

## Using Lean to Create High-Performance Workflow in a Histology R&D Laboratory

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Lab Quality Confab 2009

### Agenda

- Why focus on workflow?
- Making the commitment: building the Workflow Applications Lab
- Starting to get lean: how we use the lab
- Continuing the journey: where we're heading

## Anatomic Pathology Laboratory Challenges

### The Need to Improve Efficiencies



#### Cost and Productivity

- Increasing workload
- Labor shortages
- Budget constraints
- Labor-intensive work processes

#### Turn Around Time

- Pressure to reduce time to diagnosis
- Patient fast tracking (STAT requests)

#### Quality

- Specimen handling and tracking
- Data entry errors
- Staining quality and reproducibility



## Workflow Learning Curve in AP

### Market Segmentation Estimate



- Organize (Efficiency) – 80% of labs
  - Remove non-value added and repetitive tasks.
  - Implement automation.
- Standardize (Quality) – 10% of labs
  - Define and validate processes.
  - Document that validated processes are used.
  - Be alerted if there are deviations from the defined process.
- Optimize (Productivity) – 10% of labs
  - Real time data collection to support LEAN lab metrics and KPI's.
  - Optimized and adaptive operations.
  - Proactive equipment maintenance and inventory management.

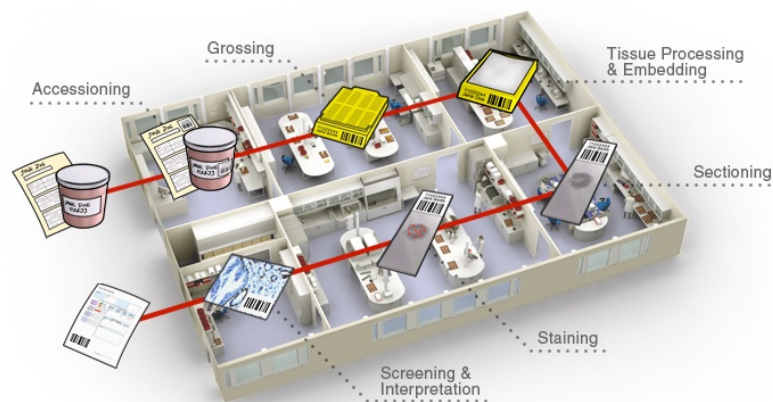
## Workflow Applications R&D

### Dako's Concentrated Focus on Workflow

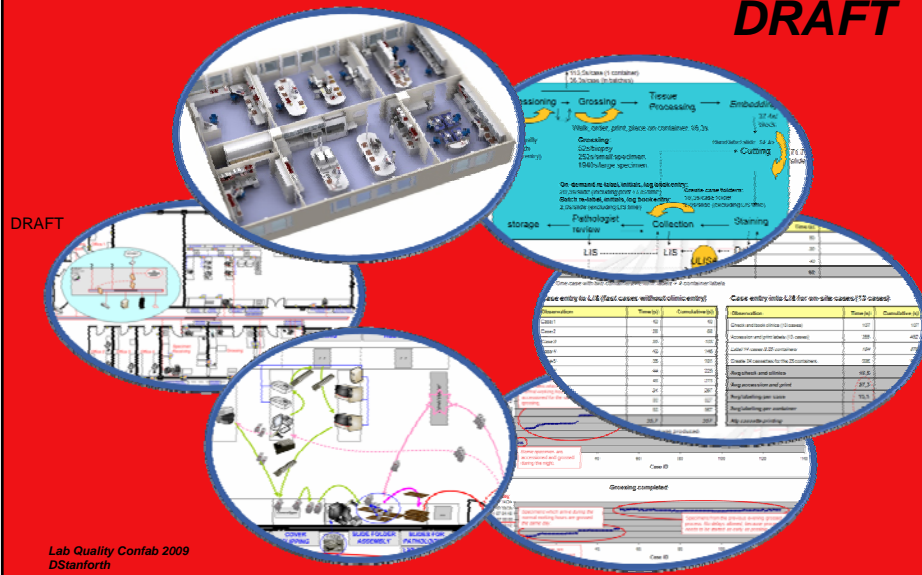


- Create a **new department** within the R&D function at the corporate headquarters.
- Expand our development focus from individual products to **integrated solutions**.
- Educate ourselves so that we can use **lean tools and principles** during product development, testing and validation.
- Use lean concepts to develop **efficient standardized processes** for Anatomic Pathology laboratories.
- **Validate** workflow solutions in a real-life Anatomic Pathology laboratory environment before launch.

## Anatomic Pathology Laboratory Typical Workflow Process Map



# Making the Workflow Applications Laboratory a Reality



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## Workflow Applications Laboratory Floorplan – Not Lean!

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Insert blueprints

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## Homework: AP Lab Time Studies

### Accessioning



1 Case with 2 containers

Observation	Time (s)	Cumulative (s)
Checking	60	60
Data entry	80	140
Labels on (6)	40	180
<b>Time per container / Total time</b>	<b>90</b>	<b>180</b>

Note: One case with two containers = 2 form labels + 4 container labels

Case entry to LIS (fast cases without clinic entry)

Observation	Time (s)	Cumulative (s)
Case 1	40	40
Case 2	28	68
Case 3	35	103
Case 4	43	146
Case 5	35	181
Case 6	44	225
Case 7	48	273
Case 8	24	297
Case 9	30	327
Case 10	30	357
<b>Average per case / Total</b>	<b>35,7</b>	<b>357</b>

After this 32s to print labels. One missing label was produced. That took 50s.

Case entry into LIS for on-site cases (13 cases)

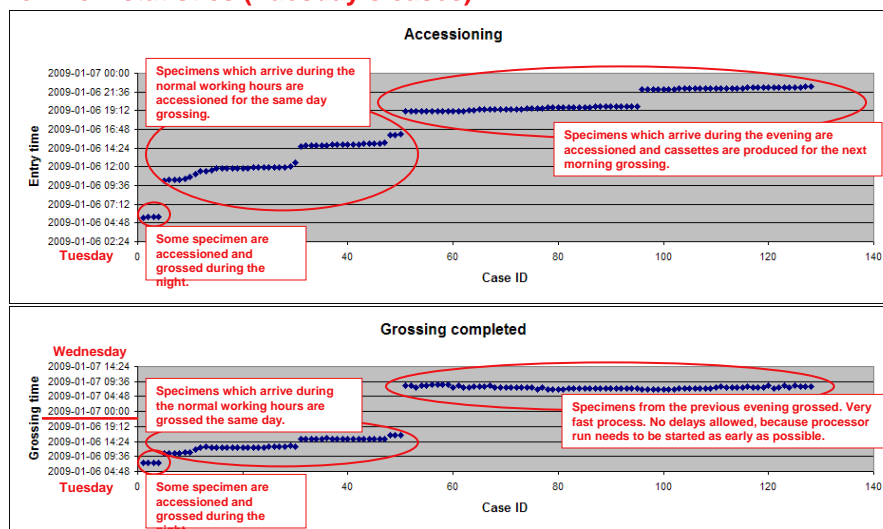
Observation	Time (s)	Cumulative (s)
Check and book clinics (13 cases)	137	137
Accession and print labels (13 cases)	355	492
Label 14 cases & 25 containers	184	676
Create 34 cassettes for the 25 containers	306	982
<b>Avg check and clinics</b>	<b>10,5</b>	
<b>Avg accession and print</b>	<b>27,3</b>	
<b>Avg labeling per case</b>	<b>13,1</b>	
<b>Avg labeling per container</b>	<b>7,4</b>	
<b>Avg cassette printing</b>	<b>9,0</b>	

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## Homework: AP Lab Time Studies

### Workflow statistics (Tuesday's cases)

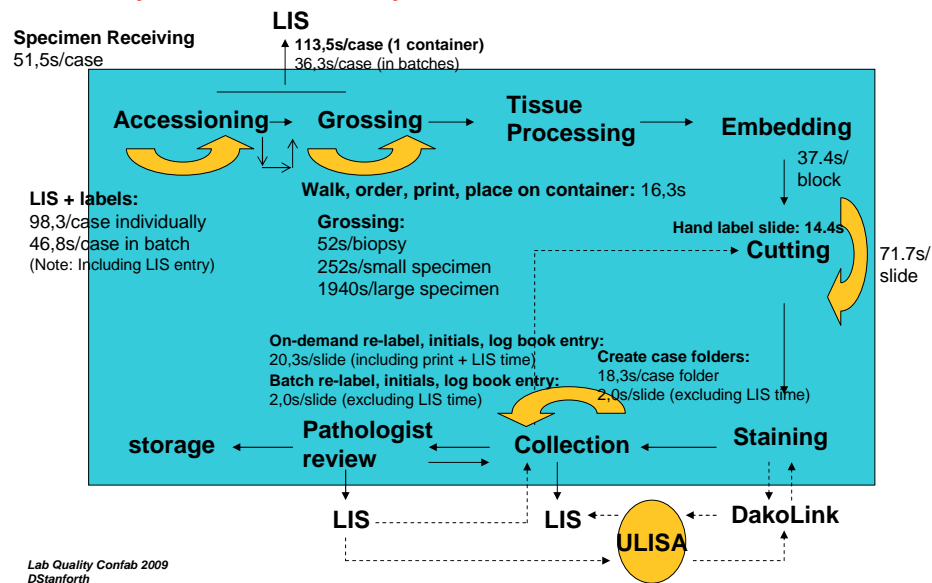
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## AP Lab Time Studies Laboratory Workflow Summary

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## Workflow Applications Laboratory Baby Pictures

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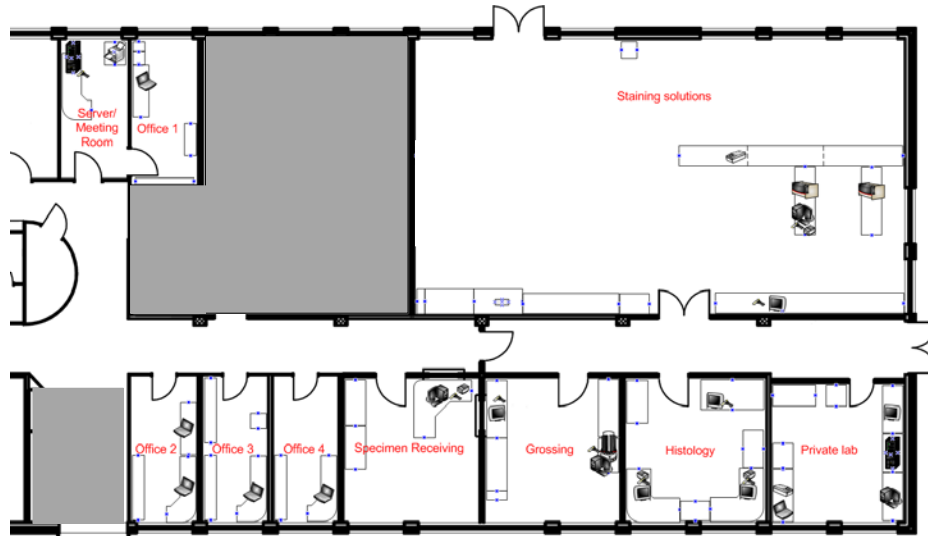


- Insert early photos of lab

# Workflow Applications Laboratory

## Initial Equipment Layout

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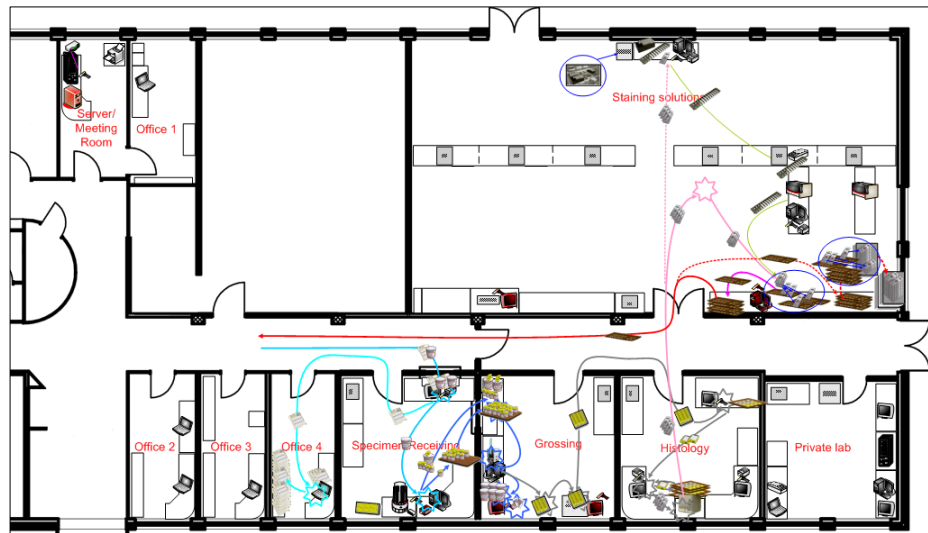
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# Workflow Applications Laboratory

## Basic Workflow Design v1.0

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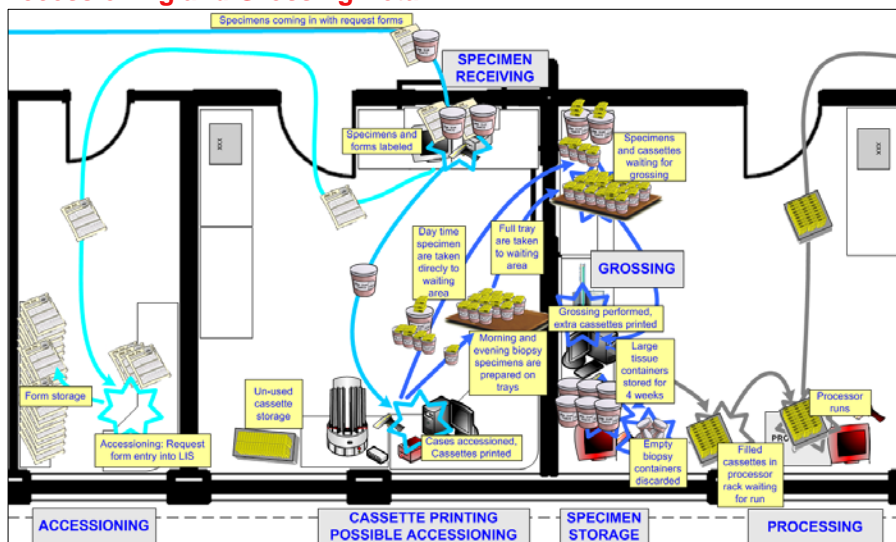


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# Workflow Applications Laboratory

## Accessioning and Grossing Detail

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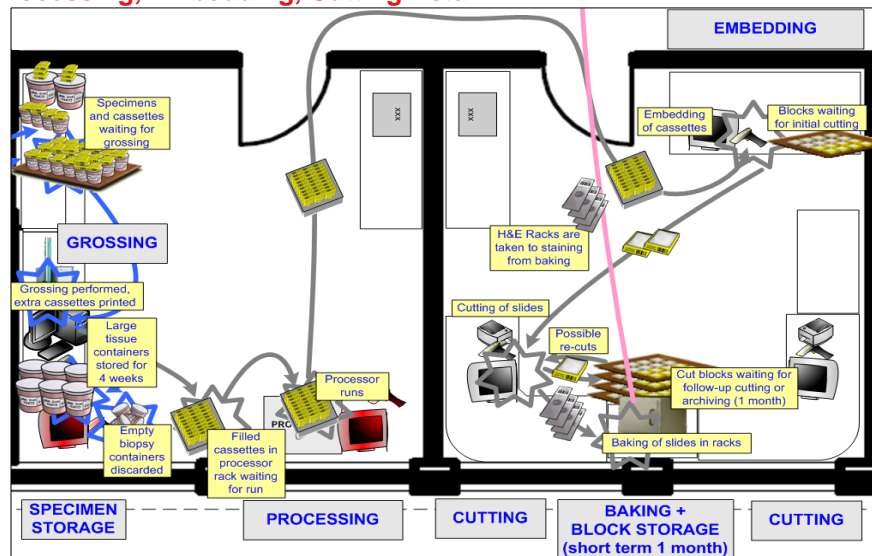


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# Workflow Applications Laboratory

## Processing, Embedding, Cutting Detail

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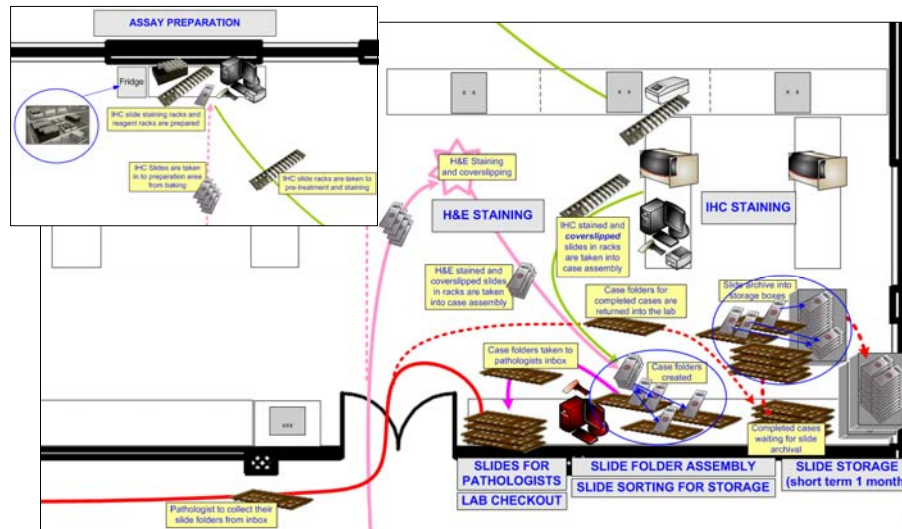
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## IHC Staining, Sorting, Archiving Detail

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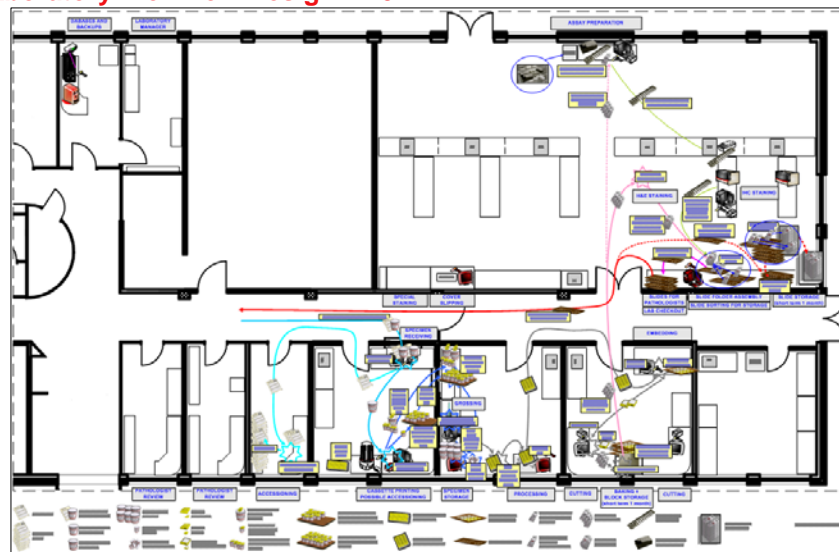


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# Workflow Applications Laboratory

## Laboratory Workflow Design v1.0

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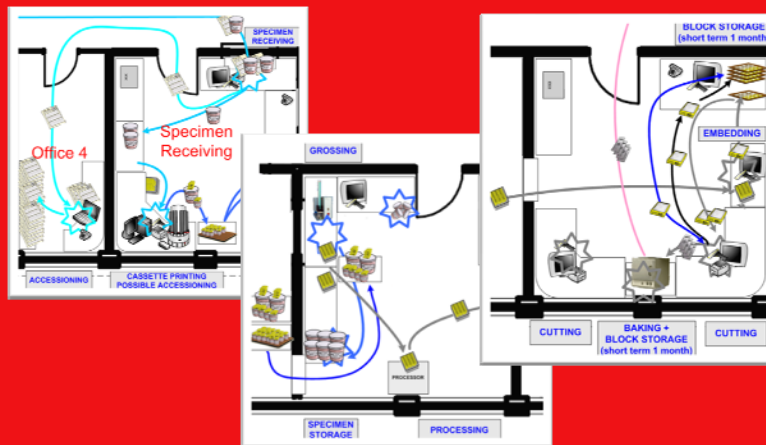


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## Starting to Get Lean



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## Workflow Applications Laboratory Thinking Lean



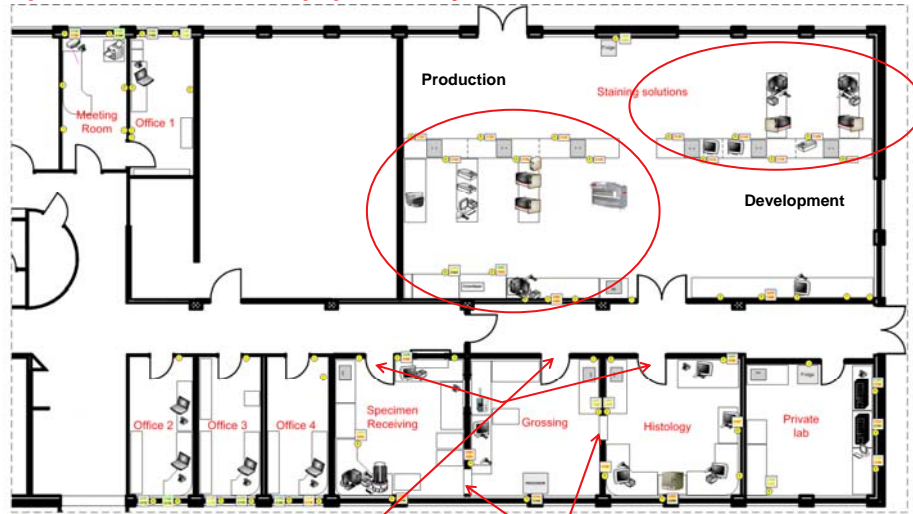
- Add H&E and Special Stains capabilities to enable the development of a total staining solution for complete cases.
- Revise floor plan to reduce unnecessary travel and increase process visibility.
- Rebuild IT structure to enable efficient lab configuration changes.
- Support for distinct production and test environments.
- Establish performance benchmark processes to measure improvements.
- Optimize individual process step workflow.

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# Workflow Applications Laboratory

## Updated Floor Plan / Equipment Layout

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Glass doors

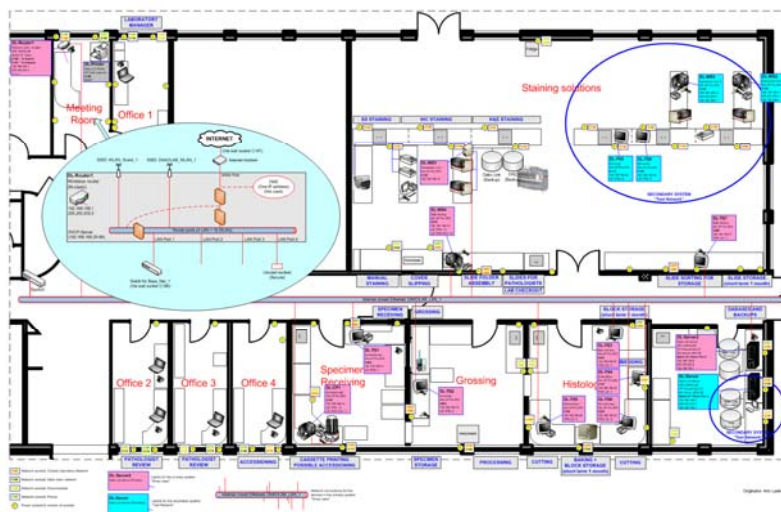
New doorways

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# Workflow Applications Laboratory

## Updated IT Layout

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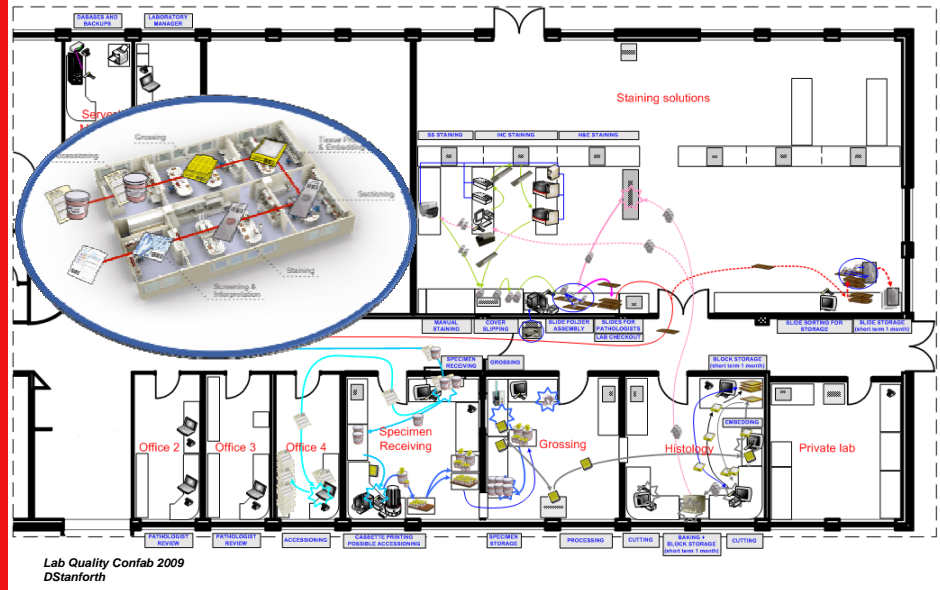


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## Workflow Applications Laboratory

Status Today: Laboratory Workflow Design v3.0

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## Workflow Applications Laboratory

Improving Our Product Validation Process

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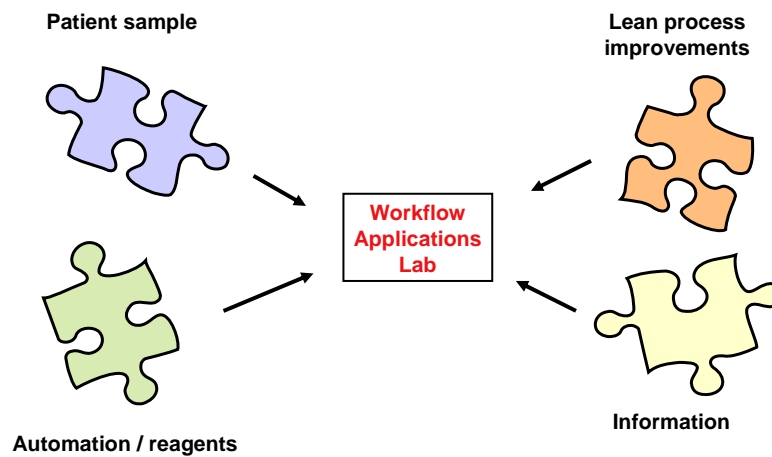
- Validate new workflow solutions in a production environment by processing a realistic sample workload on a realistic schedule.
- Assure that all information and samples flow properly from start to finish and that we have well-defined processes for every step from accessioning to archiving.
- Create validation scenarios based on process mapping data collected at Anatomic Pathology labs.
- Map laboratory current state and validate proposed improvements utilizing new solutions and processes.

**Workflow Applications Laboratory**  
**“Day in the Laboratory” Validation Example**

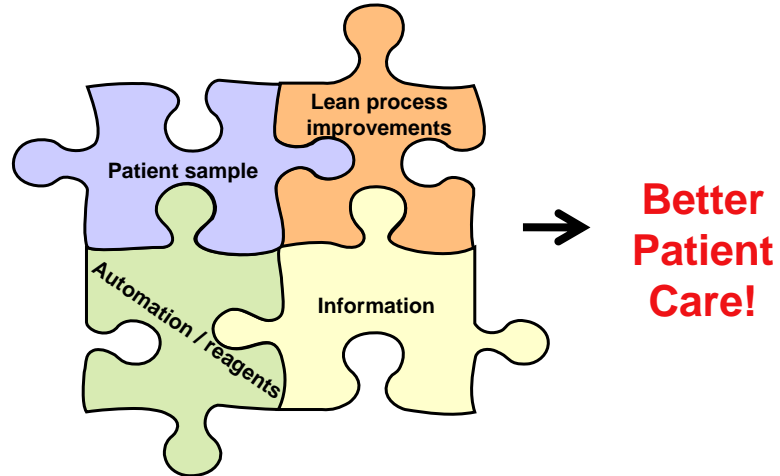


- 07:00 Laboratory opens (6 pending cases)
- 07:30 Specimen Delivery (9 new cases)
- 7-11 Specimens from surgery (4 cases, one frozen)
- 11:00 Specimen Delivery (2 cases)
- 11-13 Specimens from surgery (2 cases)
- 13:30 Specimen Delivery (5 cases)
- 14-17 Specimens from surgery (1 case)
- 17:00 Laboratory closes

**Where We're Heading With Workflow**  
**Solving the Productivity Puzzle**



**Where We're Heading With Workflow**  
**Improving Efficiency, Quality, Productivity**



Thank you for listening!  
Questions?