The LEAN Toolbox for Hard Times
Project management tools and tips for avoiding waste in your laboratory

Nancy A. Young, MD
Chairman, Department of Pathology and Laboratory Medicine
Einstein Medical Center
Philadelphia, PA

Overview
- Definition of Lean
- 8 Deadly sins of waste
- Tools to eliminate waste
  - 5S
  - Redesigning work flow
- Lean Culture

Lean Tools for Hard Times
Lean Production System - A culture and the tools to minimize waste and create more value with less work
- Lowers operating costs

Six Sigma - System for error reduction.
Rigorous data-driven standardized approach to improve processes and reduce process variability
- Lowers cost from poor quality and defects

Both systems overlap and work to reduce errors. Six Sigma can be used as part of the Lean Tool Box (or vice versa).
Work Categories

- **Value added**
  - Grossing specimens, dictating

- **Non-value added, but necessary**
  - Waiting for slides in the stainer

- **Non-value added, and unnecessary (Waste)**
  - Time spent correcting errors, searching for supplies, waiting for work to be delivered, workarounds

We often do things a certain way because that’s how they were always done

**Recognizing a problem is the first step to solving it**
-- Sanya Friedman

**A problem well stated is a problem half solved**
--- John Dewey

Much of Lean is just common sense but...

"Common sense is not so common."

…Voltaire, Dictionnaire Philosophique (1764)
7 Deadly Sins of Waste

TIMWOOD (I)
- Transportation
- Inventory
- Motion
- Waiting
- Overproduction
- Over processing
- Defects
- Intellect

Transportation Waste
Movement of material or goods

Includes unnecessary movement of supplies, reagents, specimens, slides, or reports.

Examples:
- Transporting the microscope cart back and forth to the FNA suite
- Transporting finished slides and reports to storage area
- The distance a document travels or the number of people involved in an email communication

Inventory Waste
Excess clutter, “hoarding”, or not enough inventory to supply daily needs

Disorganized Supply Closet
Cluttered Pathology Office
Motion Waste

Unnecessary movement of people

Poor layout designs and processes

Walking an extra 10 steps from one workstation to the next (when they could be moved closer together) or to a printer will eventually add up to miles of wasted motion.

Reaching and stretching for parts on the workbench when the material could be placed at point of use.

Motion Waste

Moving to and from the scale to the formalin container across the room.

Spaghetti Diagrams document Motion Waste

Start with a blue print sketch of the lab. Easy to do. Vendors placing new equipment in lab, and Quality / Industrial Engineering Departments can help.
**Waiting Waste**
*Waiting… for next step, or “hurrying up to wait”*
- Most organizations push work in batches
- Pushed work results in waste, overburden, uneven workflow, waiting

**Over-Processing Waste**
*Extra processes without value, or extra steps that are not necessary to create the value*

Example: Separating bagged requisition slips from specimens just to reunite them again. Requires checking and rechecking to prevent identification errors.

Example Solution: Keeping specimens and slips together in buckets from accessioning area to the gross room.
Over-Processing Waste

*Extra processes and steps without value*

Example: Maintaining a manual log system that can be eliminated with computerization

Overproduction Waste

*Doing work more, sooner, or faster than required for what happens next.*

Excess number of cassettes printed

...or many more sections than needed

Defects

*Workarounds because of broken equipment, rework to correct mislabeled specimens, correcting errors*

Anything not done right the first time
Waste of Intellect
Not tapping into the intellect and creativity of front line staff (who are actually doing the work) to improve processes in the work place

Ways to Eliminate Waste
a. Organize the work place (5S)
b. Simplify and Standardize Work (Redesign work flow)

Organizing the Work place
5 S
- Sort
- Set in Order
- Shine
- Standardize
- Sustain

Maintains an orderly workplace using visual cues to reduce the amount of wasted time searching, looking, waiting and asking. Empowers employees to create work areas that work best for them.
Implementing 5S in your laboratory

The “5S Party” Guide

1. Make sure a decision maker will be present or easily accessible
   Someone present with the authority (and time) to make decisions when questions come up about what to keep and what to toss, where to store things, when to call for help, etc.

2. Decide the area to work on
   Choose one that’s not too large to start. You don’t want to be overwhelmed.

3. Plan time:
   How long will you need? Depends on the size of the area
   The average is 3 to 4 hours

4. Gather your supplies:
   Review your environment and gather needed supplies
   - Four different color pads of Post-It Notes
   - Label maker or sticky labels and markers
   - Other items, such as: baskets, folders, baggies, paper towels and cleaning spray may be helpful.

5. Have a camera on hand

6. Have a kick off (food is nice 😊) with some basic Lean training (8 deadly sins of waste, principles of 5S)

7. Perform the 5S
   (6S if you include “Snapshots”)

A. Snapshots
- Before starting take a picture of the area you will be working on.
- Take pictures as your team is working. They will help remind everyone of the effort they put in and teamwork they experienced.
- Take a picture of the finished product.
- Display the pictures –
  - Celebrate the achievement!
  - Use the pictures as guides to remind you where things go, if necessary

B. Sort

Clear out the area of everything you can (including inside drawers, under the counter)

Use four different color pads of “Sticky Notes” to label items removed and in the working area.

For example:
- RED might mean “we never use this item”
- Yellow might mean “we sometimes use this item”
- Green might mean “we always use this item”
- Blue might mean “we’re not sure about this item”

The colors aren’t important; the sorting is.

Sort (…continued)
- Get rid of items “we never use” (give away, recycle, or throw out, as appropriate)
- Decide what to do with items “we’re not sure about”
- Begin a “punch list” of things that can’t be done right away, or things you’ll need help with – like moving large items, for instance.
C. Shine

- Straighten up and Eliminate Clutter
- Wipe down workplaces and items (as necessary) with the cleaning supplies you gathered ahead of time.
- Use cleaning to decontaminate and as a form of inspection to detect equipment abnormalities and impeding failures before they occur.

D. Set in order

- Work with team to evaluate where things should be placed based on workflow and efficiency (use the “intellect” of front line staff)
- Only return items to the work area when you have agreed on and created a place for them.
- Put items in bins, drawers, or on shelves to keep them organized
- Label, label, label. Make sure it’s easy to identify what goes where
Histology lab freed up valuable counter top work space (left) by relocating the drop off spot for slides to be filed (right). They “enforced” the change until it became habit.

**Set in order (Example)**

**F. Standardize**

- Use visual cues that will alert staff to the location of items and when to refill or re-order
- Label drawers and containers
- Use and label drawer organizers
- Use colored tape outlined on countertops or floors as a cue to where to park mobile work items
- Other ideas?

**Standardize (Visual Clues)**

Color coding, paint, tape, signage, shadow boarding to alert staff to the location of items…
…and to signal when to refill or reorder
Using a visual signal (“kanban”) to set inventory limits and reorder triggers

Re-order point

Using kanban order card when it's time to order more from the stockroom.
Helps ensure material is ordered (and gets replenished) before running out.
Eliminates the need for “hoarding”

Standardize
Poká Yoke (“Dummy Proofing”)
Even Better than Educating

Classic Example: Medical gas outlets are designed so proper valves fit only into their corresponding outlets.
Automation and computerization often provide “dummy proofing” solutions to prevent errors

Celebrate your success!
G. Sustain
Plan how you will regularly communicate and train employees to maintain the laboratory’s adherence to 5S standards. Audit.

Respond to audits and continue to ask “why” (Root cause analysis):
Why is this tape out of place? Why was the misplaced tape not noticed earlier? Is this a better place for it?

Ways to Eliminate Waste
a. Organize the work place (5S)
b. Simplify and Standardize Work (Redesign work flow)

Simplify and Standardize Work Design
1. Simplify pathways and Standardize tasks
2. Partner with customers and suppliers
3. Eliminate batching and level out the workload
Benefits of Standardized work

- Reduces variability and error
- Know exactly who provides what to whom and when
- Standardizing paradoxically increases freedom. Frees up staff from fretting about the “small stuff’. More time for trouble shooting and creative problem solving.

Simplify and Standardize Work Design

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All work can be boiled down to a basic customer-supplier relationship

Direct Pathway

Paths should be simple and direct and the activity performed must be standardized.
Indirect pathway (Branched/Forked Pattern)
Supplier is using more than one path to deliver goods or services to the adjacent customer in the process chain.

Customer
"Where is my work???

Supplier
Activity
Goods/services in transit

Place A
Place B
Place C

Ambiguity about whom/where to deliver the goods.

EXAMPLE: Pathologist asks "where are my special stain slides?" They were delivered to someone else.

Indirect Pathway (Looped Pattern)

Customer
Activity
Goods/services

Supplier

"WHISPER DOWN THE LANE"
Multiple steps between customer and supplier. Supplier may not give back what customer really wants.

Map out processes
Eliminate steps not valuable

Watch out for forks and loops in the process!

Instrument Vendors, Quality / Industrial Engineering Departments can help.
Direct Connection and Pathway
but
Activity/Product is not clearly defined

Customer ➔ Need/want ➔ Supplier ➔ Activity ➔ Need/want ➔ Supplier ➔ Activity ➔ Bar coding tubes incorrectly

EXAMPLE: Improper bar code label placement by nurses results in instrument failure to read blood tubes.

Simplify and Standardize Work Design

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3. Eliminate batching and level out the workload

PARTNERING WITH SUPPLIERS
Example:
- Partner with nurses and nurse educators to improve bar code labeling technique
- Teach nurses at their training sessions
- Conduct tours of the lab so nurses understand lab processes and importance of the bar code
- Give immediate feedback to supervisor and nurse educator when labels are improper and if problems recur
PLEASE PROPERLY LABEL YOUR TUBES!!

Unacceptable missing label
*Note: Thermal Printers must be fully charged!! Batteries must be replaced at the beginning of each shift and checked periodically during the shift to ensure the device is fully charged. When they are not properly charged, the barcode is light in color and the lab instruments can not read them—leading to delays!

Unacceptable fading and non-linear barcode

Excellent quality and straight orientation for rack placement in analyzer (yeah!)

Unacceptable oblique orientation

Crunched barcode with missing info

Smooth label -> normal sized barcode
Crunched label -> deformed barcode

Partner with your Customers (at different levels of the organization)

- Employees may disagree on the best way to perform tasks. Best to start with your customer's needs.
  
  Immediate customer
  - Example: Pathologist customer for the cytotechnologist
  - How to best standardize dotting the slides?

  Ultimate customer
  - Example: Clinician or patient
  - How best to standardize Cytology reports and terminology?

EXAMPLE OF STANDARDIZED WORK: Agreed upon standard sections by pathologists reduced the number of blocks and slides (over-processing waste), reducing work for histology lab, pathologists, and storage costs. Continuing monitoring of data prevents "drift"
Simplify and Standardize Work Design

1. Simplify pathways and Standardize tasks
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Batching or Continuous Flow? Push or Pull?
- Most organizations push work in batches
- Pushed work results in waste, overburden, uneven workflow, waiting (bottle necks)
- Also breaks an immediate feedback loop between customer and supplier
  Example: Clinic sending biopsies all at once when their staff “gets around to it” (usually at the end of the day)

Pull System
- Customer tells the supplier when they are ready for the next work and it is delivered
- Decreases waiting for work, work sitting idle, and builds in active feedback between customer and supplier
  Example: Regular lab pick ups even out work flow. Smaller batches are better even if it is not the ideal single or continuous flow.
Batching Vs Single Flow in the Gross Room

Attendant pre-labels cassettes in batches and stores them with specimens. Time is spent checking and rechecking numbers to prevent identification errors. Overproduction waste.

Automated Cassette labeler. Print cassettes on demand at the time specimen is grossed. Safer and faster.

ANATOMIC PATHOLOGY PROCESS ERRORS PRE AND POST AUTOMATION

COLLECT DATA PRE AND POST CHANGE TO DOCUMENT THE EFFECTIVENESS AND TO MONITOR (CONTROL) THE PROCESS

Lean is also a Culture

<table>
<thead>
<tr>
<th>Traditional Culture</th>
<th>Lean Culture</th>
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</thead>
<tbody>
<tr>
<td>Function in silos</td>
<td>Interdisciplinary teams</td>
</tr>
<tr>
<td>Blame people</td>
<td>First blame the process</td>
</tr>
<tr>
<td>Hope problems will go away. Don’t advertise.</td>
<td>Look for problems to fix. Perform a root cause analysis.</td>
</tr>
<tr>
<td>Supplier is an enemy</td>
<td>Supplier is an ally</td>
</tr>
<tr>
<td>Volume lowers cost</td>
<td>Removing waste lowers cost</td>
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<tr>
<td>Internal focus</td>
<td>Customer focus</td>
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Lean Culture
See with your own eyes
Go to the “genba”

- Go to the “genba”, the place where the problem actually happens
- Avoid the conference room, conference call, email, and board meeting to solve problems
- See and solve problems at the source
- Involve front line staff. Examine how the most highly-functioning individual performs and document that process (the “positive deviant”)

Overlap of Lean and Six Sigma
Project Management tools

DMAIC
- Define
- Measure
- Analyze
- Improve
- Control

Kaizen (Rapid Improvement Event)

“A journey of a thousand miles begins with one small step”… Chinese proverb

- Start small by just noticing waste
- Empower staff to understand TIMWOOD
- Host a 5S party
- Host a Kaizen with a Lean Sensei (mentor)
- Slowly change the culture.
A big thank you to Dr. Stephen Raab
My Lean Sensei (mentor)