“Visualizing the Optimal Biopsy Flow from OR to Histology to Pathologist”

3 Rules Highlighting Early Successes with Lean, Integrated Automation, and Informatics That Cut TAT, Improve Quality

Deb Schofield

Adam Walter

What's the definition of insanity?…

Process Silos are a subtle form of insanity… *and we all have them!*

Our message today is to challenge you to think differently about what is really required to deliver greater value to your customers.

"To realize extraordinary benefit in healthcare, we must apply extraordinary effort & employ <u>new</u> thinking."

…D Schofield, Oct 2017

Breaking Down Silos Within & Between Departments

Apples vs. Oranges

Clinical Pathology

Anatomic Pathology

The 3 Rules…
Rule #1

1. All things “laboratory” are not equal

2. Improving tissue quality will have significant impact on the AP lab’s ability to process efficiently

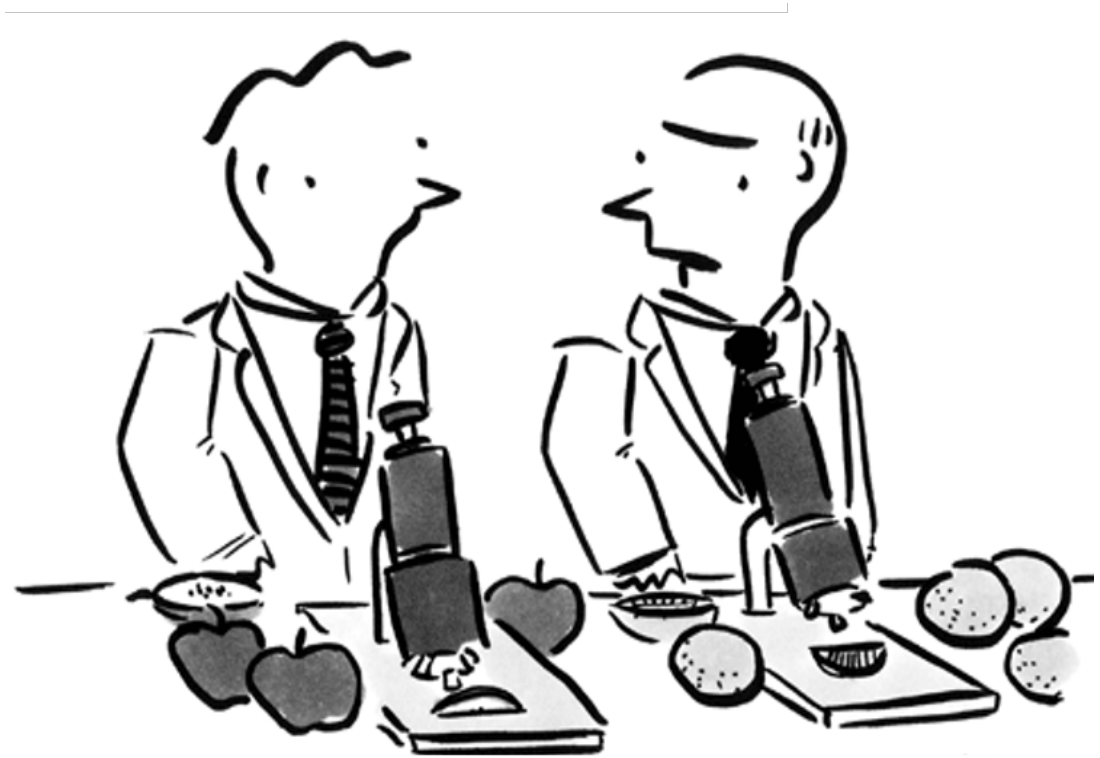
3. Understanding the process & resourcing constraints first will help you make the correct process improvements; or, more simply stated…

   “Are you solving for the right problem?”

Apples vs. Oranges

Clinical Pathology (CP)

- Tube→Automation→Result
- Data Rich
- Indirect Impact to Patient Care
  - Lab result – pool of results – interpretation by clinician
- Goal: SPF
- C/T: 23 min ‘heartbeat’
- Single Report: one result, one report



“Explain to me how comparing apples and oranges is fruitless.”

Apples vs. Oranges

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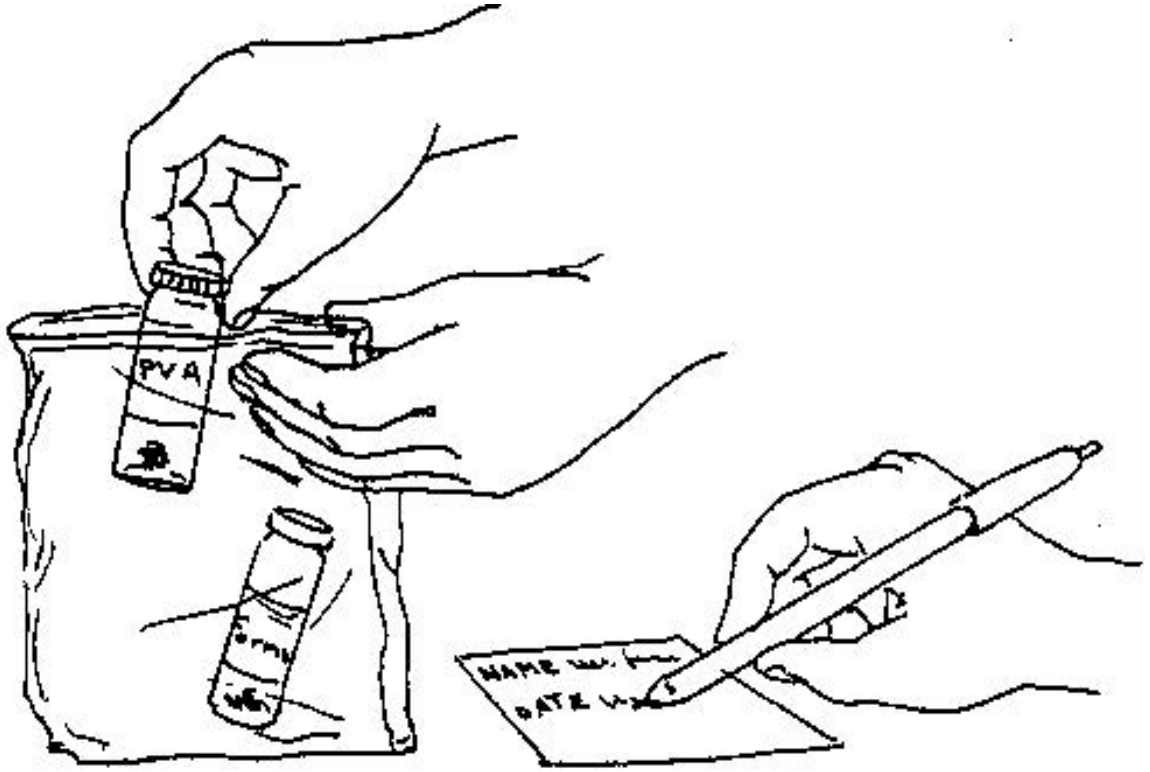
Anatomic Pathology (AP)

- Tissue → 5-8 transfers → 9-13 products
- Data Poor
- Direct impact to Patient Care
  - Initial result directs treatment, prognosis, etc
- Goal: Continuous flow, optimized batch size
- C/T: complex, multi-stage 1-4 days
- Integrated Report
  - Frozen, Macroscopic, Microscopic, Preliminary, Advanced Testing, Interpretive, Final

Apples vs. Oranges

Clinical Pathology (CP)

- Standardized Collection Devices, chosen by the lab
- Resampling can be accomplished at minimal risk, inconvenience &/or discomfort to the patient
- Majority of processes are highly automated w/ low to moderate complexity
- Collection device has nominal impact on specimen quality



Apples vs. Oranges

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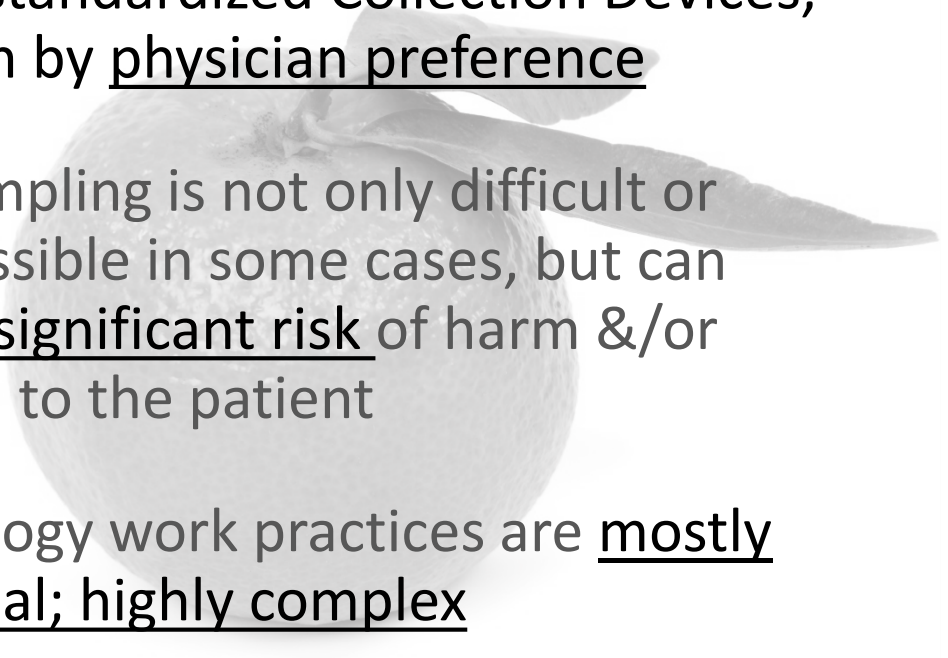
Anatomic Pathology (AP)

- Non-standardized Collection Devices, driven by physician preference
- Resampling is not only difficult or impossible in some cases, but can pose significant risk of harm &/or death to the patient
- Histology work practices are mostly manual; highly complex
- Collection device may have significant impact on specimen quality



So, in fact...

1. All things “laboratory” are not equal

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   “Are you solving for the right problem?”

The 3 Rules…
Rule #2

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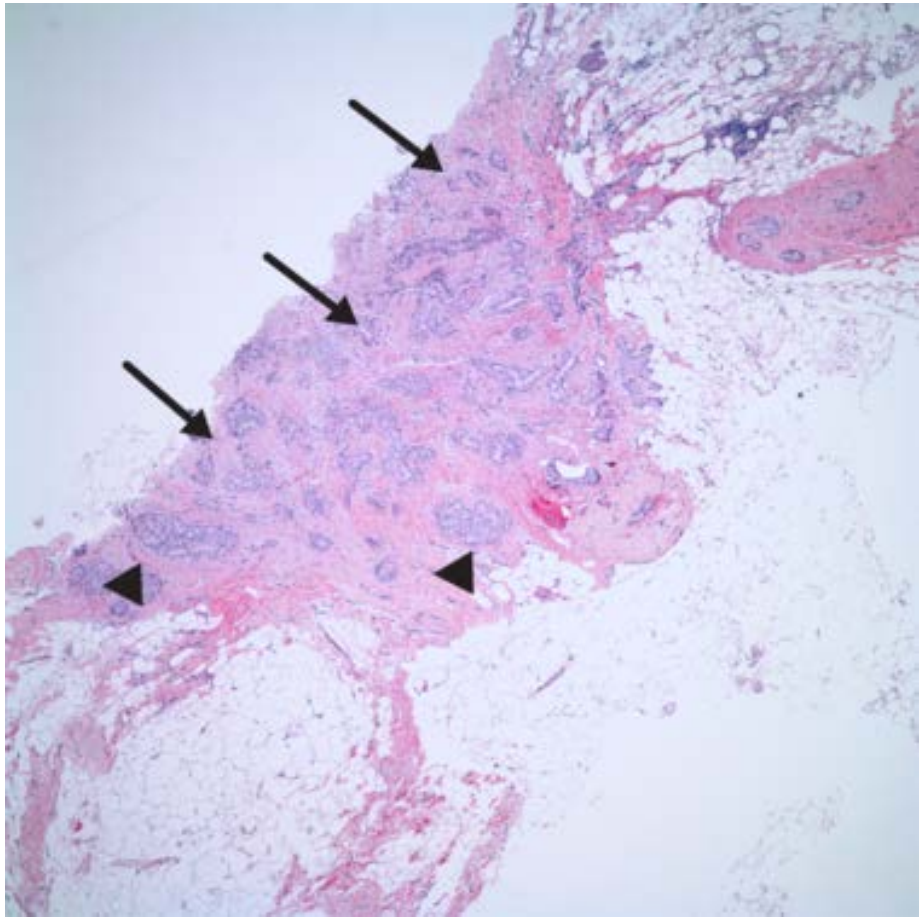
To Drive Efficiency in the AP Lab

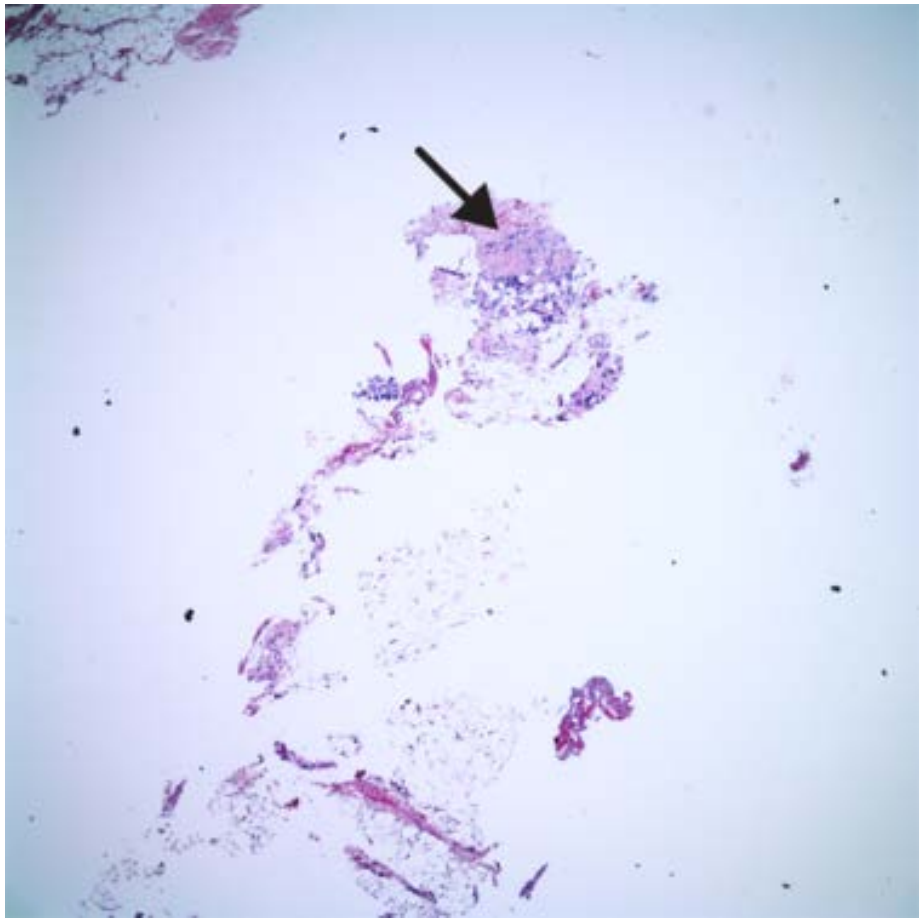
- To drive a Histologist's efficiency:
  - Optimize batch sizes
  - Process in continuous flow
  - Integrate automation
  - Measure the right metrics
  - Utilize informatics to maintain chain of custody
- To drive a Pathologist's efficiency:
  - Optimize tissue quality
  - Optimize tissue quantity
  - Utilize a high quality stain



To Drive Inefficiency in the AP Lab

- To impede a Histologist's efficiency:
  - Process single-piece flow
  - Staff to schedules, not specimen arrival
  - Focus on processing outliers
  - Perform extra work "just in case"

- To impede a Pathologist's efficiency:
  - Process poor quality tissue
  - Process low volume of tissue
  - Handle the tissue excessively



The 3 Rules…
Rule #3

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Case Study “A”: 6-hosp IDN with Core AP Lab; Decentralized Grossing & Pathologists

- 53,810 surgical cases/year *
- 40% biopsy
- AP LIS, but NO specimen b/c tracking
- Handwritten labels, slides & cassettes
- Multiple manual or computer-generated paper logs at histology bench, for couriers, send-outs, etc

** Case volume is consistent with observed national average for hospitals/ IDNs of similar size*

Case “A”: Situation Analysis

Business Need:

Plan for 25% growth in next 18 months and improved TAT on Biopsy Cases.

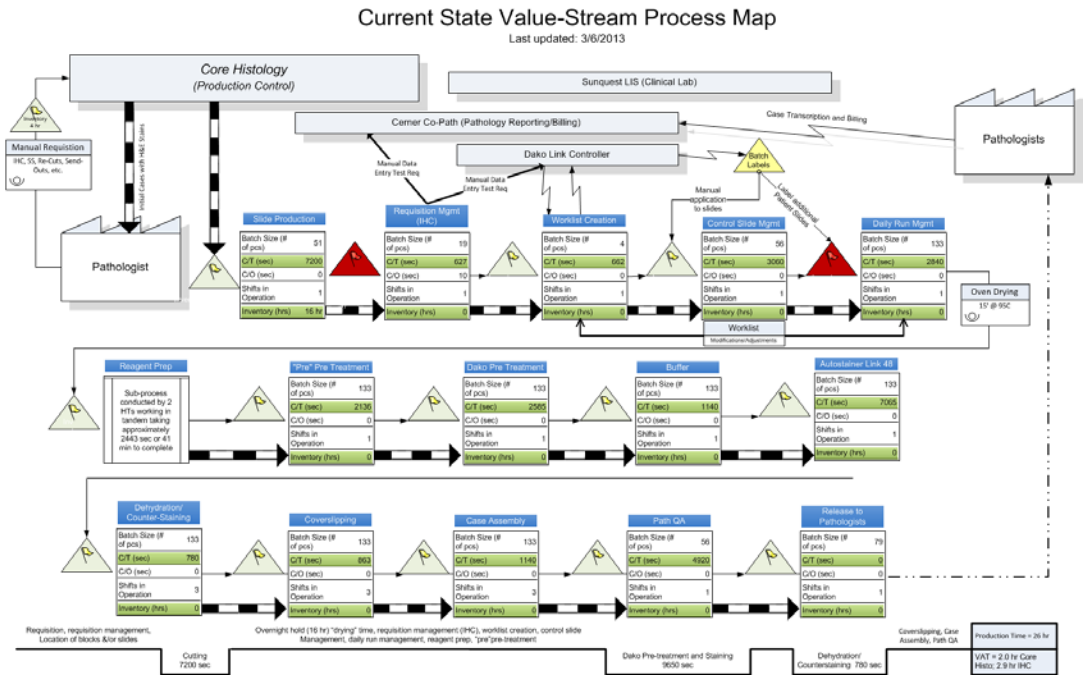
Perceived Problem:

- Currently over-capacity with existing staff and equipment; cannot manage peak work demand

Countermeasures (RPI):

- Added 1 FTE HT during peak hours
- Installing new tissue processors to handle peak courier drops

Case Study “A”: **REFOCUS**



Are we solving for the right problem?

- Gather data in key areas
  1. Work Demand at the completion of Grossing; not at the point of courier drop off in the lab
  2. Production Metrics to Load Balance SEC & EMB
  3. Optimization of Tissue Processing protocols and start times
  4. Constraint points in process

First understand the process & resourcing constraints…

DATE: 6/22/2017

Cassette Volumes By Hour By Tissue Type **

Optimal TP Protocol	2 hr	4 hr	18 hr +	12 hr	8 hr
	Endoscopies Breast/Prostate/Liver/Kidney - biopsies and cores GI and Bladder Bxs Skin punches and shaves EMCs/ ECCs/Cervical bxs	Small, non-dense tissues Kidney Liver Bowel Excisional & Incisional Skin Bx Skin Ellipses	Brain	Breast	Colon Cancer Uterine Cancer Large melanoma excisions Whipple Leg/ digit amputations Large Lipomas and Sarcomas Large resections
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0700					
0800	24	2			
0900	30	0		17	44
1000	37	61	18	0	38
1100	13	30		27	19
1200	28	61		20	5
1300	27	53			16
1400	26	68			9
1500	76	53			14
1600	56	24			30
1700	26	19			32
1800	6	2			
1900	7	6			
2000	16	7			
2100	5	6			
2200					
2300					
TOTALS	377	392	18	64	207
% Workload	36%	37%	2%	6%	20%

** SUMMARY OF TISSUES AVAILABLE FOR PROCESSING - ALLOWANCE INCLUDED FOR ONE HOUR TRANSPORT TIME FROM EXTERNAL FACILITIES

You should focus on:

1. **Work Demand at the completion of Grossing; not at the point of courier drop off in the lab**
2. Production Metrics to Load Balance SEC & EMB
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Meeting Work Demand

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** SUMMARY OF TISSUES AVAILABLE FOR PROCESSING - ALLOWANCE INCLUDED FOR ONE HOUR TRANSPORT TIME FROM EXTERNAL FACILITIES

- Perform audits of WIP at each process step
- Create a “pull” system
- Continuous flow – optimizing the batch size
- Focus on your customers – both internal & external
- De-emphasize pathologist availability – control what you can control

First understand the process & resourcing constraints…

You should focus on:

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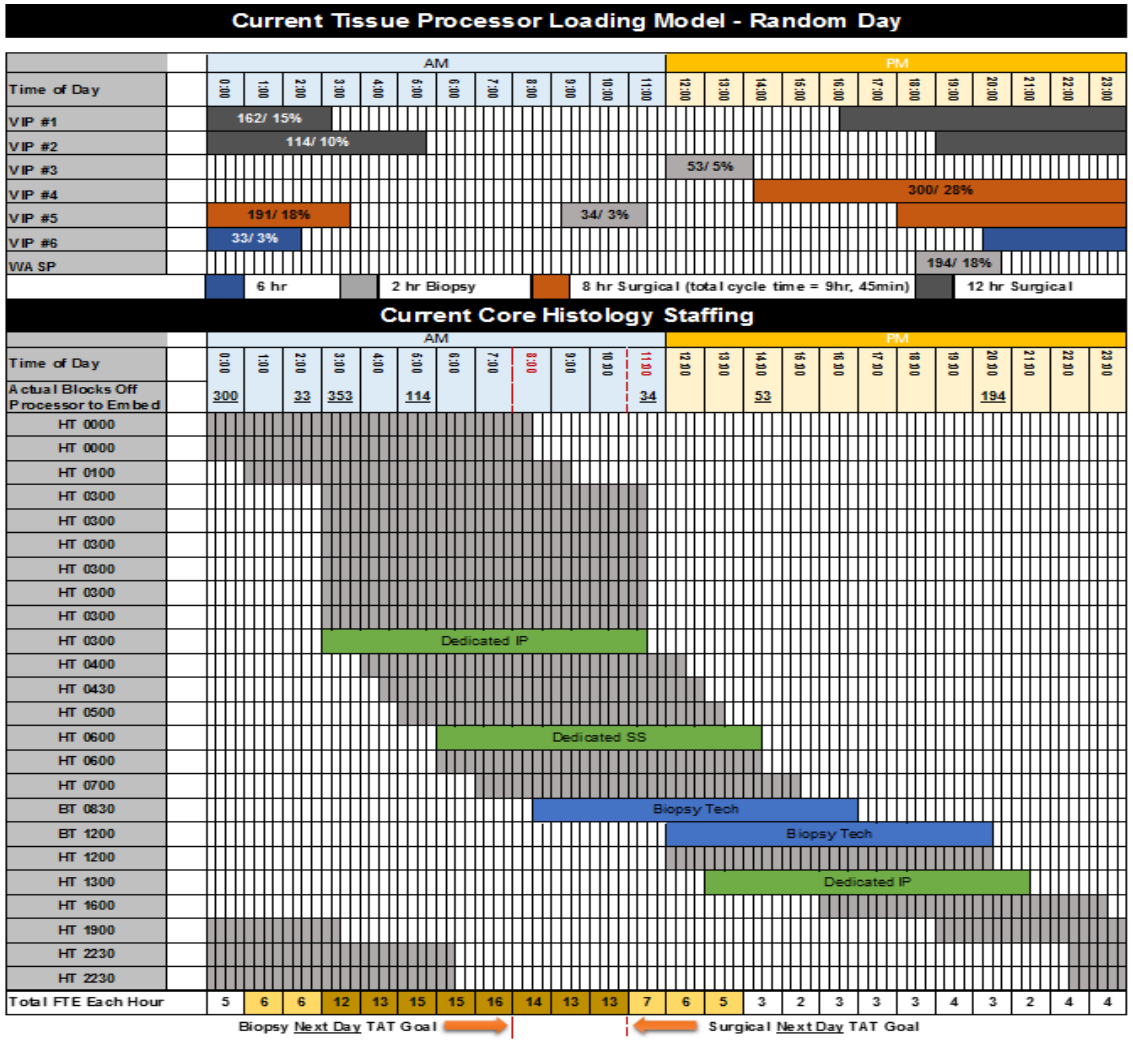
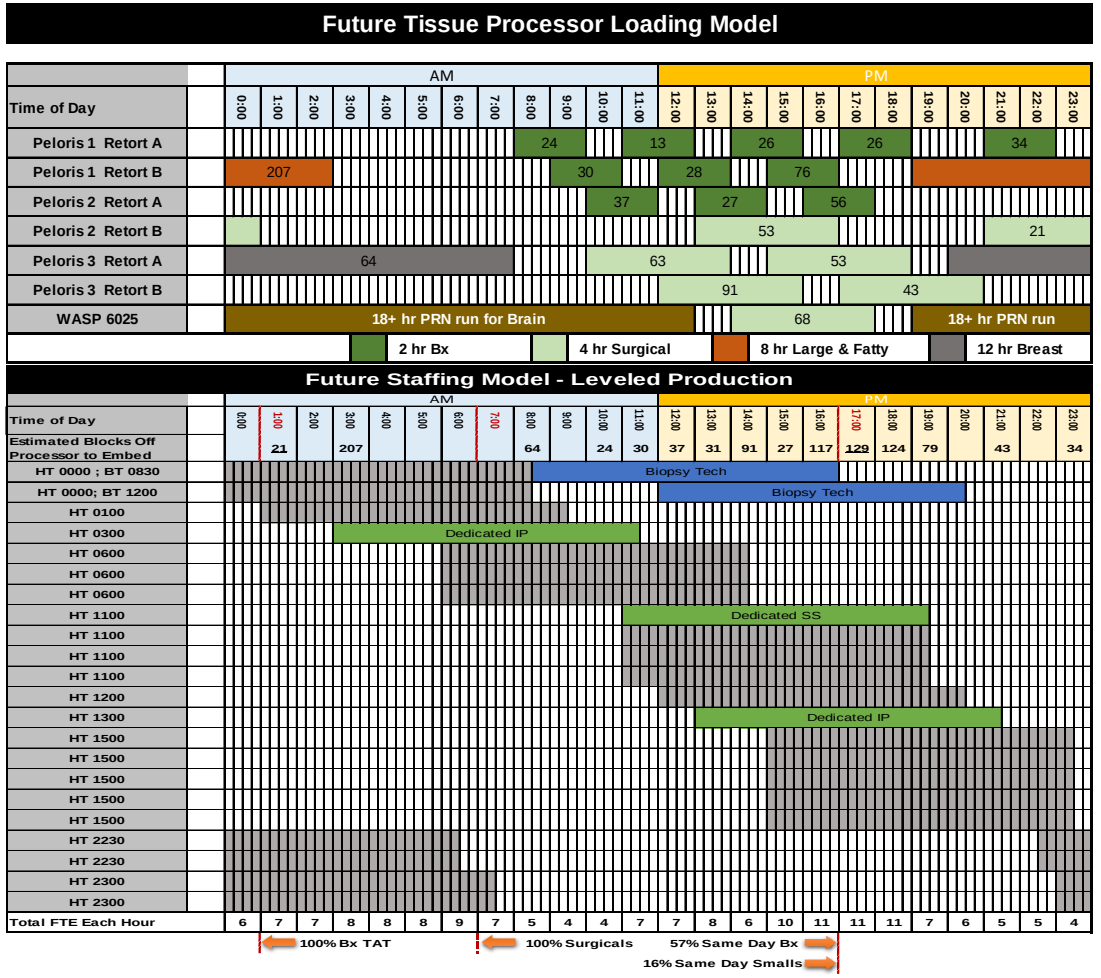


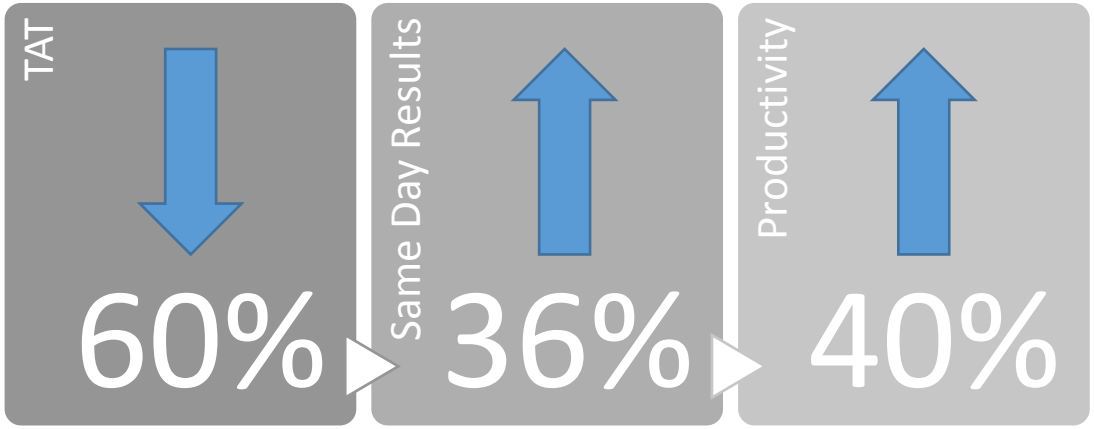
Case Study “A”: Changes Implemented

1. Rapid Tissue Processing
2. Processing Schedule altered to meet work demand
3. Staffing aligned to match work demand flowing from Processors
4. Layout modified to reduce footprint between process steps
5. Specimen Tracking installed
6. Cassette & Slide generation automated



Case “A”: Outcomes

- Within 6 months of Implemented Changes:
  - Reallocated 3,536 hr/year in labor
  - Decreased overall AP TAT from 3 days to 1.2 days
  - Biopsy Same Day results increased from 0% to 36%; 100% by 7AM next day
  - Process Capability increased 1.7x
  - 40% improvement in individual worker productivity
  - “Hands-on” cycle time reduced by 47%



☑ Success, or
☐ Failure?...

Solving for the Right Problem Nets Superior Results…

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Case Study “B”: Large public hospital w/ Outreach

- 16,476 Surgical Cases per year*
- Samples received through CP rather than dedicated AP receiving
- Frequent CP Accessioning errors and sample deliveries to AP are delayed
- Teaching hospital with residents responsible for Grossing; impacting TAT
- Batch printing slides the night before; multiple paper logs to manage workflow

Annual Volumes	
Episodes (Cases)	16,476
Specimens	35,448
Blocks	89,196
Slides	139,882
Recuts	17,926
Consult Cases	230
Autopsy Cases	54
Autopsy Blocks	1,296
Autopsy Slides	1,296
Cytology Episodes	9,756
Cytology Cell Blocks	763
Cytology Cell Block Slides	2,544
Special Stains	14,156
Special Stain Recuts	2,608
IPX	17,070
Frozen Section (1 Specimen)	346
Frozen Section (2-4 Specimen)	90
Frozen Section (>4 Specimen)	18

** Case volume is consistent with observed national average for hospitals/ IDNs of similar size*

Case “B”: Situation Analysis

Business Need:

Decrease Accessioning error rate on AP cases; Decrease TAT (averaging 3.5 days)

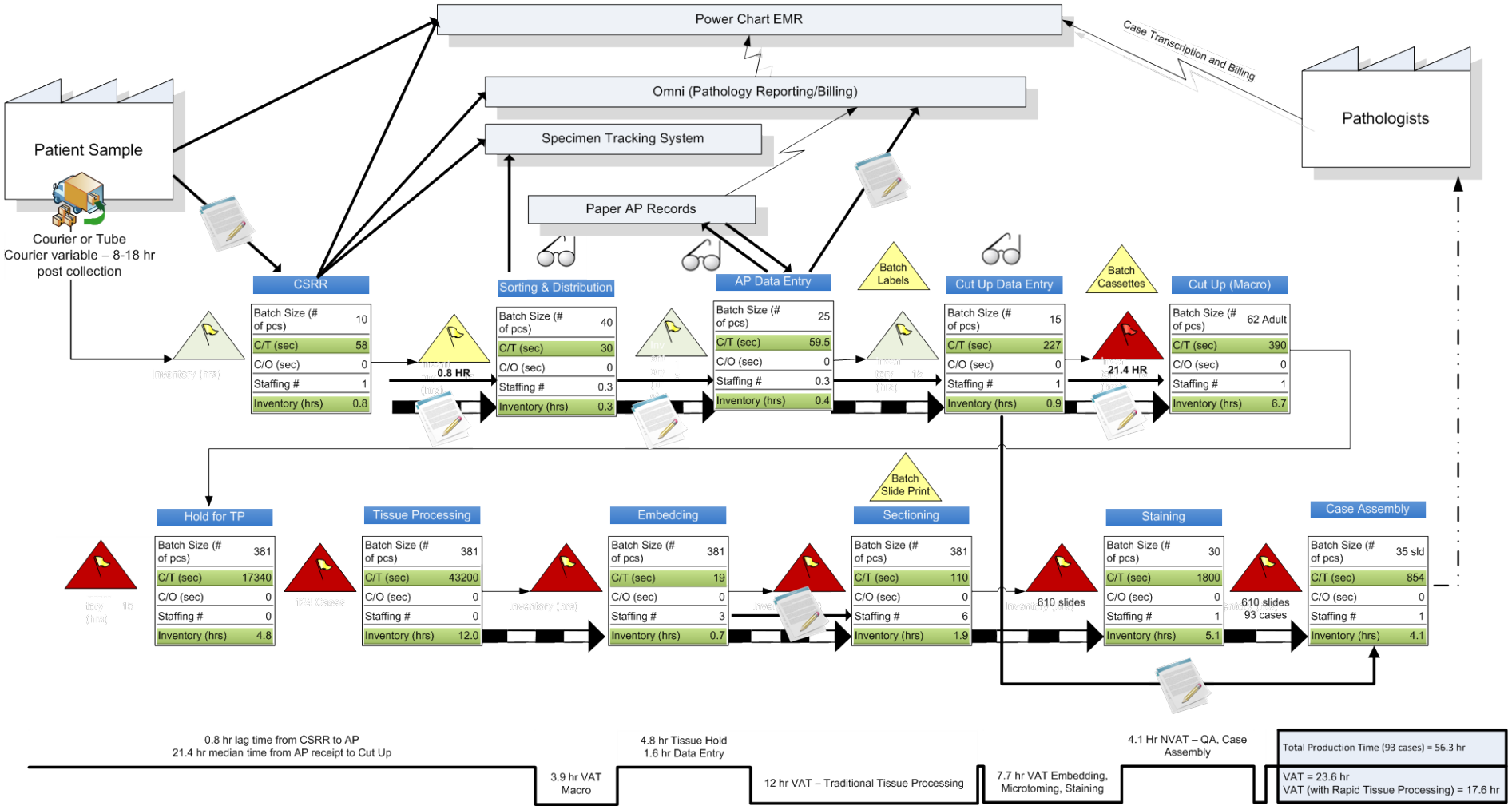
Perceived Problem:

- Old, unreliable and insufficient # instruments; lack of b/c reader increases error rate; growth in volume has exceeded current staffing capability

Countermeasures (RPI):

- Added 1 FTE HT per shift during peak morning and night hours
- Increasing # of EMB & SEC stations

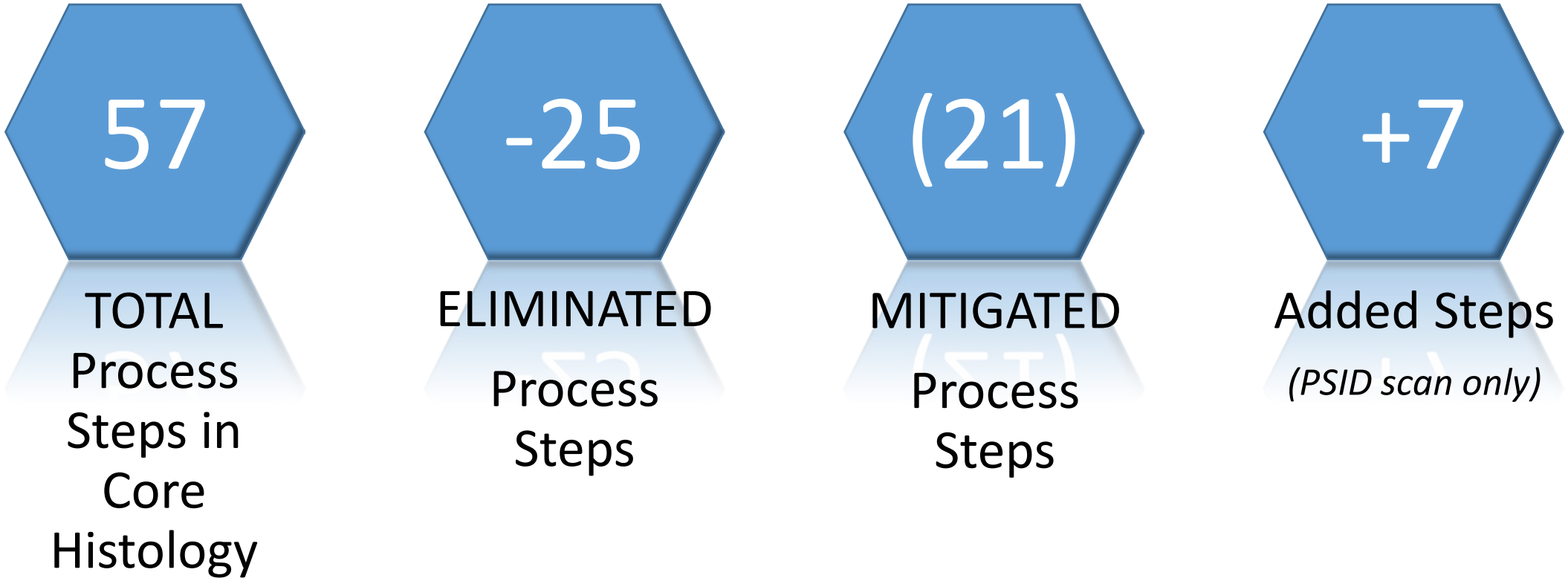
Case Study “B”: Total C/T = 56.3 hr



Case “B”: Changes Implemented

- Accessioning processes consolidated and relocated from CP to AP
- B/C implemented at Accessioning data entry (HIS to APIS)

Case “B”: Outcomes



Elimination or Mitigation = Time; Quality; Safety; Confidence

Perceived Problems vs. Actual Constraints

Perception

- More staff needed to manage peak workload volumes in A.M.
- Additional Microtomes should be ordered

Data-Driven

- Order entry error at CP Accessioning = 5%
- Redundant Order Entry Functions at CP and AP
- Average AP Receipt to Grossing completion = 21.4 hrs
- SEC/EMB bottleneck = level loading needed
- 58% of production time was NVAT
- NVAT could be reduced by 25% with rapid tissue processing

Summary

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THANK YOU
MERCI
OBRIGADO
ASANTE
СПАСИБО
どうも
MATONDO
SUWUN
ZIKOMO
EIO
WELALIN
THANK YOU VERY MUCH
MAAKE
SPASIBO
MULTUMESC
VINAKA
MOCHCHAKKERAM
GRAZIE
CHOKRANE
RAIBH MAITH AGAT
NIRRINGRAZZJAK
MOCHCHAKKERAM
MATUR NUWUN
SAAGHA XALDA HWA
KHUBLEI
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