Histology Successes with Automation and Workflow Redesign: Leaning Our Lab by Reducing Sources of Errors, Identifying Non-Value Added Processes, and Changing the Culture

By: Ary Franklin, HT(ASCP)

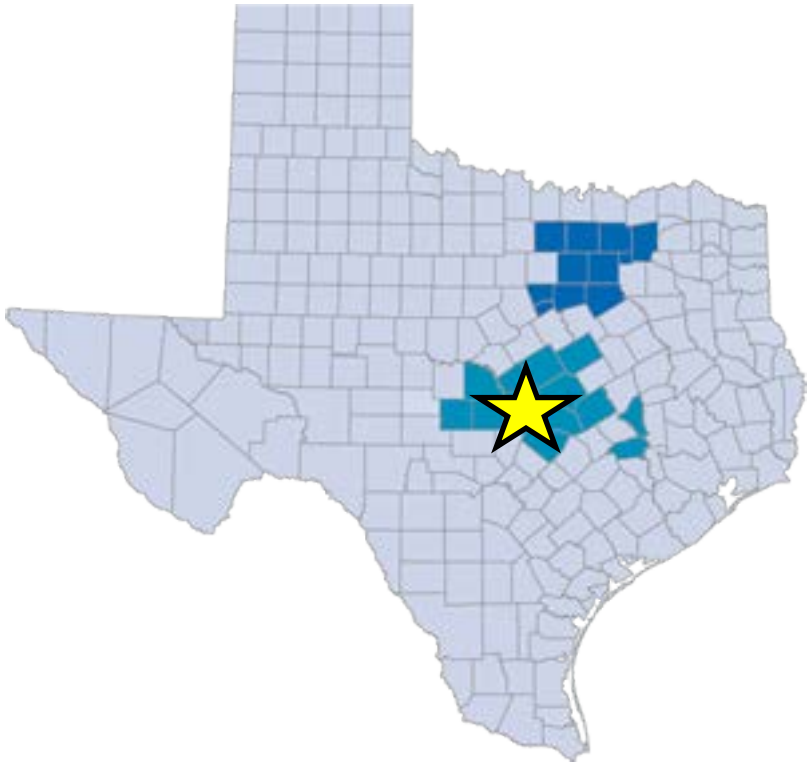
Histology Supervisor - Memorial

Baylor Scott & White Healthcare

- Largest not-for-profit health care system in Texas and one of the largest in the US
- System-wide:
  - 46 Hospitals
  - 10,000+ physicians
  - 44,000+ employees
  - 5+ million patient encounters annually

Baylor Scott & White – Memorial Hospital

- Provides health care to Central Texans in a 29,000 square mile service area
- Level 1 Trauma Center
- Statistics:
  - 1,200+ physicians
  - 14,000+ employees
  - Primary clinical teaching facility to more than 300 residents & fellows in training



BSWH – Memorial's Anatomic Pathology Department

- Gross Lab is responsible for accessioning & grossing all surgical and clinical specimens & is located:
  - Temple – main
  - Round Rock
  - Marble Falls
  - College Station
- Centralized Histology Lab is responsible for processing, embedding & microtomy of all surgical & clinical specimens from:
  - Temple/Belton
  - Waco
  - Round Rock
  - College Station
  - Marble Falls

BSWH – Memorial's Anatomic Pathology Department

- Full-time Employees
  - 5 Pathologist's Assistants (including Gross Lab Supervisor)
  - 8 Grossing Assistants (some at RR, CS & MF)
  - 12 Histotechnicians (including Histology Lab Supervisor)
  - 6 Lab Assistants (Gross Lab & Histology)
- 2015 Annual Volume
  - 58,000+ cases
  - 175,000+ blocks
  - 200,000+ slides

Catalyst for Change

- Barcode system implementation due to errors introduced in every step of our process
  - Identified, documented, quantified problem processes
    - The level of adoption and implementation was left to our department to decide
  - Forced a necessary change in every area of the lab
  - Realistic expectations and flexibility are KEY

What were *we* missing?

- Patient Safety
  - Labeling errors
    - From collection to microtomy
- Process Standardization
  - Everyone had their own way to do their job
    - From collection to microtomy

What do we do???

In a Lab without LEAN tools…

You try to protect yourself, the institution & the patient by:

- "Safety Nets"
- Double Work

This is not LEAN or Efficient, but may appear to be "safe".

- In August of 2011 -

"If we introduced single piece flow protocols, barcode tracking and automation, and if we placed the power of improving the lab in the hands of our front-line employees, we knew we could improve laboratory efficiency and help preserve patient safety."

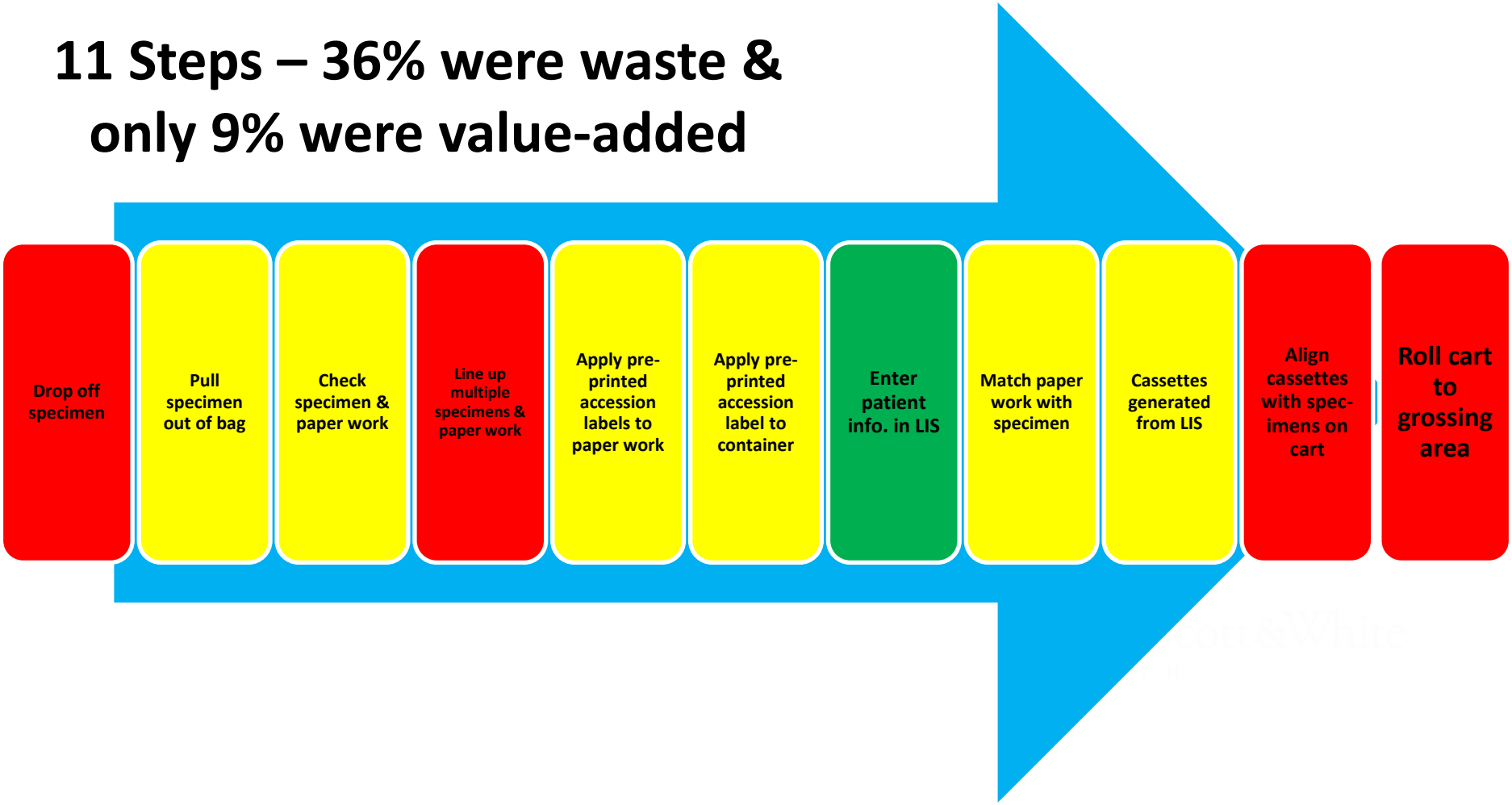
—Robert Beissner, M.D., Ph.D., Pathologist and Chief, Section of Anatomic Pathology Informatics

- Our First Lean Tool -

- Decision was made to purchase and implement a barcoding system in the Anatomic Pathology department
  - The vendor sent workflow analysis team in to:
    - Observe our workflow
    - Recommend changes
    - Share what would improve with the barcoding system

Accessioning Workflow – Snapshot

11 Steps – 36% were waste & only 9% were value-added



Accessioning – Snapshot

Error Potential

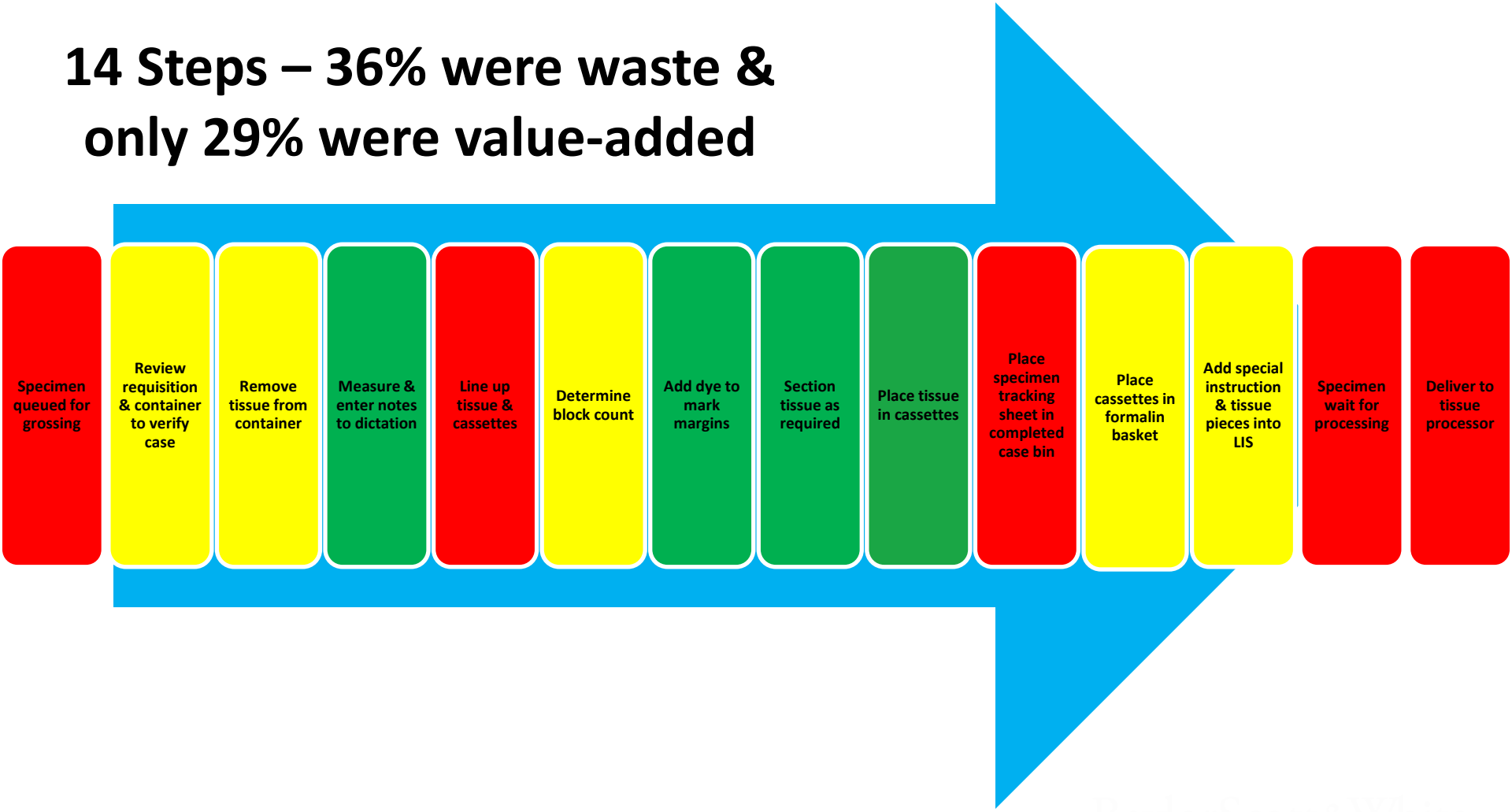
- Multiple, opened, patient specimens scattered during the accessioning process: **Double Work**
- Pre-assigning and pre-sorting specimen time: **Safety Net**

Error Statistics

- ***8 hours per day*** of wasted time on pre-assignment and pre-sorting steps
  - 4.5 minutes/case

Grossing Workflow – Snapshot

14 Steps – 36% were waste & only 29% were value-added



Grossing – Snapshot

Error Potential

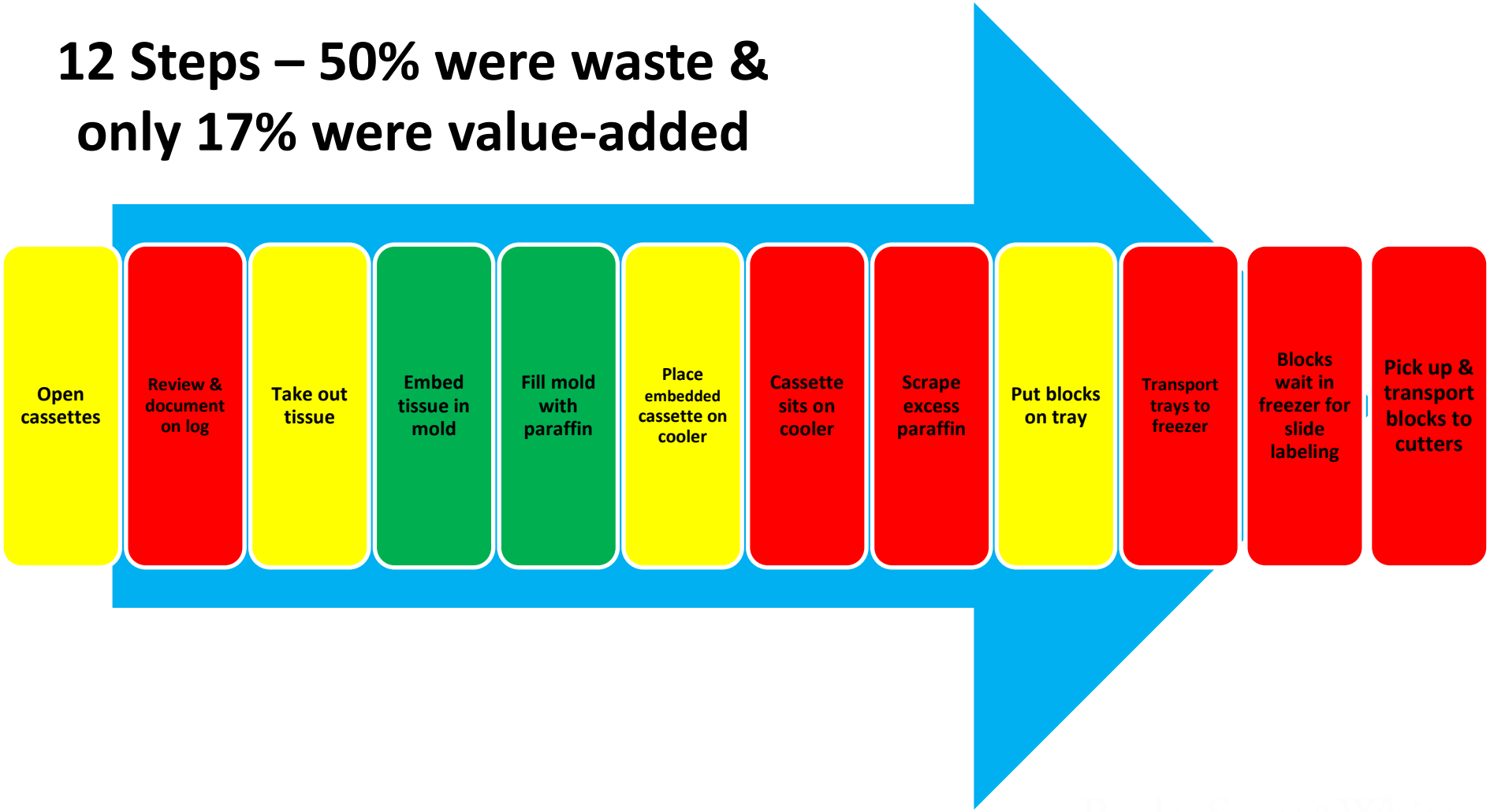
- Placing grossed tissue into the wrong patient's cassette because verification is only as good as the person performing the task
- Creating inaccurate information on the histology logs (i.e. special instructions and tissue pieces): **Safety Net**

Error Statistics

- ***45 minutes per day*** spent on correcting inaccurate information on histology logs. **Double Work**

Embedding Workflow – Snapshot

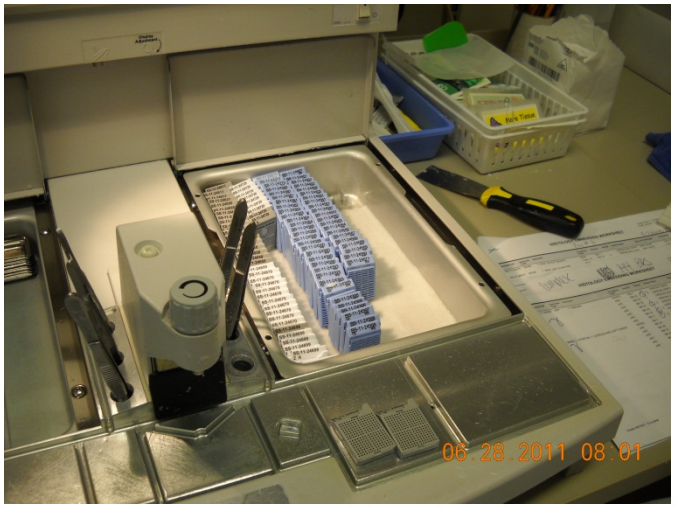
12 Steps – 50% were waste & only 17% were value-added



Embedding – Snapshot

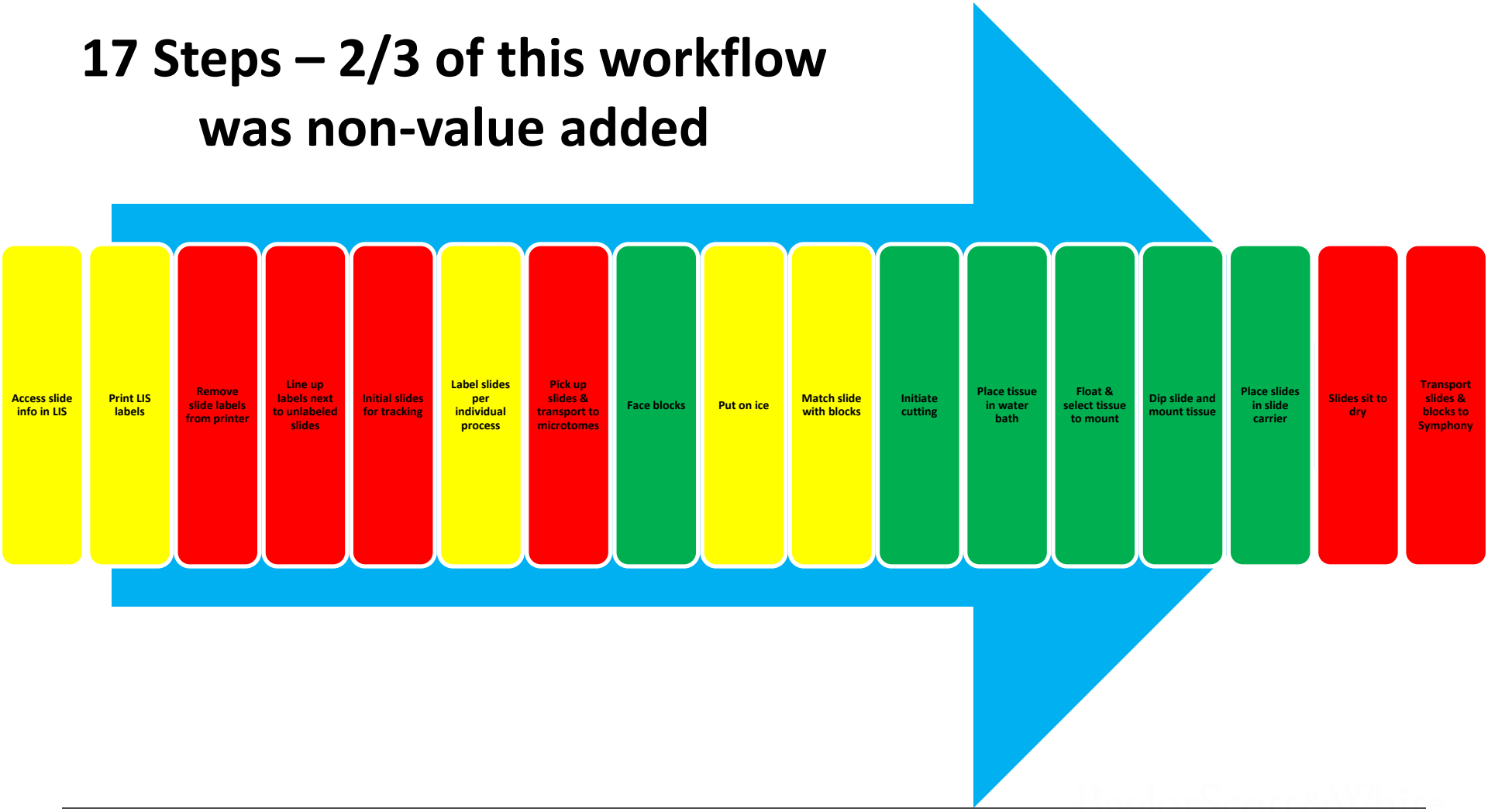
Waste

- Approximately 45 minutes per day is spent correcting documentation on accurate number of tissue pieces: **Double Work**
- Significant sorting of cassettes based on colors to establish priority, with additional sorting to identify reading pathologist: **Double Work**
- Embedding log is used to determine pathologist assigned to case, review special instructions, and to determine the correct number of tissue pieces: **Safety Net**



Labeling & Microtomy Workflow – Snapshot

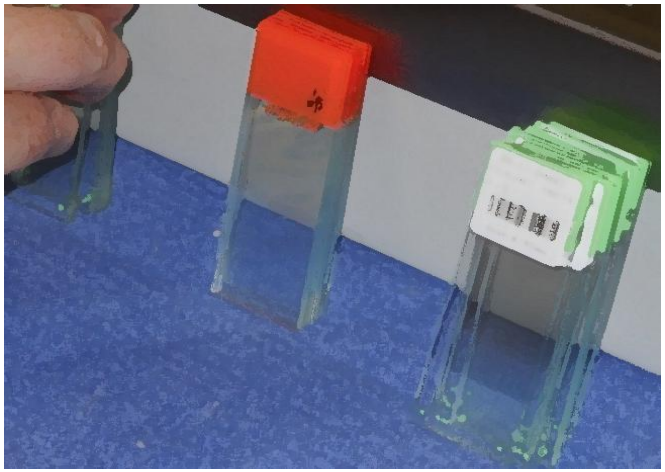
17 Steps – 2/3 of this workflow was non-value added



Labeling & Microtomy – Snapshot

Error Potential

- Placing the wrong patient tissue on the labeled slide
- Performing slide/block verification by looking at the last 2-3 numbers on the accession number only: **Safety Net**
- Lack of standardization in labeling practice



Error Statistics

- **Time required to correct errors:**
  - **Minor errors: 2.5 hours**
  - **Risk Management errors: 3-4 days**

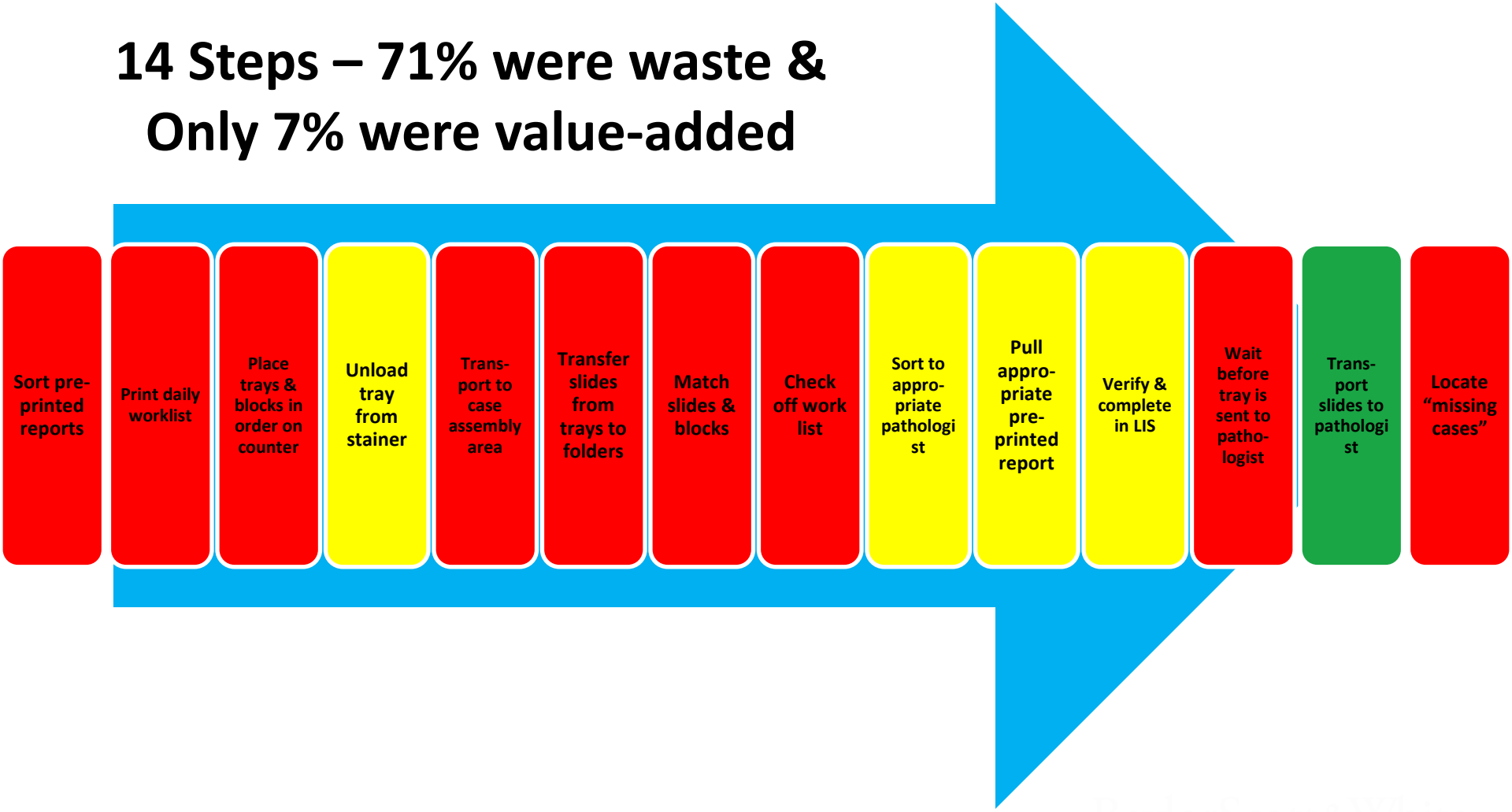
Labeling & Microtomy – Snapshot (Continued)

Waste

- All slide labels are pre-printed from LIS prior to cutting: **Double Work**
  - Requires 84 minutes per day to print all required labels
- Additional time is required for slide initialing for tracking
  - 34 minutes per day across all staff (observed)

Case Assembly Workflow – Snapshot

14 Steps – 71% were waste &
Only 7% were value-added



Case Assembly – Snapshot

Error Potential

- Slides matched to block as a visual check the tissue was placed on the correct slide: **Safety Net**

Waste

- Significant time spent matching stained slides to cut blocks
  - 76 minutes per day
- Travel time and distance associated with transport to the pathologists office
  - 5 minutes for every delivery with a minimum of 16 trips per day – that's **80 minutes** in one day!

Dealing with Change…

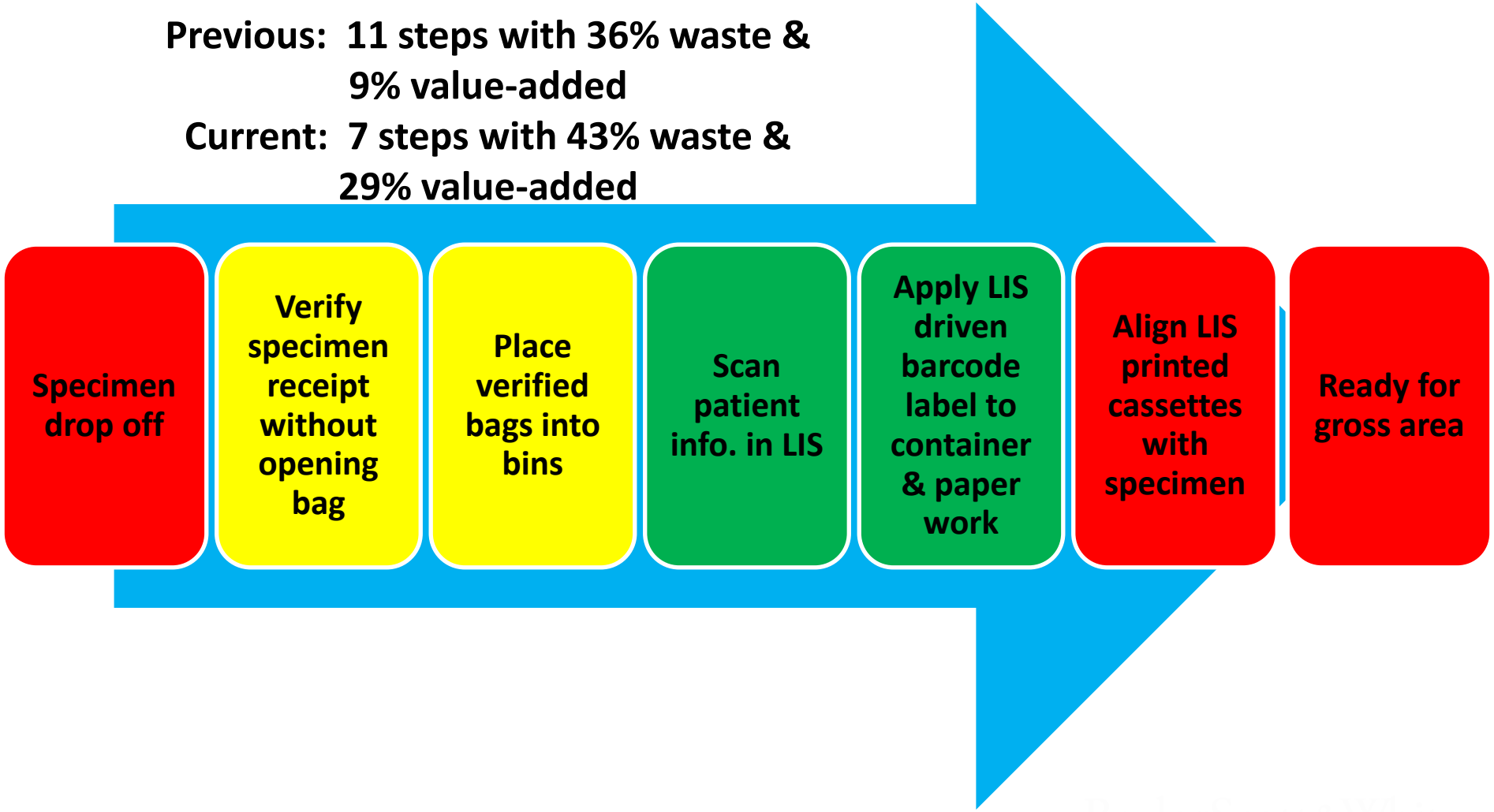
Dealing with Change…

- Any change is hard initially
- Everyone works through it at their own pace
- Some may get hung up in one step or another and it's our job to help them get to acceptance
- Change that is implemented with input from end staff is better accepted
  - Give them choices
  - Let them vote/have a voice
- Remember to stay positive & keep everyone focused on the end goal with big changes

Accessioning Workflow – Current Snapshot

Previous: 11 steps with 36% waste & 9% value-added

Current: 7 steps with 43% waste & 29% value-added

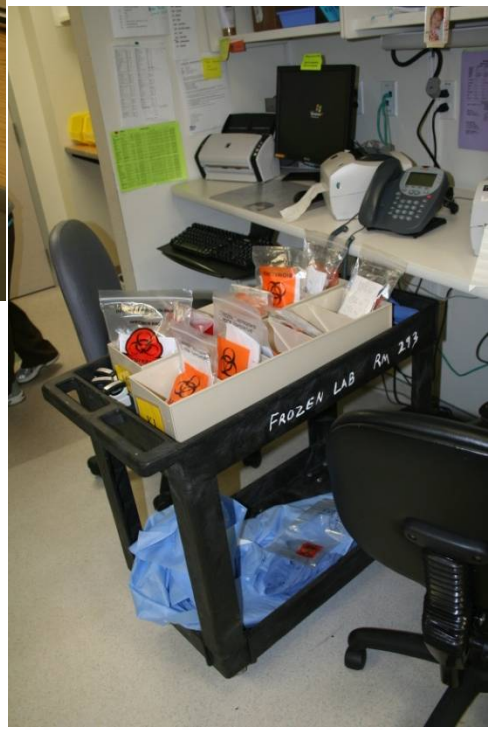


Accessioning – Current Snapshot

Error Potential DECREASED with barcoding technology!

- No pre-analytic sorting or queuing necessary with barcoding technology
- Realization that all the "safety-nets" in the process were non-value added and were unnecessary and **ELIMINATED!**

Waste Completely Eliminated!



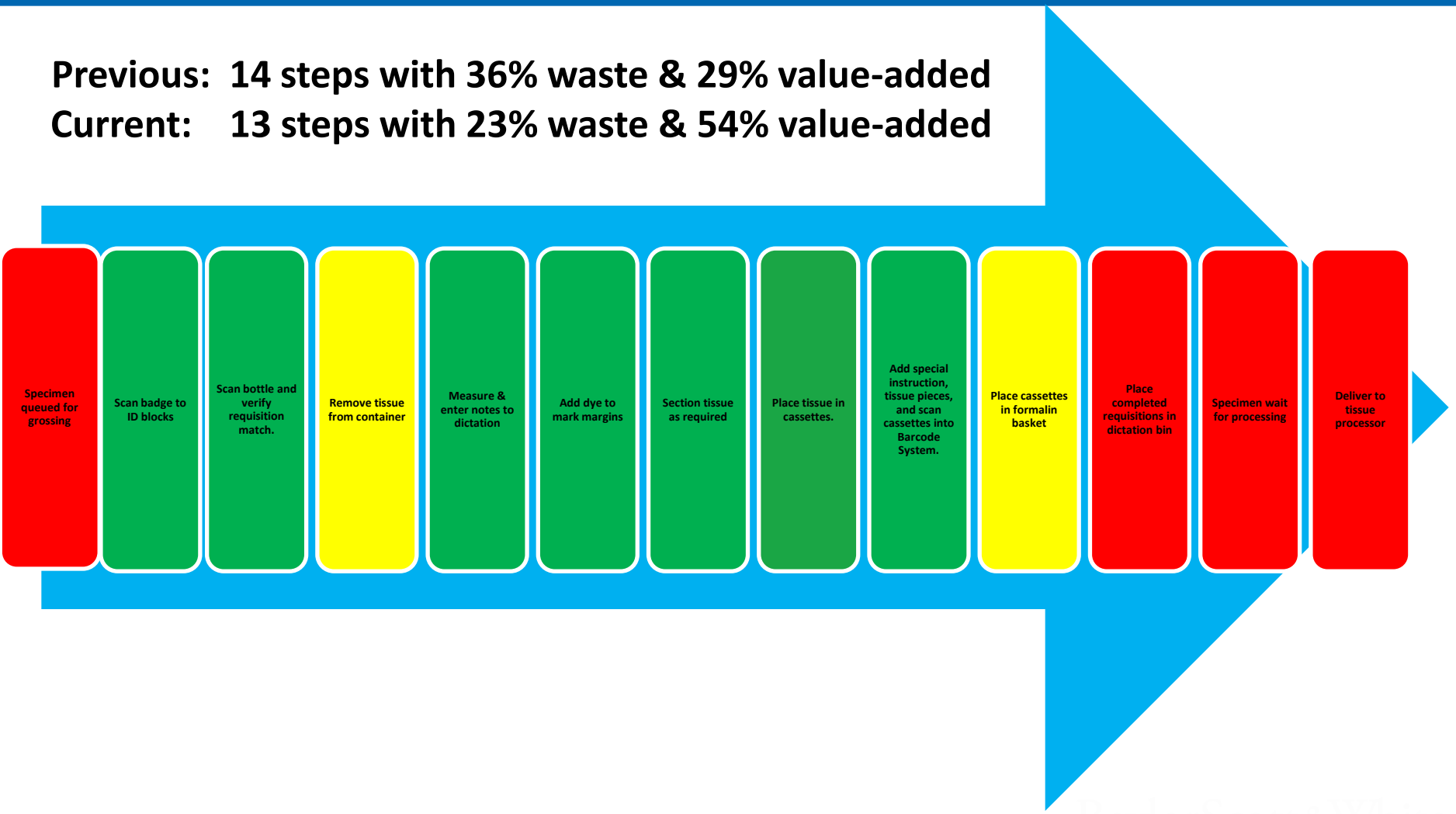
Fostering Buy-in from Users

"It was amazing to watch everyone figure it out for themselves. Most saw on day one where they could eliminate checklists, but the next day, light bulbs really went off when the calls with questions from histology went away."

—Carol Beth Taylor, MHS, PA(ASCP), HTL(ASCP), Lead Pathologists' Assistant

Grossing Workflow – Current Snapshot

Previous: 14 steps with 36% waste & 29% value-added
Current: 13 steps with 23% waste & 54% value-added



Grossing – Current Snapshot

Error Potential DECREASED!

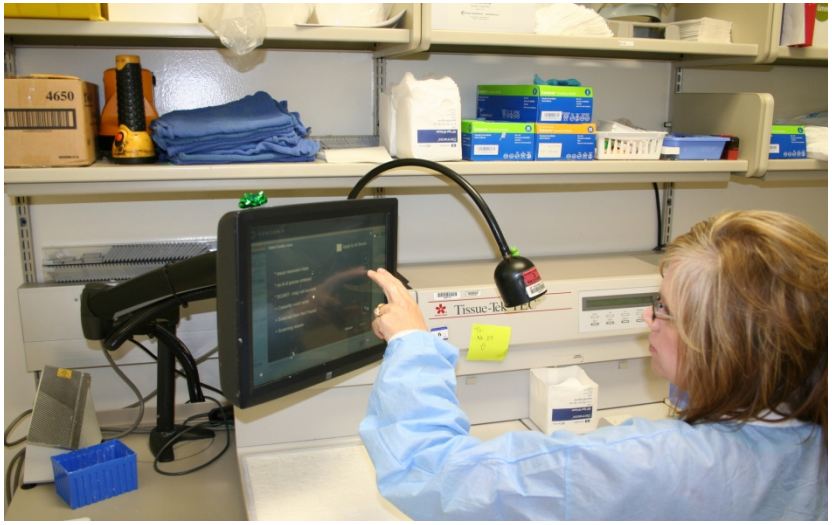
- When grossing, wrong tissue in block is impossible, if you follow the procedure.
  - Scan the bottle
  - Section tissue in bottle
  - Place tissue in cassette
  - Scan cassette
- Reduction of inaccurate information to histology
  - **Real time entering means better accuracy**
- *Less re-work for Histology in following steps*

Embedding Workflow – Current Snapshot

Previous: 12 steps with 50% waste & 17% value-added

Current: 10 steps with 20% waste & 50% value-added

Embedding – Current Snapshot



Double Work & Safety Nets Eliminated!!

- Incorrect # of pieces marked as Quality Issue in Barcode System at the workstation – allowing us to track it and decrease the Quality Issue
- Embed priorities (colored cassettes) first and then just embed in numerical order – no more sorting by Doctors, etc.
- Embedding & Processor Logsheets are GONE!!

Fostering Buy-in from Users

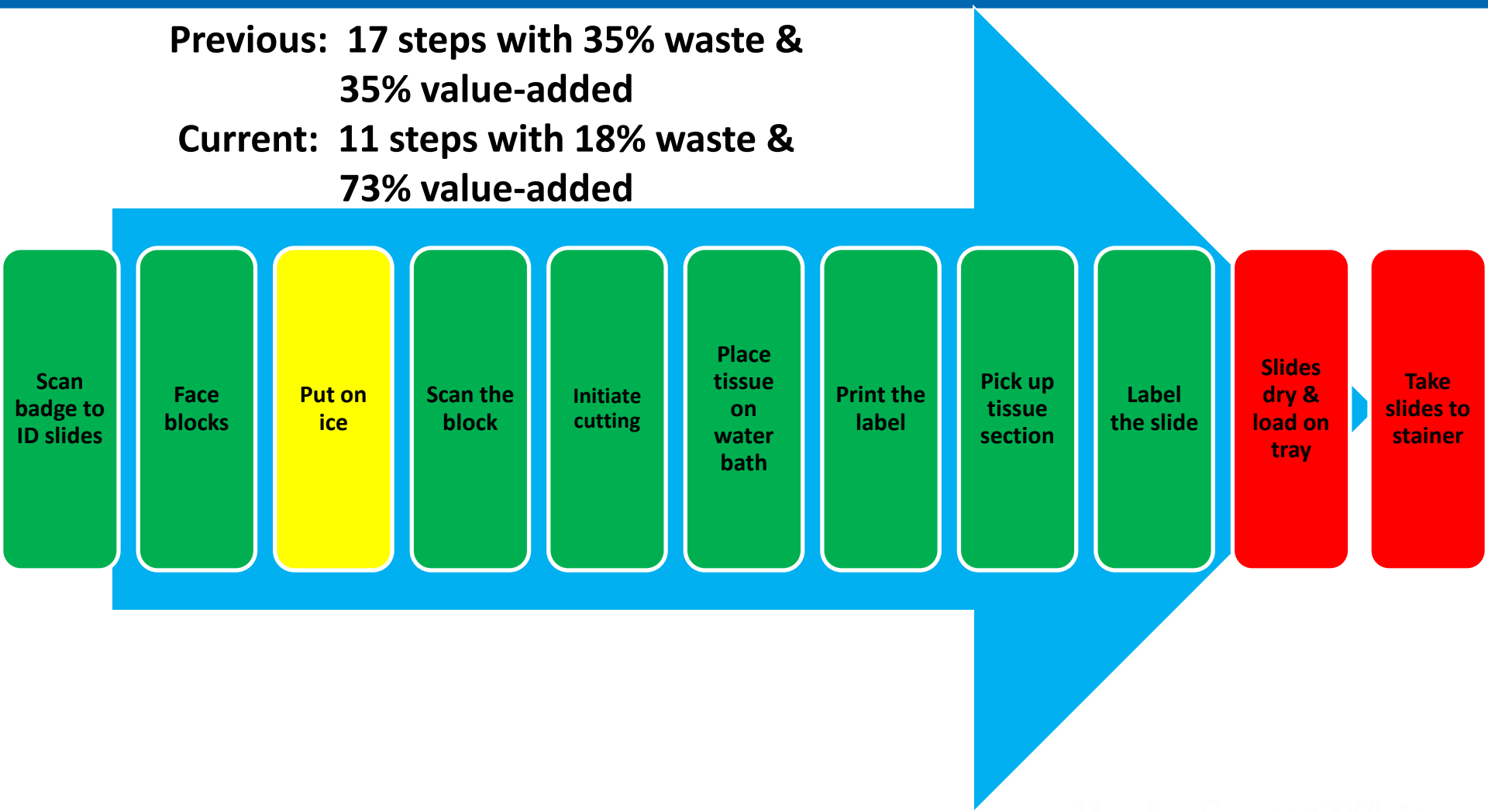
"In microtomy, we made our own decisions as histotechs for what our protocols would be with the new technology. Standardizing our own processes, as opposed to being told exactly how to do it by someone outside our station, gave us ownership of the new path ahead of us."

— Histotechnician

Microtomy Workflow – Current Snapshot

Previous: 17 steps with 35% waste & 35% value-added

Current: 11 steps with 18% waste & 73% value-added



Microtomy – Current Snapshot

Error Potential Decreased!

- When microtomy is done correctly, mislabeled slides are not possible
- No longer need to verify the blocks with the labels - follow the procedure, slides are labeled correctly every time
- Standardization of work:
  - Scan the block
  - Cut the slide
  - Print the label
  - Label the slide

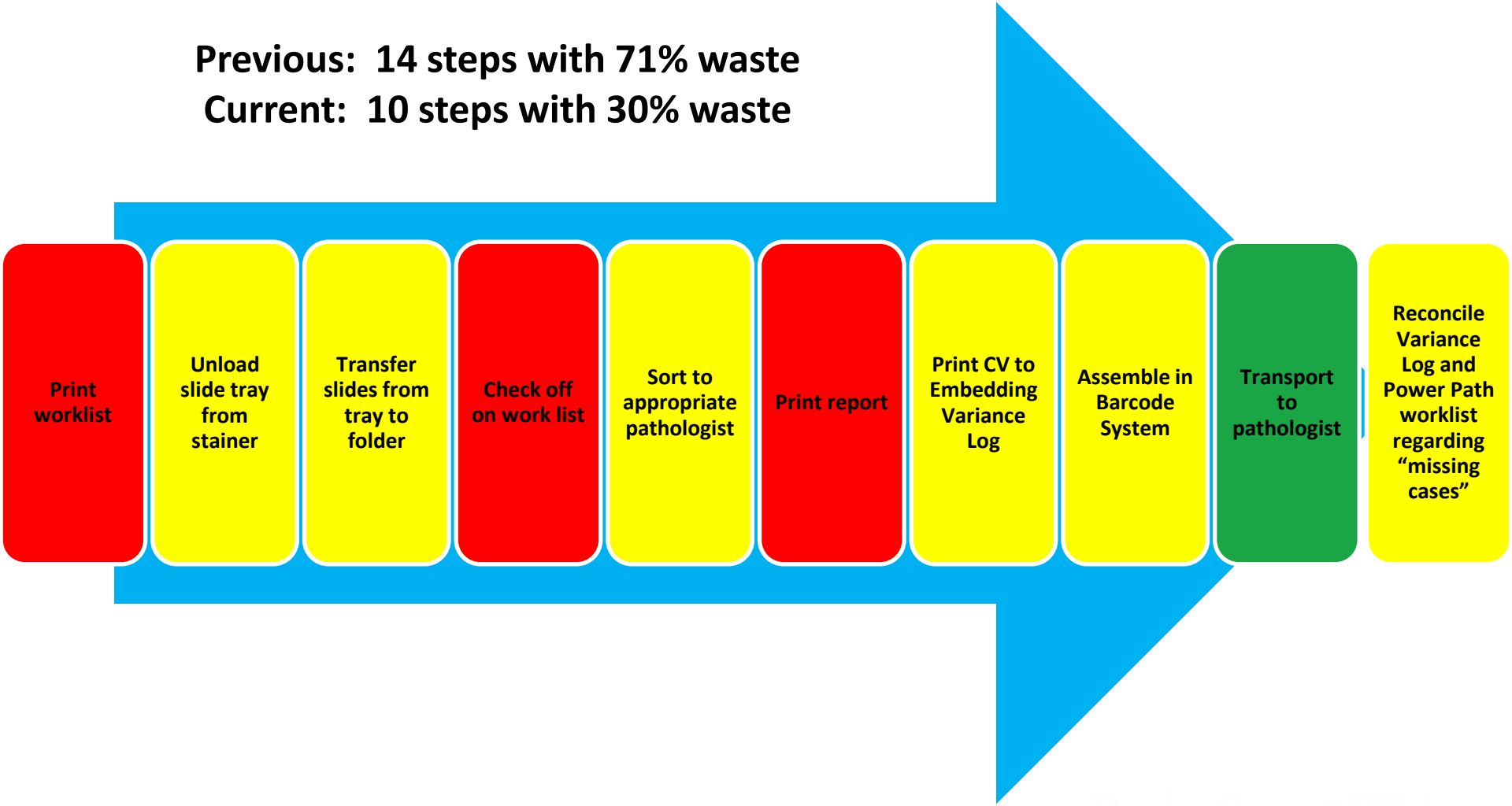
Error Statistics GONE!

- *0 mislabeled slides*
- *0 wrong blocks cut* – Our Barcode System "double-checks" you. Ordered tests only shows on the correct block.

Double Work, Safety Nets & "Blame Game" are Completely Eliminated!

Case Assembly Workflow – Current Snapshot

Previous: 14 steps with 71% waste
Current: 10 steps with 30% waste



Case Assembly – Current State

Error Potential Eliminated

- No Slide & Block Comparison

Double Work & Safety Nets Decreased!!

- No need for slide & block comparison – Barcode system
- We have not moved - so travel time and distance associated with transport to the pathologists office is still the same

Decreased Double Work & Safety Nets = Freedom

Throughout implementation and in the days following go-live, philosophies shifted as employees realized they were being empowered to change work processes to better protect patients — and themselves — from errors. They quickly understood they could trust new automated work processes and stop double- and triple- checking every action.

"Now we operate in a culture of safety, not fear."

— Histotechnician

What we've gained:

- Decreased mislabeling errors in microtomy post go-live
- Decreased accessioning process resulted in zero errors post re-design
- Workflow cost savings of $45,000/year
- Reduced turnaround time (TAT) by 24% in the first 6 months post go-live & have maintained to date
- Increased volume by 11% while also increasing the complexity of cases with minimal increase in staff
- Integrated Quality Metrics and Performance Dashboards now drive daily management and improvements
- Decreased overall recut rate by 37% and significantly reduced overall reprocessing rate
- Eliminated six paper-based worklists, previously used for labor-intensive manual tracking and safety nets

Added/Unexpected Benefits

- Greater visibility into operations, we can now track:
  - All blocks & slides in the process (we can see where they are located and when they will be complete)
  - Staff Productivity (for performance evaluations & building new staff competencies)
  - Workflow Visibility
  - Quality Issues (helps us identify process problems, eliminate waste & retrain staff when appropriate)

Lean Tools Impact

- Implementing Lean tools in your workplace changes the way that you look at the world around you
- You see opportunities and find that you are implementing these tools without a thought
  - 5S your workspace, office, car, house or spouse ☺
  - Visual cues in the workplace
  - Single piece workflow vs. batching
  - Standard processes
  - A3
  - Why Charts

Managing Change

- Having a positive attitude is the first step to managing change:
  - This seems like a simple thing, but it really is a HUGE thing
  - It's all about delivery and tone more than the words you are speaking
  - Reassurance of fears, concerns & the unknowns
  - Encourages positive attitudes in the workplace – they will follow your lead

Staff Education is key…

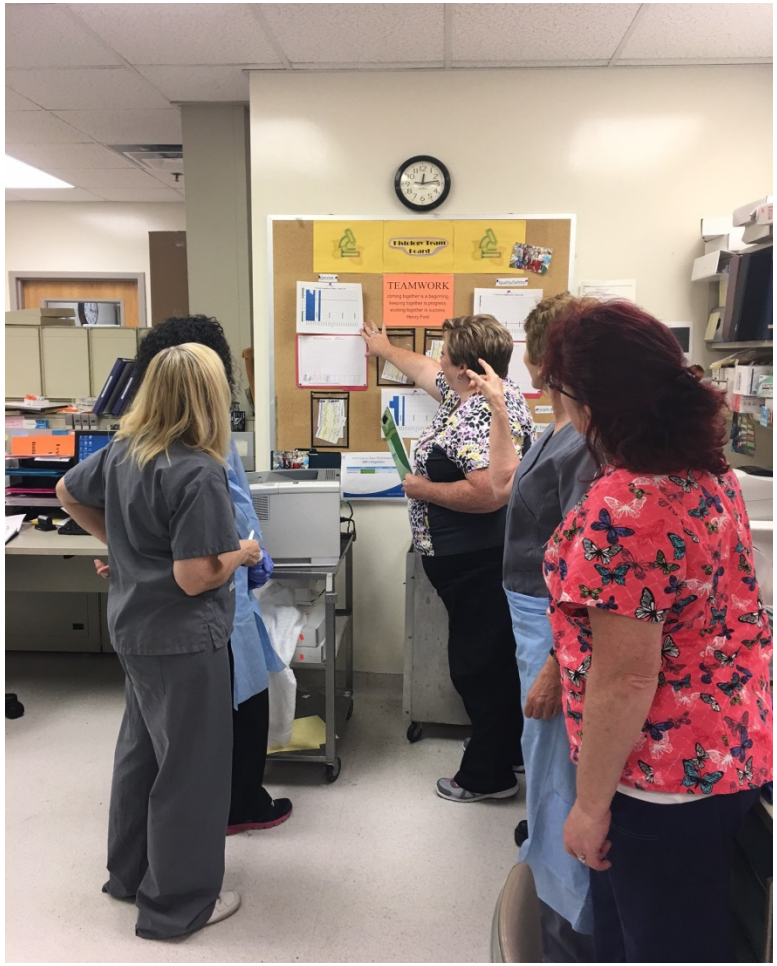
- Educating your staff about lean tools is a great step to managing any change:
  - New staff are required to attend lean training for ½ a day at BSWH with more opportunities to learn to come
    - This changes their point of view
    - Is exciting to new staff that we want to hear their ideas
    - Helps create a positive and receptive mind to change
  - You want their understanding of the process & why we need the change
    - This will foster buy-in and support
    - Front line staff may see roadblocks that you don't see
    - You can help them see the bigger picture of why
    - They have IDEAS!!

Staff Involvement/Empowerment

- Change management really starts with your staff:
  - Understanding is key:
    - Where we are & where we are striving to go
    - You don't want them to do it just because you told them to, but because they understand how it will improve the big picture.
  - Everyone wants to have a voice and to give input
  - You can't force change or you won't have support
  - Any change must be realistic & achievable
  - Communication – keep those lines open for feedback, support & questions
  - Take small steps – like eating a elephant

Huddle up, Everyone!

- Daily Huddles help keep everyone informed:
  - Keep it brief
  - Keep it on topic
  - Review metrics
  - Discuss any losses and/or gains
  - Discuss ways to improve
  - Keep it positive
  - Escalate issues/ideas



Management – What have we done well?

- PA as "Change Champion" in the gross lab
- Histotechnician as "Change Champion" in Histology Lab
- Informed, positive & engaged Staff
- Optimized the reports in the system to collect quality data and productivity
- Immediate feedback for ideas that are implemented

Management – What can we do better?

- Implementation in IHC
- Real-time dashboards to monitor workflow
- Better utilization by pathologists
- Improve new employee training

Where are we headed now?

- We are always looking to the future of our lab, it's growth potential and how we can be prepared for it the best?
  - We analyze our quality metrics on a daily, weekly and monthly basis to eliminate rework or pinpoint areas where re-training may need to occur
  - We analyze our workflow daily in our huddles to discover ways to improve, resolve any road blocks or bottle necks
  - We review productivity with staff for continuous improvement & personal career growth
  - We review productivity, as a lab, to ensure adequate staffing for current snapshot, prepare for growth and knowledge of our "capacity"

Any Questions???