasks → Influence the Accuracy of the Outcome

"***Common Histology Practice***"

- ✓ Hand labeling
- ✓ Hand typing
- ✓ Handwritten orders
- ✓ Visual matching of paper with patient artifacts

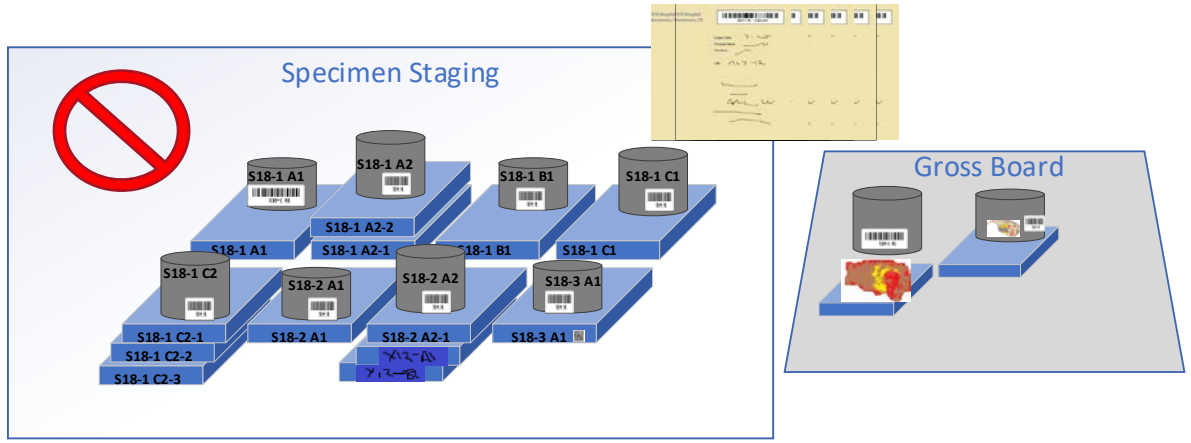


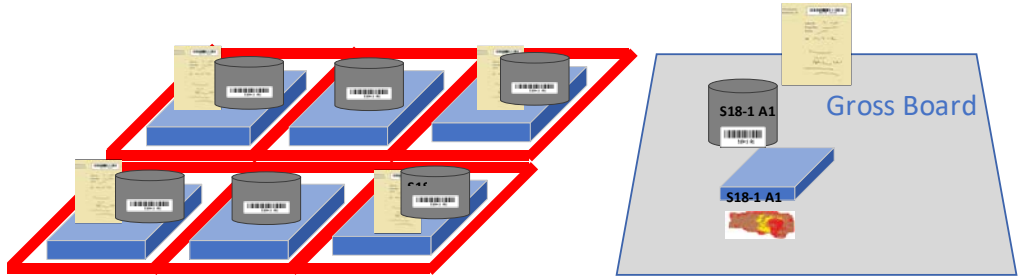
Histology Process and Practice

Opportunities to Improve Efficiency and Patient Safety

"Common Histology Practice"

- ✓ Batching
- ✓ Human Error Risk
- ✓ Duplication
- ✓ Excessive motion





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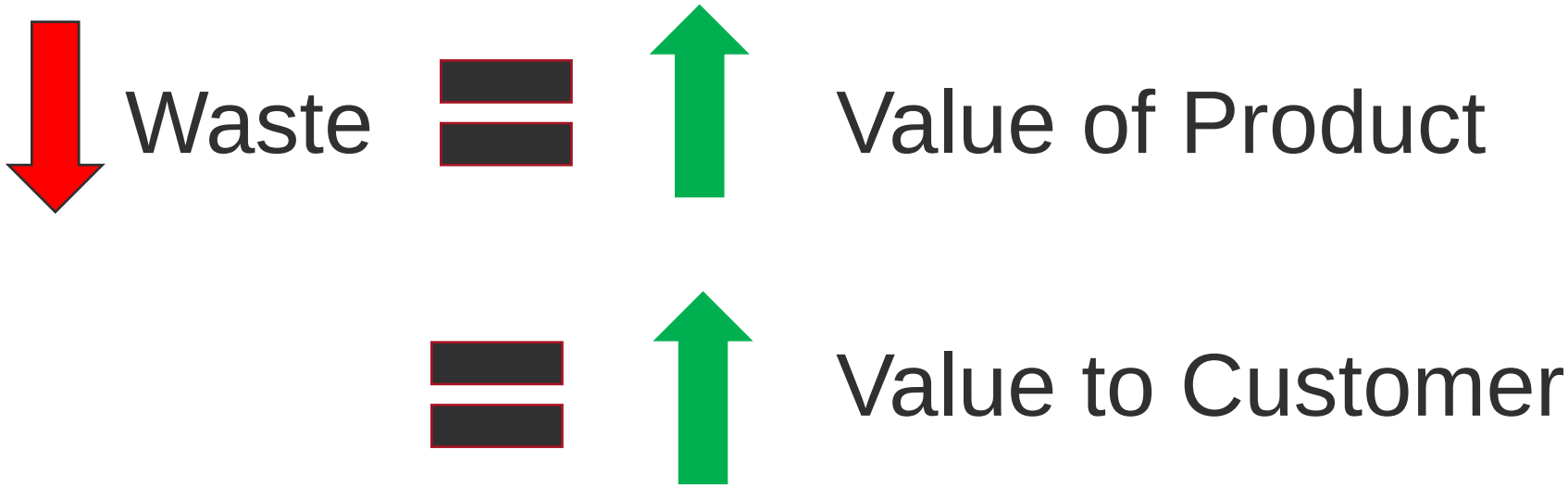
Lean Benefits

- 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

Foundations of Lean



Impact of Identifying Waste

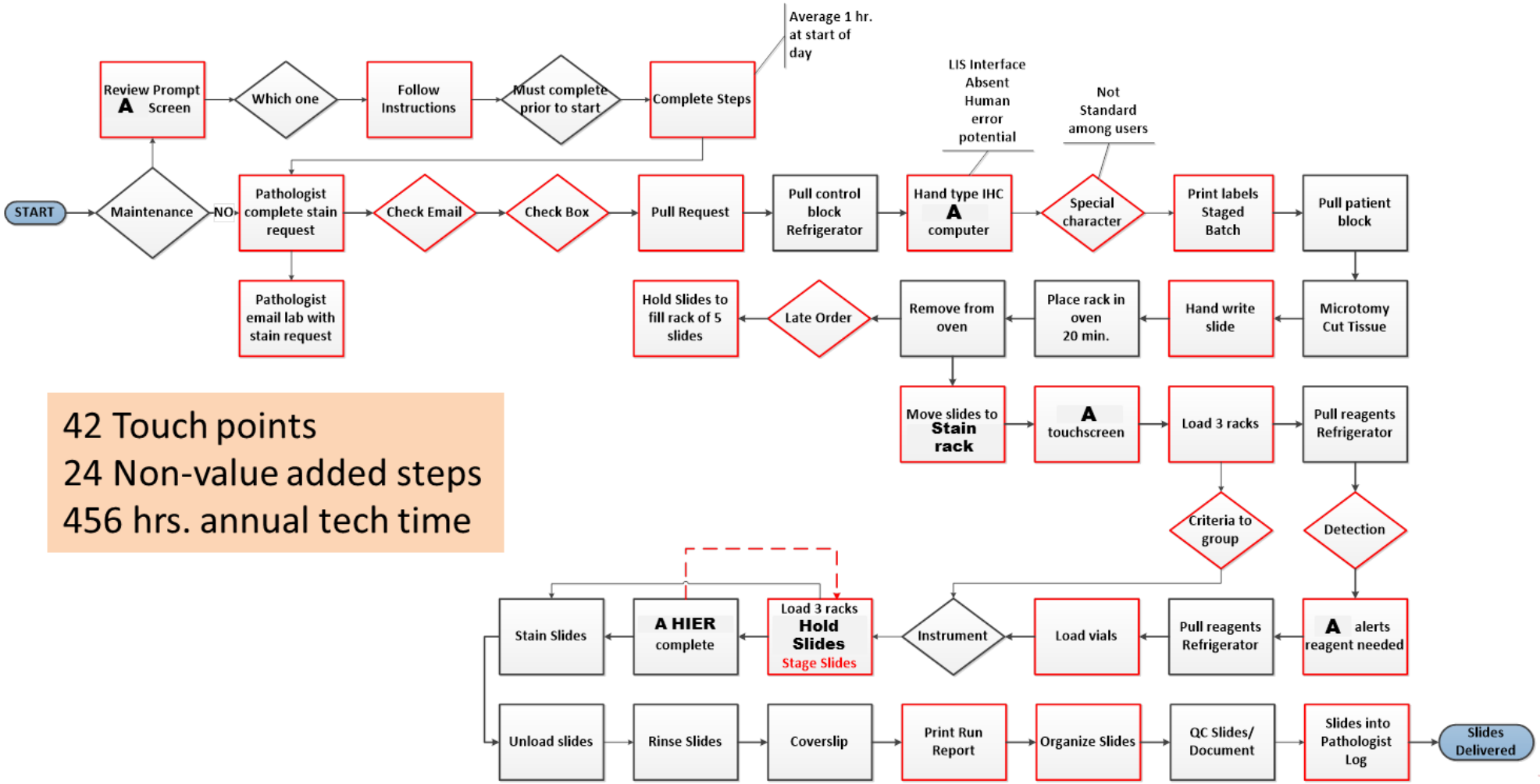
8 Types of Waste

- 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

Process Waste Identification

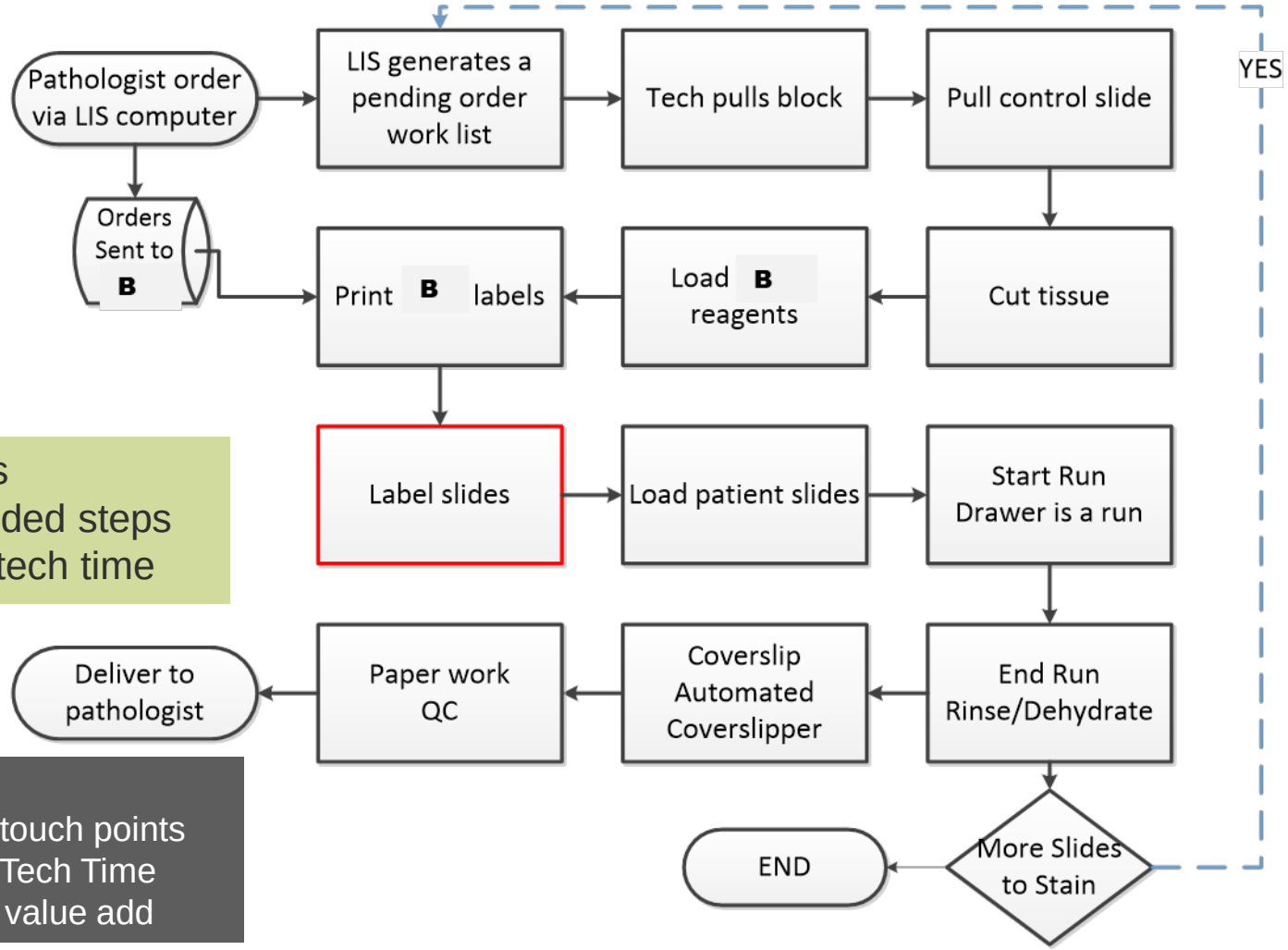
- Create a process map
- Evaluate each process step
- Identify process value
  - NVA (Non value add)
    - Duplicate labeling
    - Transfer of patient data
  - VA (Value add)
    - Cutting slides
    - Slide staining
  - Bottlenecks
    - Batch handling
    - Cut off time

Lean Principles – Value of Process Mapping
Process Steps (IHC Instrument A)



42 Touch points
24 Non-value added steps
456 hrs. annual tech time

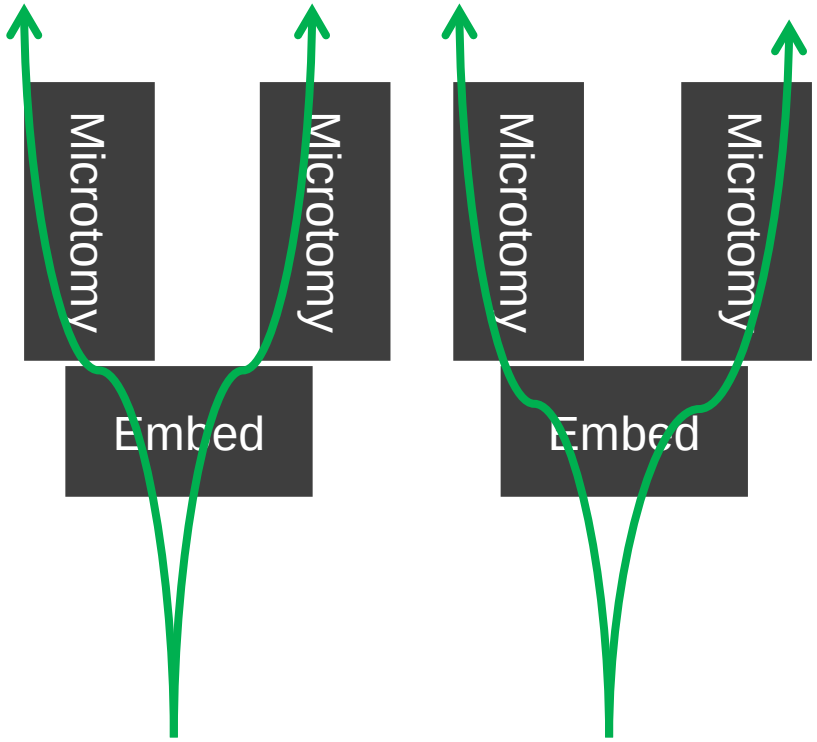
Lean Principles – Value of Process Mapping
Process Steps (IHC Instrument B)



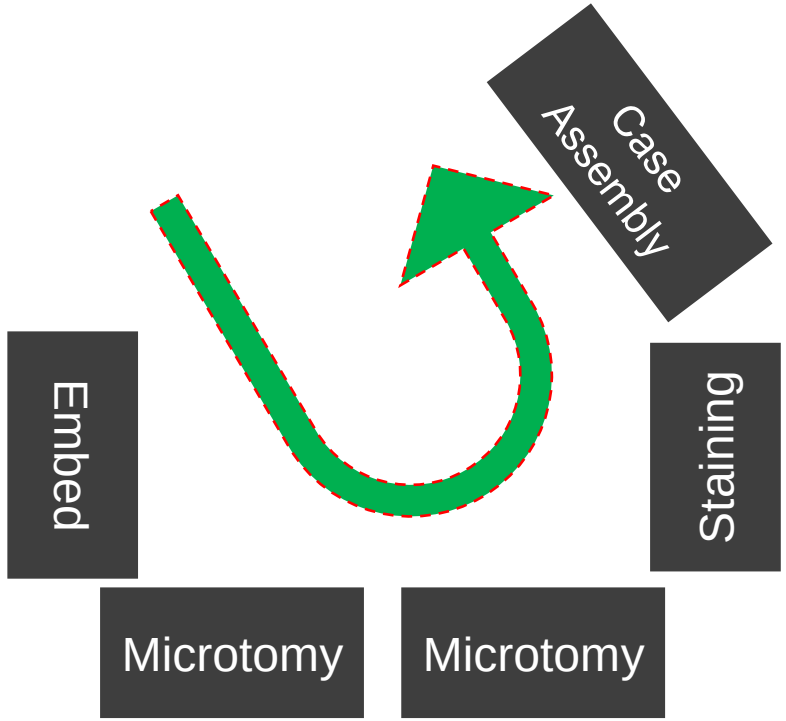
14 Touch points
6 Non-value added steps
66 hrs. annual tech time

Instrument B
66% Reduction in touch points
85% Reduction in Tech Time
Reallocate staff to value add

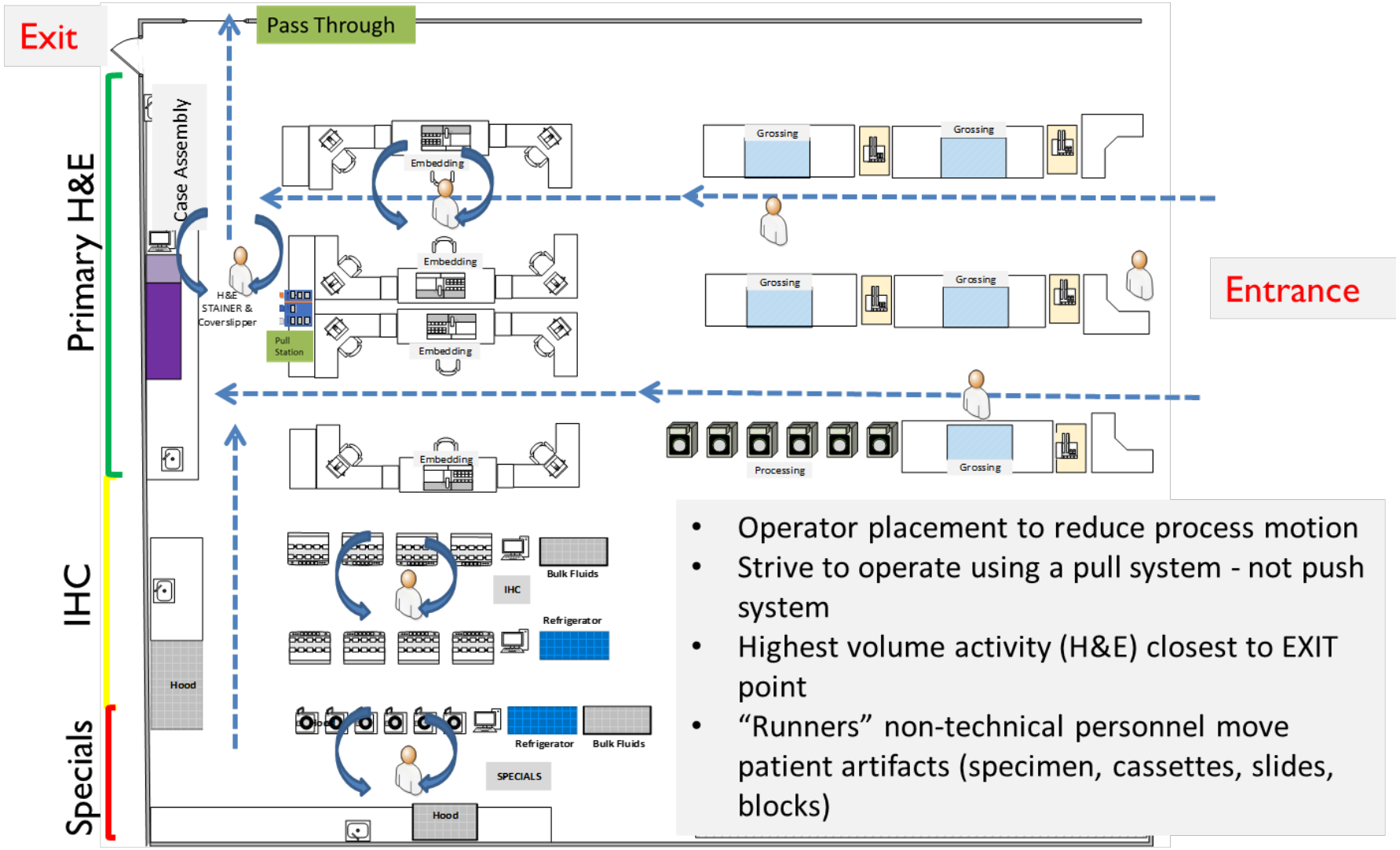
Lean Principles
Work Cell Design Drives Efficiency



- 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)

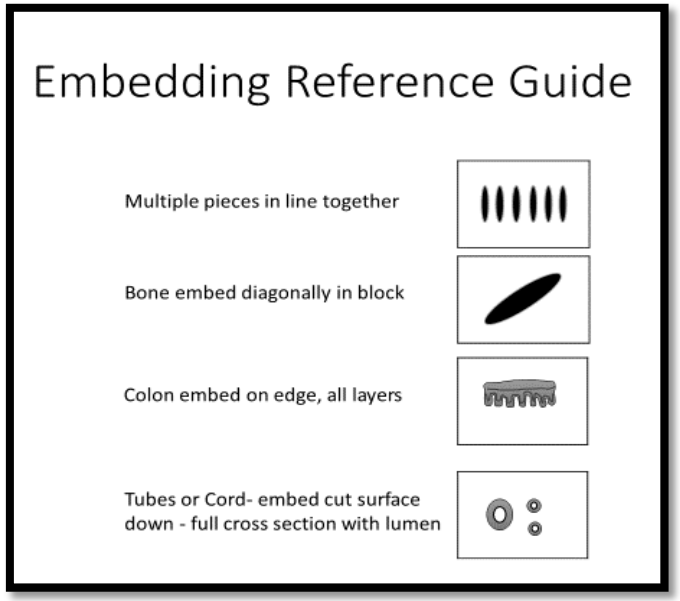
Lean Principles - Driving Standard Practice at the Work Bench

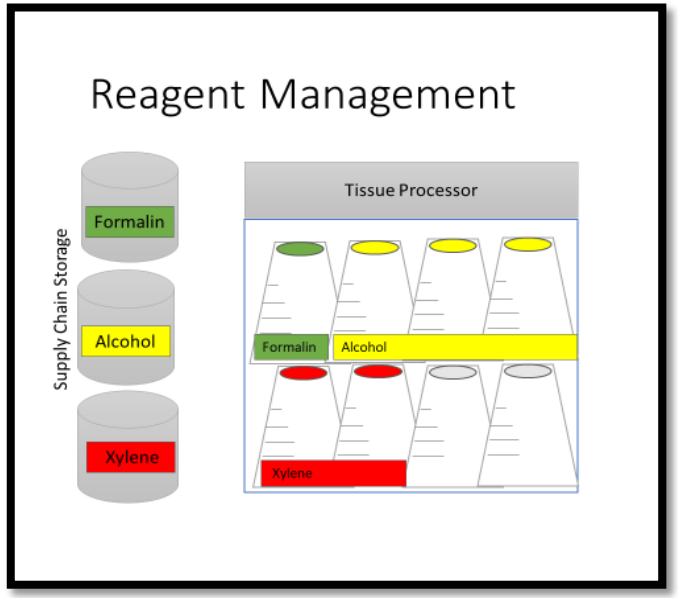
Visual Cues

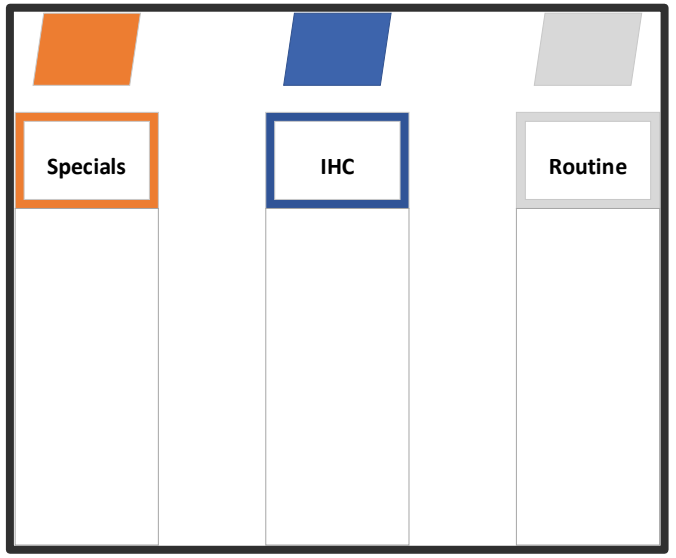
- Posters
- Reagent management
- Taping bench top for slide hand off point

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



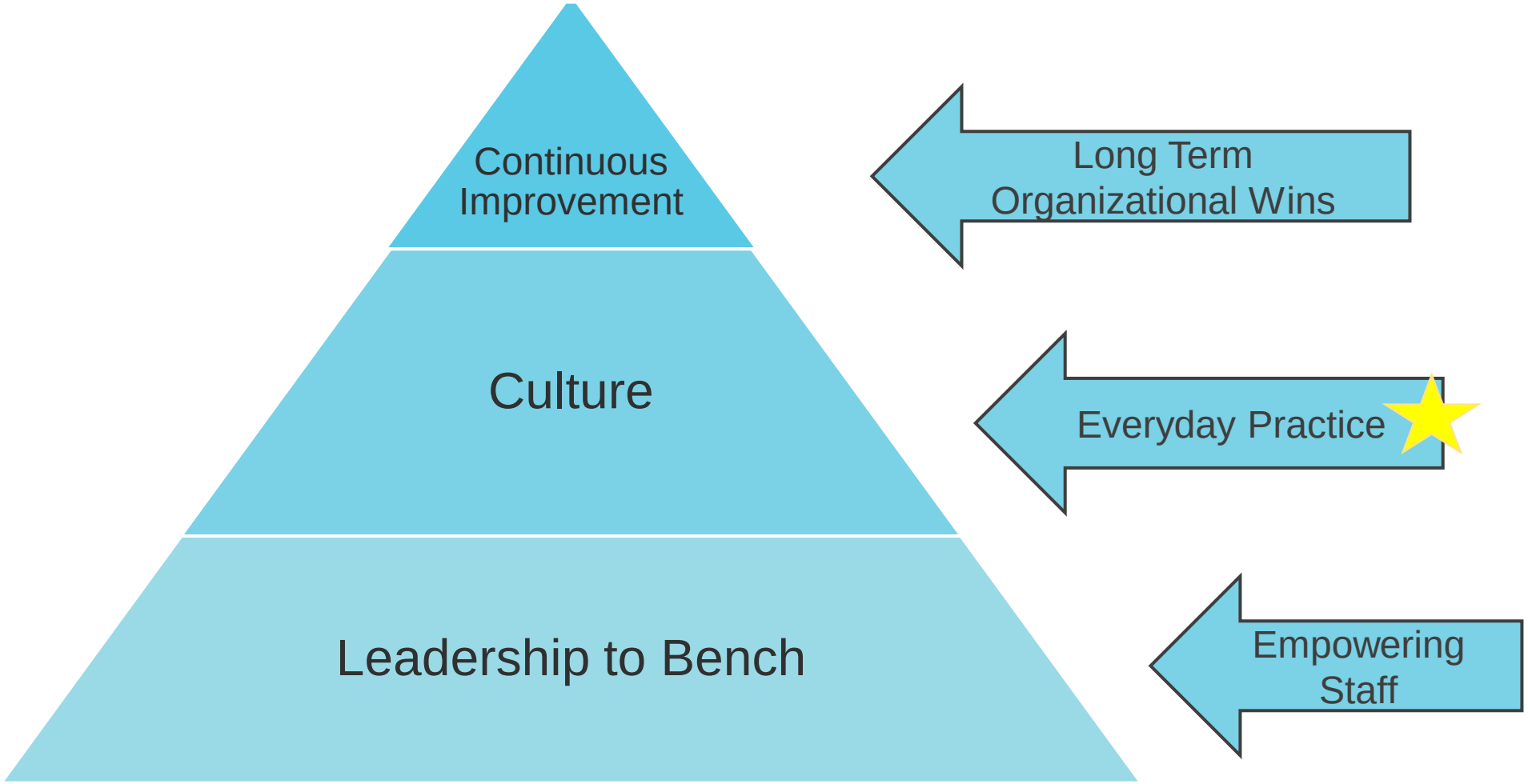




Lean Principles
Driving Standard Practice at the Work Bench

- Error proofing (Poka Yoke)
  - 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
  - Instrument technological features, barcode slides & reagents

Key to Sustaining Lean Practice



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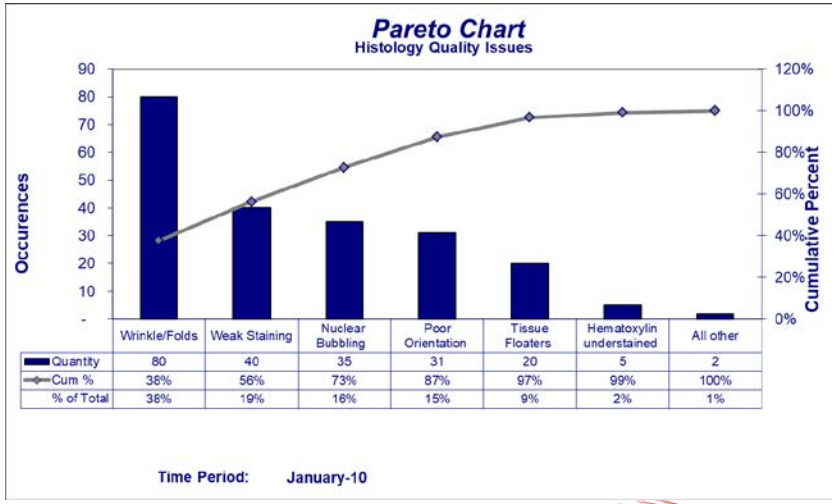
Performance Metrics
Benchmark-Driving Continuous Improvement Goals

- 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



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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

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Questions?

Presented by:

Christa Cappellano, B.S. HT(ASCP)QIHC, LSSBB
coLABration Consulting™, LLC
Phone 214.799.9575

christa.cappellano@coLABration.com
https://www.coLABration.com

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