9 Waste of Lean- Downtimes

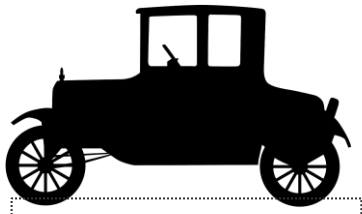
Dillan Jelitto, CSSGB

Improvement Engineering

Objectives

- History of Lean
- What is Lean
- Value Categories & Quiz
- Downtimes & Quiz
- Examples
- Activity
- What's Next
- Quiz

History of Lean- Identifying Value & Reducing Waste



Henry Ford set tools in order of operation; go/ no go gauges

Founder Sakichi Toyoda & Ohno of Toyota improve automation & evaluate waste

Eiji Toyoda, Taiichi Ohno, Shigeo Shingo develop Toyota Production System

Healthcare companies start adopting Lean to reduce cost and improve patient care

1908-1913 → 1930's → 1950's - 1970's → 1990's

Ford develops moving assembly line; Flow Production

Shigeo Shingo
-Just-in-Time production
-team development
-respect for employees

Major publications, education on lean
-The Machine that Changed The World
-Lean Thinking

What is Lean?

- Lean is the reduction of waste
- Waste is anything that doesn't add value
- Value is defined by the Customer

"Many people are busy trying to find better ways of doing things that should not have to be done at all. There is no progress in merely finding a better way to do a useless thing."

-Henry Ford

Value Categories

Value-Added (VA):

- Changes the product AND
- Meet customer need; willing to pay for it
- Can be done right first time

Required Non-Value-Added (RNVA):

- Required by law, regulation, contract, accrediting body, or organization
- Necessary for health, safety, environmental, or ethical considerations
- An activity required due to space/design constraints

Non-Value-Added (NVA):

- An activity not related to the customer or product.
- Also called “pure waste”

Value is defined by the customer!

Value Added Quiz

Q: Pipetting a sample

Q: Safety audit

Q: Storing samples after testing

Q: Re-labeling a sample

Q: Drawing blood

Q: Gross dissection of a tissue

Q: Cleaning the floor

Q: Pour-off into standard tube

A: VA (Changes form, fit or function)

A: RNVA (Required, a condition of business)

A: VA (if more testing is needed)

A: NVA (rework)

A: VA

A: VA

A: RNVA (can't stop cleaning floors)

A: NVA

9 Waste of Lean- Downtimes

Waste = Any activity that does not add value to the process

DOWNTIMES (TIMWOODS)

- Defects
- Overproduction
- Waiting
- Non-utilized resource
- Transportation
- Inventory
- Motion
- Excess processing
- Safety risks

D-O-W-N-T-I-M-E-S

Defects

- Anything that does not meet customer expectations
- May be identified internally and reworked
- May only be identified by the end customer

- Example:
  - » Error Correct Report (ECR)
  - » Quantity Not Sufficient (QNS)
  - » Mislabeled specimen

What <u>defects</u> occur in your work area?

D-O-W-N-T-I-M-E-S

Overproduction

Worst of the Wastes

- Producing more than is needed
- Generating products too early
- Completing a task too early

- Example:
  - » Too much reagent, expires
  - » Finish run build when analyzer is still busy
  - » Running test 2x when not necessary
  - » Using outdated templates/software

Is there overproduction in your area?

D-O-W-N-T-I-M-E-S

Waiting

- Workers waiting between activities
- Products waiting before process steps, between process steps and at the end of the process for customer delivery

- Example:
  - Waiting for more volume to fill up run
  - Specimens waiting to be added to run
  - Results waiting for technologist sign off

Is there anyone or anything <u>waiting</u> in your area?

D-O-W-N-T-I-M-E-S

Non-utilization of resources/talent

- Equipment or systems not used to full capability/capacity
- Employees not used to their full potential
- Employees too busy to make changes

- Example:
  - » Technologist doing technician work
  - » Liquid handler only run 50% of the time
  - » Spending too much time in meetings
  - » Not listening to improvement ideas from bench staff

Is there equipment, systems or personnel under-utilized in your area?

D-O-W-N-T-I-M-E-S

Transportation

- Waste of distance traveled of the product
- Any product movement is considered waste

- Example:
  - » Distance from Specimen Receiving to lab
  - » Distance from storage to run build
  - » Distance from resupplies and workstation

How does transportation apply to your area?

D-O-W-N-T-I-M-E-S

Inventory

- Holding more parts or resources than is required
- Holding items that are no longer needed or in use

- Example:
  - » Storage paperwork that could be moved off site (or out of work area)
  - » Expired reagent
  - » Incorrect storage between fridge and walk-in

Is there excess supply inventory in your area?

Is there non-productive inventory in your area or being help for your area?

D-O-W-N-T-I-M-E-S

Motion

- Waste of distance-traveled of the employee
- Any employee movement is considered waste
- Space design and ergonomics are contributors

- Example:
  - » Distance from workstation to fridge
  - » Distance between two processes while multitasking
  - » Distance to storage
  - » Digital motion; clicks to find files

How does motion apply to your area?

D-O-W-N-T-I-M-E-S

Excess processing

- Doing something again
  - Think of words beginning with “Re”
  - Retest, reprint, repeat, recheck, redo, etc.

Duplicating a task done by someone else

- Example:
  - » Reruns
  - » Tracking down reroutes
  - » Quality checks
  - » Number of tube touches

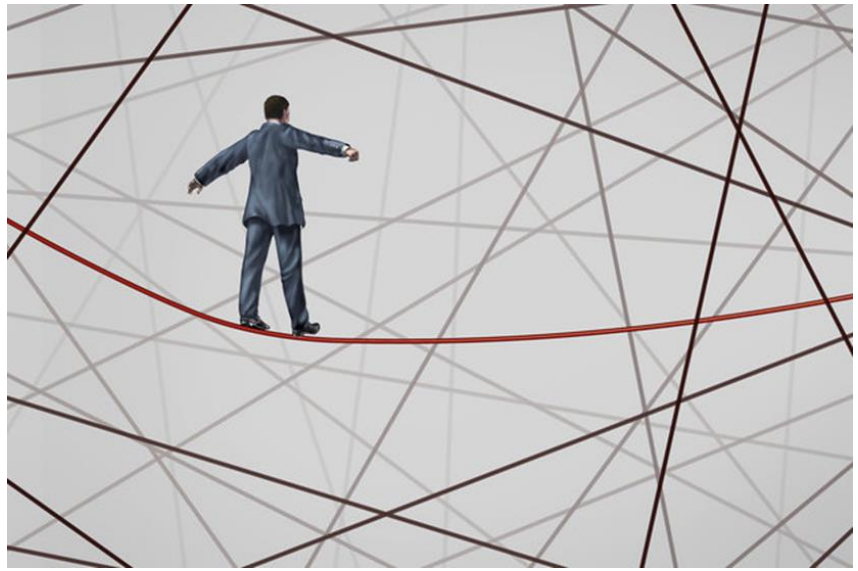
Is there extra processing in your area?

D-O-W-N-T-I-M-E-S

Safety risks

- Conditions or actions that put patient or customers safety at risk
- Conditions or actions that put employee safety at risk
- Uncomfortable working area that affects focus

- Example:
  - » Poor ergonomics
  - » Improper PPE
  - » Improper use of biohazardous disposal/sharps
  - » Tripping hazards
  - » Lifting Injuries



Are there safety concerns in your area?

Waste Quiz

Q: Scheduling and building 10 runs but no one schedule to verify results

A: Overproduction, Waiting

Q: Working in a fume hood while stooped over

A: Safety

Q: Mixing up patient tube labels

A: Defect

Q: Letting the incubator go for 4 hours when it only needs 30 minutes

A: Excess processing

Q: Multitasking between 2 runs/assays

A: Waiting, Motion

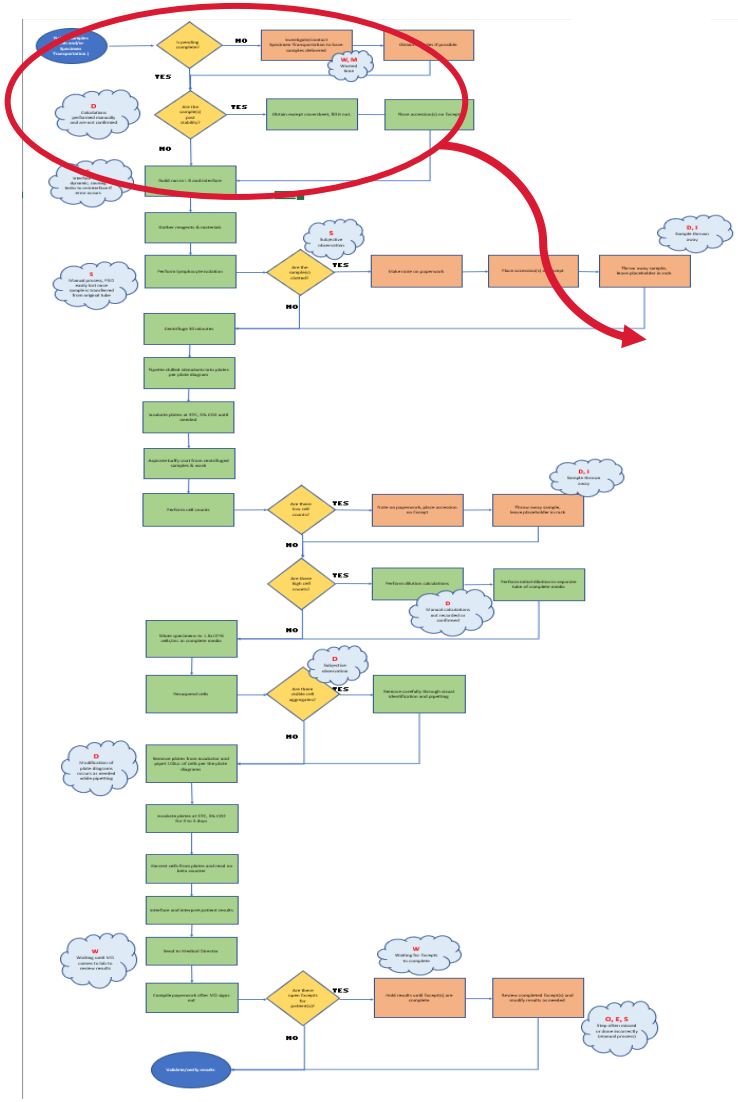
Q: Not including lab staff in improvement projects

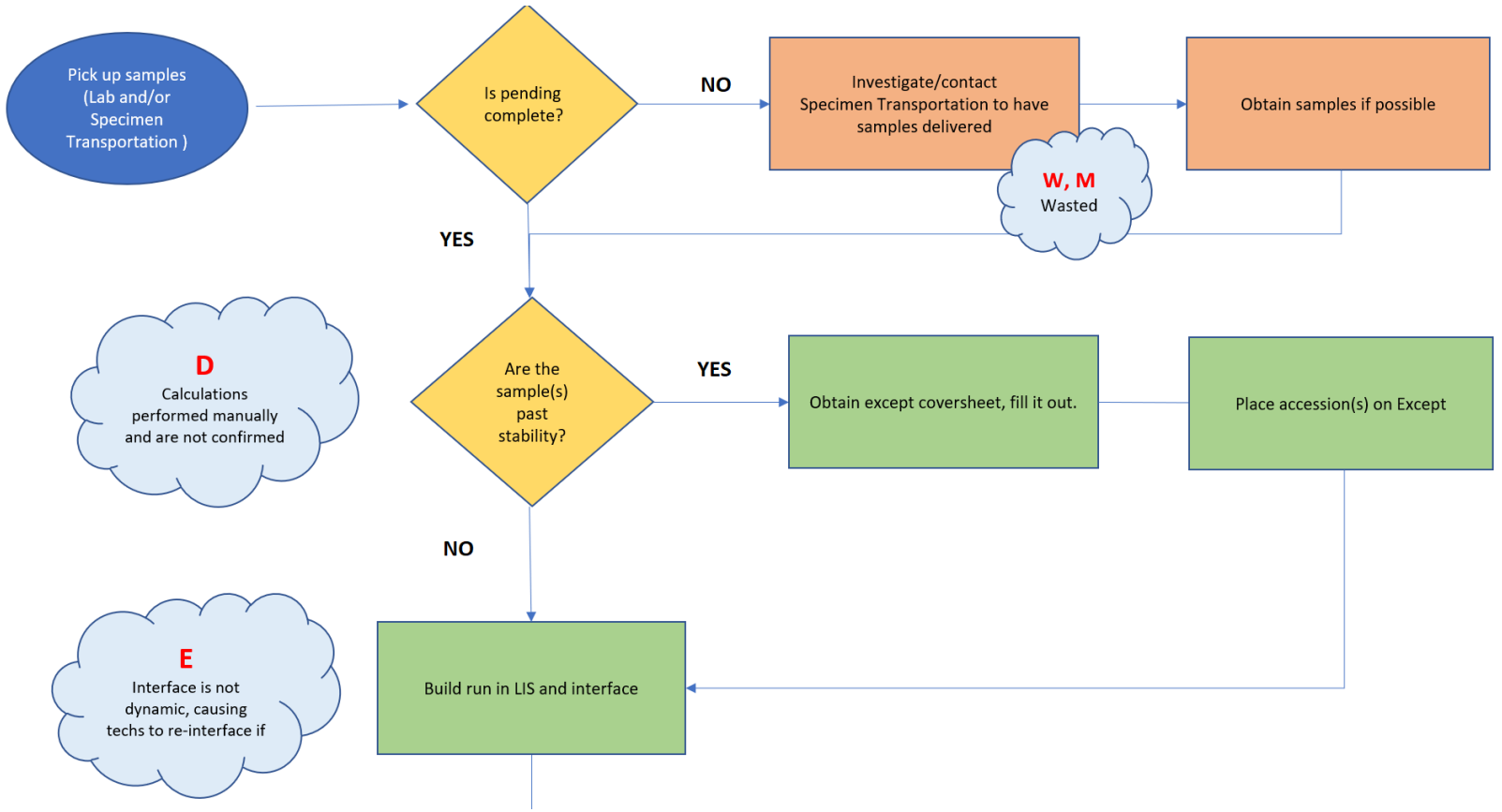
A: Under utilized resource

Q: Storing frequently used reagents in the walk-in down the hall

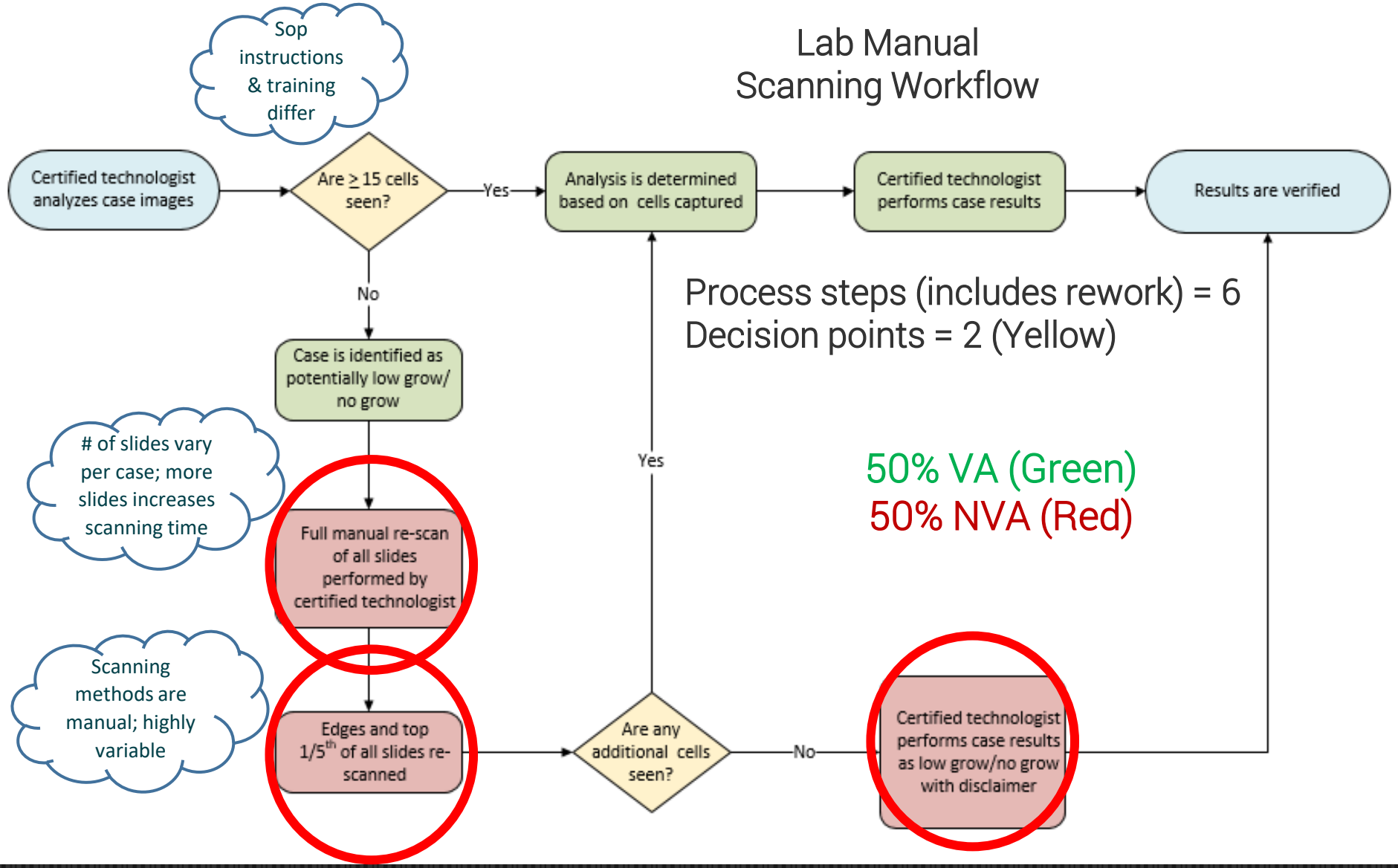
A: Inventory, Motion, Transportation

Trouble bubbles example

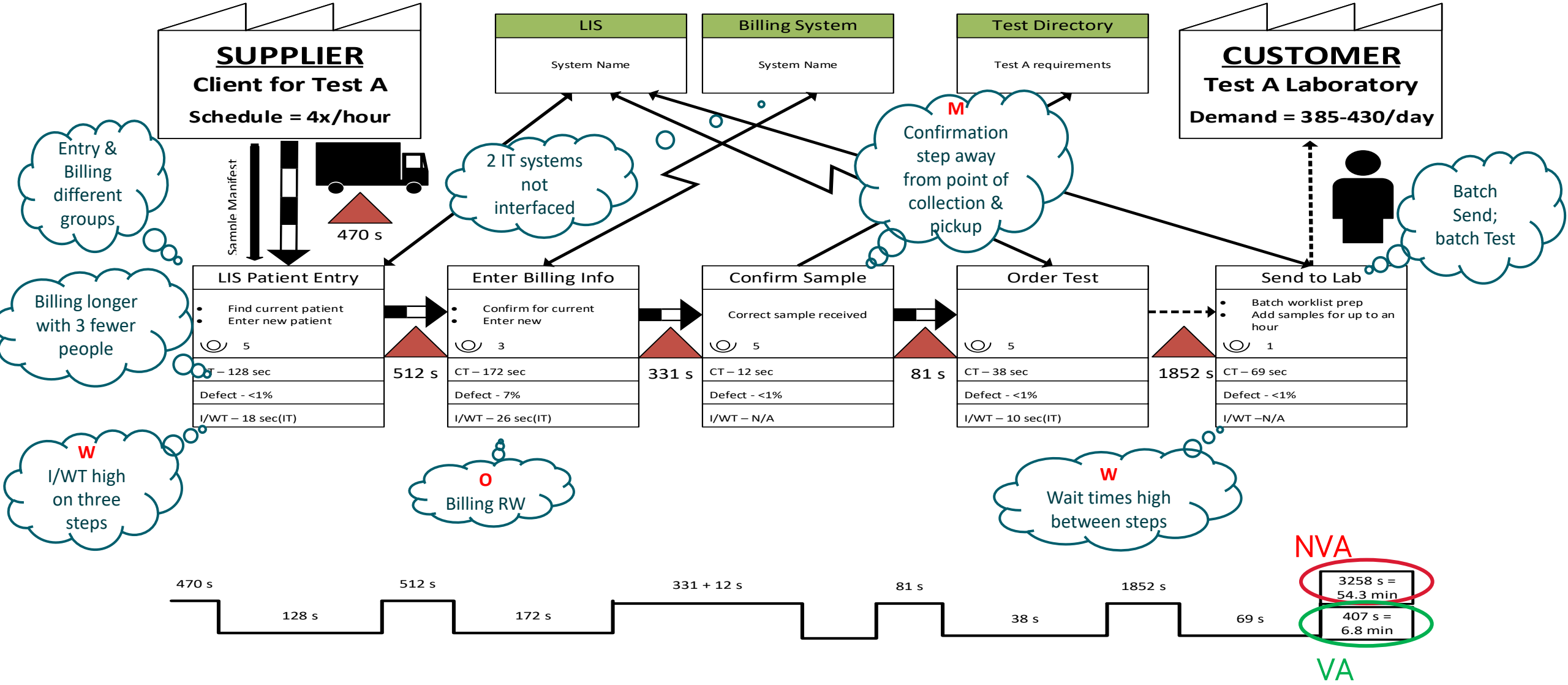




Process Map/Flowchart- VA/NVA

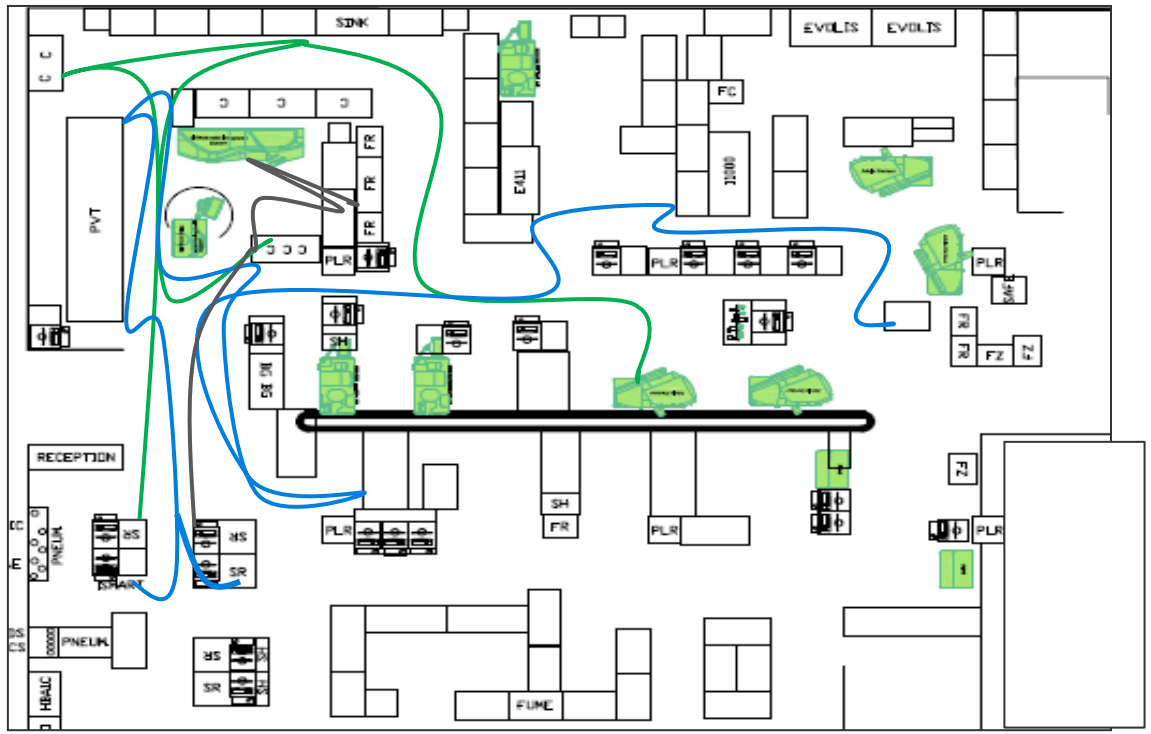


VSM example


SUPPLIER
Client for Test A
Schedule = 4x/hour
LIS
System Name
Billing System
System Name
Test Directory
Test A requirements
CUSTOMER
Test A Laboratory
Demand = 385-430/day
Entry & Billing different groups
Sample Manifest
470 s
2 IT systems not interfaced
M
Confirmation step away from point of collection & pickup
Batch Send; batch Test
Billing longer with 3 fewer people
LIS Patient Entry
Find current patient
Enter new patient
5
CT – 128 sec
Defect - <1%
I/WT – 18 sec(IT)
512 s
Enter Billing Info
Confirm for current
Enter new
3
CT – 172 sec
Defect - 7%
I/WT – 26 sec(IT)
331 s
Confirm Sample
Correct sample received
5
CT – 12 sec
Defect - <1%
I/WT – N/A
81 s
Order Test
5
CT – 38 sec
Defect - <1%
I/WT – 10 sec(IT)
1852 s
Send to Lab
Batch worklist prep
Add samples for up to an hour
1
CT – 69 sec
Defect - <1%
I/WT –N/A
W
I/WT high on three steps
O
Billing RW
W
Wait times high between steps
NVA
3258 s = 54.3 min
407 s = 6.8 min
VA
470 s
128 s
512 s
172 s
331 + 12 s
81 s
38 s
1852 s
69 s

Spaghetti Diagram (Specimen, Diagram Waste)

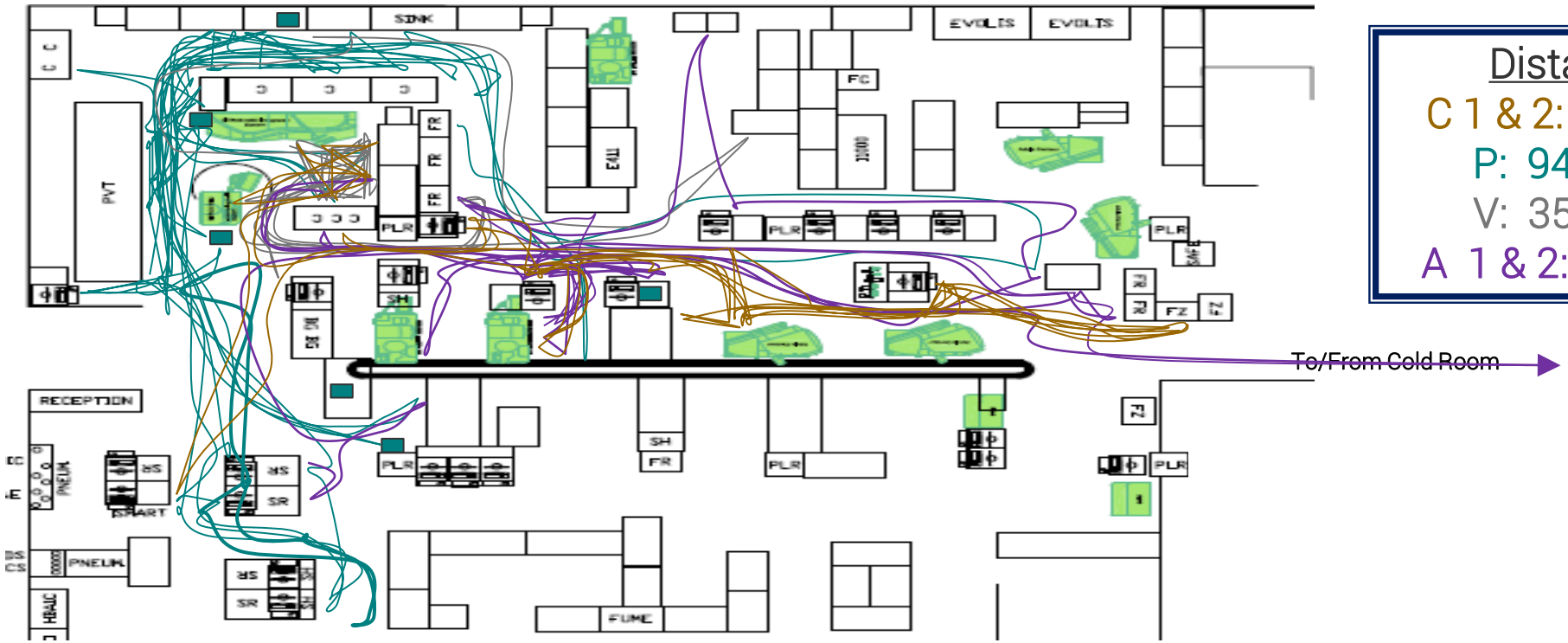
- Visual of the product path during data collection
- May benefit from seeing multiple products on one diagram



Work Area	Distance	Touch Points	Wait Points
Lab area	37 feet	5 by 2 operators	3
PVT/LAS	143 feet	7-8 by 2 operators	9
Other offline	71 feet	6 by 2 operators	5

Spaghetti Diagram (Person, Motion, Waste)

- Visual of the operator path during data collection
- May benefit from seeing multiple operators on one diagram



Distance Traveled
C 1 & 2: 440 feet in 15:43
P: 948 feet in 26:30
V: 358 feet in 17:39
A 1 & 2: 561 feet in 20:42

Activity

- Identify an example of each of the nine wastes in your own work/lab.

Name: _____

Nine Waste of Lean

Identify an example of each f the nine wastes in your own work/lab.

Defects
Process: _____
Waste: _____

Overproduction
Process: _____
Waste: _____

Waiting
Process: _____
Waste: _____

Non-utilized Resources
Process: _____
Waste: _____

Transportation
Process: _____
Waste: _____

Inventory
Process: _____
Waste: _____

Motion
Process: _____
Waste: _____

Excess Processing
Process: _____
Waste: _____

Safety
Process: _____
Waste: _____

What next?

- Measure
  - » How bad is it
  - » What is the extent of the waste
- Analyze
  - » Why do we have nonvalue-adding steps in our process?
  - » Can we eliminate them?
- Improve
  - » How can we eliminate or reduce waste in our process?
- Control
  - » How do we prevent this issue from coming back?

Quiz

1. What is Lean?
    A. The Reduction of Waste
2. Who is Value defined by?
    A. The Customer
3. What does DOWNTIMES stand for?
    A. Defects, Overproductions, Waiting, Non-Utilized Resources/Talents, Transportation, Inventory, Motion, Excess Processing, Safety
4. (VA, NVA, RNVA) What value category is drawing blood?
    A. Value Added
5. Once you have your process mapped out, what is the next step?
    A. Trouble bubbles – Identifying waste
6. What can help with visualizing the product path (transportation) during data collection
    A. Spaghetti Diagrams

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