Transforming Histology Operations with Work Flow Optimization and Automated Systems

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Expectations:

- Identify how process Improvement methods can lead to improved outcomes.
- Learn how the application of LEAN principles reduces opportunities for errors.
- See how automation and LEAN complement each other in histology.

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Why?

- Histology has traditionally been slow to accept many of the newer Performance Improvement Process methods.
- Now a number of facilities are beginning to apply these new methods to address their issues.
- It is about improved patient service, enhanced efficiency and elimination of waste

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Space and Product Flows

- At McKennan, like most Histology Labs, space was added in a random fashion as it was needed and became available with little attention to flow.
- Specimen/Product flow did not follow the most efficient and effective route due to layout constraints.

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Concept of Flow

- One of the major Lean concepts is FLOW.
  - The goal is to allow product to “flow” from one step to another with minimal if any interference.
  - You also want to allow the operators to “flow” seamlessly from one phase to the other. You want to reduce wasted motion and delays.

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Pre Lean Set Up

- Our pre-lean histo area was literally divided by the clinical lab.
  - Grossing was done in one side, processing, embedding, microtomy and staining in another.
  - Staff retraced their steps continuously.
  - The processing area was not set up for good flow. It was set up where ever you could “fit” the equipment.

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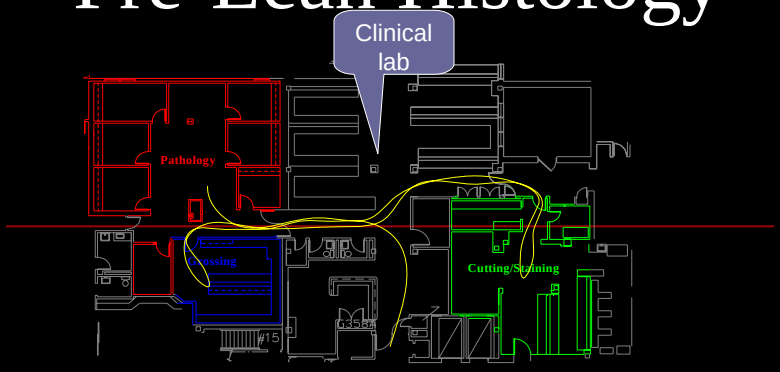
Pre-Lean Histology



Equipment Selection

- Sakura Express Rapid Processor
  - 1 and 2 hour protocols in use
- Sakura VIP Conventional Processors
  - Overnight processing for selected tissues
- Conventional Embedding Centers
- Sakura Linear Stainer
- Dako IHC Stainers (2)
- Ventana NexXes Special Stainer

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Product/Operator Flow

- Cases are processed singly through the grossing step.
- Processed in small batches on the Sakura Express.
- Embedded, Cut and mounted in single case flow to reduce errors.
- Final step is block check to ensure quality and error detection.
- Product Flow is now unidirectional.

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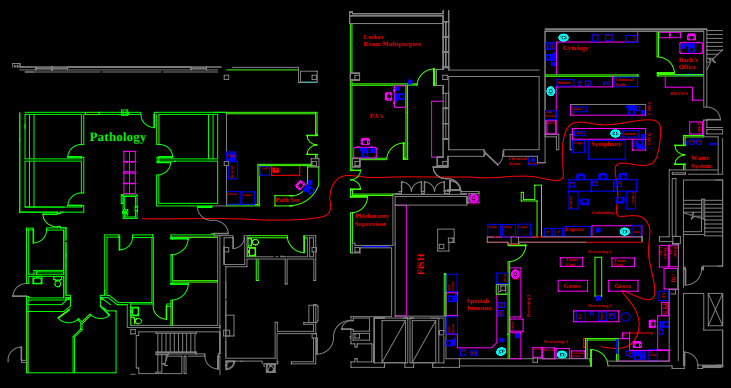
Post Lean Workflow



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Typical Histology Flow

- It all begins with specimen accessioning.
  - It is here where demographics are dropped in, specimen types entered, pre-analytic processing, etc. are performed and documented on a single case flow basis.
- Once Accessioned, the product “flows” to the grossing stations.
  - Grossing is also done on a single case basis.

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Receiving/Accessioning

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Grossing Area

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Tissue Processing

- Because tissue processing is by its nature a batch system, a rapid processor is used and processes small batches (10 -15 cassettes) using one or two hour process cycles.
- Normal overnight processing is still used for certain tissues on a limited basis.

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Tissue Processing – Rapid/VIP

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Embedding the Tissues

- Product “flows” from the rapid processor to the embedding station(s) in small batches.
- The batches are separated into cases by accession number.
- Each case is embedded individually but all of the cassettes from a case are done together.

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Embedding/Cutting area

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Microtomy/Staining

- Cases are handed across from the embedding stations to the cutting stations.
  - They are placed on ice trays to cool and we prep and face each block individually in groups of 10 or less (more than 1 case at a time but separated from each other)
  - Cases are cut in single case fashion and slides are labeled as the cases are cut. No pre-labeling.
  - Slides are prepared for staining in small batches separated by empty slots on the stainer.

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Microtomy/Processing

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Block Check

- A final step for quality control. The finished case slides are checked against the blocks to ensure appropriate identification.
  - Slides are also viewed for quality of stain, adequacy of depth, quality of section, etc.
  - Any variation is documented and retraining is performed.

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Block Check/Special Stains

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Special Stains

- Most special stains are automated.
- Because of Lean workflow, many cases are completed on same day (including some special stains).
- Most special stains can be ordered up until 3 PM and be available the same day.
- Many IHC stains can be ordered by 12 PM and be available the same day.

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IHC Area

- IHC cuts their own slides.
- All cases are done in single case flow.
- Any IHC ordered by 11 AM is available that afternoon by 5 PM.
- IHC offers over 100 different markers and all are available as needed.

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Current Pathology Turn Around Times

- Current Condition (as of 2/09)
  - Group Average = 22.3 Hours
    - Range - 6 to 48.5 hours

  Receipt into Histology to Sign-Out by Pathologist
  Time reflects all cases average
  Selected cases available same day as received

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Post Lean Improvements

- Linear workflow means markedly reduced walking and time waste.
- Block Check/Quality Check means less re-work and higher quality.
- In excess of 65% of all specimens are processed using rapid processing.

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Summary

- Lean design improved workflow
- Lean plus Automation allowed for greater productivity with less stress.
- Lean design improved total Pathology Turn Around Time.
- Staff satisfaction is at its historical highest.
  - Both technical staff as well as Medical Staff.

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Pearls of Pathology

- Improve processes THEN automate.
- Use improved processes to design area.
- No need to have pathologists read at night if no action is to be taken until morning.
- Look at TOTAL processes not just technical processes.
- Applying Lean Principles takes patience

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Questions??

Thank you.

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