7 Flows of Medicine
Module 22

Global Production System

One Piece Flow  Takt Time  Pull Production

Value Stream Mapping

5S
- Sorting
- Simplifying

4 No’s
- Sorting
- Simplifying

Kaizen  Kaikuku

Setup Reduction Changeover

Standard Operations
Heijunka (Leveling)

Multi-process Operations

Just-in-Time

Quality  Cost  Delivery
Safety  Cost  Delivery

Profit = Price - Cost

Cost Reduction By Eliminating Waste

GPS Depth Study NVA/VA-Functions/Mgrs

TAKT Time Map Capacity Tables

Visual Control

Andon

Jidoka (human automation)

Realignment  Rework

GPS

MUDA

Poka-yoke (mistake proofing)

Total Productive Maintenance

RPIW

Product/Patient Quantity Analysis

7 Flows of Medicine

7 Wastes

3P Prod Prep

Profit = Price - Cost

Cost Reduction By Eliminating Waste

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7 Flows of Medicine

1. Flow of Patients
2. Flow of Family
3. Flow of Providers
4. Flow of Medications
5. Flow of Supplies
6. Flow of Information
7. Flow of Equipment
1. Flow of Patients

A. No patient waits.
B. Minimize patient walking; bring the services to the patient.
C. Problems must force the process to stop.
D. Patient flow is in only one direction with successive steps in order of processing.
E. Incorporate quality checks at each step of the process with mistake-proofing methods.
F. If there is single-piece flow, schedulers/planners are not needed for the process.
G. Understand Takt Time – meeting the demand.
H. Use “between processes” time to complete indirect patient care tasks.
Questions to ask about Patient Flow:

- How many patients does your unit treat in a day? In a week? What do you treat them for?
- How much time per patient is allotted? Is this time too little or too much, based on the patient load and the severity of cases?
- Where do waits occur?
- When and where do clinicians wait for patients?
- Where are opportunities to optimize patient flow?
- If unavoidable waits exist between processes, can other value-added work be done?
- Can the service be brought closer to the patient? (e.g., can lab work be performed near the patient rather than sending the patient to a central lab?)
2. Flow of Family

A. Family and important relationships are defined by the patient.
B. Family travels with the patient where appropriate and as the patient desires.
C. Family is a respected part of the patient care team.
D. Family concerns stop the process until addressed.
E. Family is a respected source of information about the patient.
F. Information should flow to the family throughout the process as desired by the patient.
Questions to ask about Family/Relationships Flow

- How does the patient define their family or important relationships and how does the patient want them involved?
- When and where can the family be included in the process to improve care for the patient?
- Where are the opportunities to optimize information flow between care team, patient, and family?
- What unique information might they have that would enhance the care of the patient?
3. Flow of Providers

A. Understand Takt Time and cycle times of the work.

B. Look for standard work – it is critical to people flow.

C. Do not isolate people in “islands.”

D. Understand people movement, especially if across several process steps.

E. Providers are part of the process – when they stop, the process should stop.

F. All supplies, instruments and materials should be as close to the provider as possible.

G. Examine motion of hands, feet, and eyes.

H. Stand when possible – do not use chairs!

I. Do not tolerate rework!

J. Avoid unreasonableness (i.e., Muri).
Healthcare clinicians are the people most instrumental in providing value-added work to healthcare processes.

The flow of clinicians between the clinic, the hospital, and other patient-care delivery centers should be quick, easy, and stress-free for both clinicians and patients.

Doctors, nurses, and other practitioners are often stressed when forced to scramble around, traveling from one appointment to another.

This situation sometimes results in a curt demeanor and poor patient relations.

Studies show that physicians who are known for a good bedside manner and for taking time to know their patients are less likely to be sued for malpractice.
Questions to ask about Clinician Flow:

- How many patients does your unit treat in a day? In a week? What do you treat them for?
- What is the average length of time required to process and treat one patient?
- Where can you better arrange work cells? How easy would it be to reconfigure the work space?
- Is it possible to set up satellite labs or pharmacies for smaller, less invasive treatments, reducing the time a patient or a clinician takes to travel to a central site.
- Can you reduce interruptions to the provider?
4. Flow of Medications

A. Single-piece flow with signal/pull from provider.

B. Introduce point-of-use. Get as close as possible to the point of use.

C. Kit medications where possible.

D. Make smaller, specialized “satellite” pharmacies where possible.

E. Bring medications to the patient, no patient walking.

F. No waiting for medications.
Optimally, the medications flow through the system JIT—only in the amount needed, at the place and time needed, at the appropriate cost.

Here are some ways to improve flow of medications.

- *Provide single-piece flow with signal/pull* from clinician. Locate medications as close as possible to the point of use.

- *Combine medications (kit) commonly used together in one container where possible.* Add to the kits any additional medications prescribed by the physician.

- For example, kitting medications the night before discharge enables a patient and family to exit the system more quickly.

- *Create smaller, specialized satellite pharmacies where possible.* Satellite pharmacies bring pharmacy staff closer to high–patient population locations and make it easier to eliminate backlogs and long queues.
Questions to ask about Medication Flow

- Can a satellite pharmacy be placed at each service delivery center so that medications are delivered quickly and effectively?

- Where can you pre-kit medications and stimulate flow?

- Can medications be kitted the night before patients are to be discharged?

- How often are medications being ordered?

- Are you stocking medications not used regularly, “just in case”? Are some of them reaching their expiration dates before use? Are you increasing costs by being overly cautious?
5. Flow of Supplies

A. Do the supplies flow to point of use?
B. Just in Time – only material on-hand needed at the right place and at the right time.
C. Make the flow visual for simple control.
D. Introduce min/max, or “2 bin” strategies to re-supply point of use.
E. Presentation of materials and sequencing is key.
F. Quality is critical.
G. Inventory reduction strategies – use kanban for total inventory reduction.
H. Think of flow upstream – to suppliers – is it Just In Time? (JIT)
Questions to Ask Regarding Supply Flow

- How can you create systems to bring supplies into the medical center in a quick and efficient way?
- Is there pull from patient–service delivery centers to central supply and out to suppliers?
- Where can you make it visual so that patients or employees can scan supplies or the process at a glance and tell what is happening and what action to take next?
- Is safety stock necessary? If so, where?
6. Flow of Information

A. Information travels with patient.

B. When information flow stops, the process stops.

C. When designing the process, consider how information flows.

D. Only the minimum information necessary to perform the process should be released.

E. Introduce mistake proofing and go/no go gauges to ensure the flow of correct information.

F. Information can come in many forms – signals, lights, sounds, music, spaces, etc.

G. Information must facilitate pull processes, not push.

H. “Open room” arrangements facilitate the flow of information between providers and staff.
The efficient and effective flow of information enables timely, high-quality patient care, and enhanced safety.

You don’t want a stop in information flow—for example, a missing chart or lab results—to interrupt patient flow.

Do not have incorrect or missing information (e.g., allergies to medications) that can endanger the patient.

Consider how many times hospital clinicians take time to verify patient identification. This is a quality check to ensure that the correct person receives the correct treatment.

Value-stream mapping can tell you:

- How information flows through the system.
- Where redundancy and rework exist.
- How many data systems exist that all ask the same questions and keep the same data.
Questions to ask about Information Flow:

- Where and how can you make information travel with the patient?
- Are you providing information clinicians don’t use?
- Where do you find redundancy and rework in information flow?
- Can we put all the vital patient information on an electronic card that can simply be swiped upon arrival at the medical center?
- What is your process for flow of information? How can you improve this flow to better serve your patients?
- How do you ensure that information is correct every time?
7. Flow of Equipment

A. Arrange equipment in a sequence that facilitates the flow of patients, providers and information.

B. Separate people from machine work (i.e., Jidoka).

C. Use equipment with narrow frontage. Think “townhouse” not “ranch house.”

D. Operation in front – maintenance in back.

E. Right-sized, small, economical equipment on wheels that is home-made.

F. “No money” and “no time” are just excuses.

G. Use of small, single-purpose machines with in-process checks.

H. “No roots, no ivy, no anchors.”

I. Equipment must facilitate flexible arrangements as demand and processes change.

J. Is there wasted machine movement?
Whenever possible, use right-sized, small, home-made economical equipment on wheels that’s easy to move and light enough for one person to manage.

This approach limits walls and monuments (immovable equipment or furnishings), so the space available can be configured in the most effective and efficient way possible.

Optimize equipment use. Machines can operate 24 hours a day, seven days a week. Are you optimizing the use of your equipment? For example, you could offer MRI services in two or three shifts.

Be flexible in your equipment use. Explore adding or subtracting equipment as demand varies. Can equipment that is not currently needed be easily dismantled or folded up and stored nearby for future use?
Questions to ask about Flow of Equipment

- How will a piece of equipment improve patient flow, quality of care, and safety? Is it the most cost-efficient solution?
- How often will the equipment be used? Can it be used more if demand increases?
- Is the equipment located where it makes the most sense in terms of patient flow? Can it easily be moved to the point of service delivery?
- Does every piece of equipment have a preventive maintenance schedule? Is it being followed?
Summary and Key Learnings

- Studying the seven flows in your facility and identifying the waste within the processes can lead to creative ways of improving both the facility and patient care.

- Improved flow creates greater patient satisfaction and greater staff satisfaction. It also reduces the chance for errors and increases the percentage of value-added work.

- If you want to improve flow, go to the place of action and see what the clinicians are doing. Look for long wait times or clutter piling up in the system.

- The seven flows work together and complement each other. An existing facility can be redesigned to enhance and streamline all those flows.

- The seven flows also can—and should—be applied in the preliminary design of a new facility or site. This will optimize the new design and improve all seven flows of healthcare.
A Few Other Thoughts:

Takt Time is a crucial measure of the seven flows in your medical center. It is the primary tool to measure demand for the medical center’s rooms, equipment, and patient delivery services.

There is no room for complacency. If you find yourself becoming complacent, that’s a sure sign that something needs to be improved.

Eliminate preconceived notions. If necessary, take a walk through the facility as a patient would and try to see it through their eyes.

*Kaizen is everybody’s responsibility in the medical center.*
Process Name: Flow of Patient
Model Number: SLP
Model Name: Internal Medicine

STANDARD WORK SHEET

Operation sequence:
From: Start of appointment
To: End of appointment

Date prepared or revised:
Dept. Head: TR
Supervisor: AB

Safety Precaution: Pre-Kaizen
Quality Check: •
Safety Precaution: +
Standard WIP: ○
# of pieces of WIP: 1
TAKT time: 4:39 min
NET time: N/A
Operator Number: Patient A

1188 feet per appt
From elevator to lobby to exam room to nurse’s office to leaving
### STANDARD WORK SHEET

<table>
<thead>
<tr>
<th>Process Name</th>
<th>Flow of Patient</th>
<th>Model Number</th>
<th>Model Name</th>
<th>Operation sequence</th>
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<th>Start of appointment</th>
<th>To:</th>
<th>End of appointment</th>
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<th>Dept. Head</th>
<th>Supervisor</th>
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<td>TR</td>
<td>AB</td>
<td>252 feet per appt -79% reduction</td>
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**Flow of Patient**

**SLP**

**Internal Medicine**

**Operation sequence**

**From:**

**To:**

**Date prepared or revised**

**Dept. Head:**

**Supervisor:**

**Post-Kaizen**

**252 feet per appt -79% reduction**

**Quality Check**

**Safety Precaution**

**Standard WIP**

**# of pieces of WIP**

**TAKT time**

**NET time**

**Operator Number**

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<tr>
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Pre-Kaizen

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<td></td>
<td></td>
<td></td>
<td>1</td>
<td>4:39 min</td>
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<td>Family A</td>
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1188 feet per appt
From elevator to lobby to exam room to nurse’s office before leaving.
## STANDARD WORK SHEET

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<td>Internal Medicine</td>
<td>To: End of clinic day</td>
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### 7920 feet per day

From office to exam room to nurse’s station to dictation

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<th>Operator Number</th>
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<tbody>
<tr>
<td>♦</td>
<td>+</td>
<td>○</td>
<td>4</td>
<td>28:14 min</td>
<td>20:02 min</td>
<td>Clinician A</td>
</tr>
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<td>TR</td>
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<td>To: End of clinic day</td>
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<td></td>
<td></td>
<td></td>
<td>4</td>
<td>28:14 min</td>
<td>20:02 min</td>
<td>Clinician A</td>
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3960 feet per day -50% reduction
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<th>Process Name</th>
<th>Flow of Nurse</th>
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<td>Flow of Nurse</td>
<td>SLP</td>
<td>Operation sequence</td>
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**START OF CLINIC DAY**

**END OF CLINIC DAY**

**3775 feet per day**

From lobby to exam room to triage office

**Quality Check** | **Safety Precaution** | **Standard WIP** | **# of pieces of WIP** | **TAKT time** | **NET time** | **Operator Number**
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<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>15:29 min</td>
<td>30:07 min</td>
<td>Nurse A</td>
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STANDARD WORK SHEET

Process Name: Flow of Nurse
Model Number: SLP
Model Name: Internal Medicine

Operation sequence:
From: Start of clinic day
To: End of clinic day

Date prepared or revised: ...
Dept. Head: TR
Supervisor: AB

Safety Precaution: 
Quality Check: 
Standard WIP: 
# of pieces of WIP: 4
TAKT time: 15:29 min
NET time: 30:07 min
Operator Number: Nurse A

203 feet per day
-95% reduction
**STANDARD WORK SHEET**

**Process Name**: Flow of Technician  
**Model Number**: SLP  
**Model Name**: Internal Medicine

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**Operation sequence**
- From: Start of appointment
- To: End of appointment

**Quality Check**
- Diamonds

**Safety Precaution**
- Plus symbol

**Standard WIP**
- Circle

**# of pieces of WIP**: 4

**TAKT time**: 4:39 min

**NET time**: 11:00 min

**Operator Number**: Technician A

540 feet per day
- From supply room to exam room to supply room
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<td></td>
<td></td>
<td></td>
<td>4</td>
<td>4:39 min</td>
<td>11:00 min</td>
<td>Technician A</td>
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- **21 feet per day**
- **-96% reduction**
- **Post-Kaizen**
Process Name: Flow of Equipment
Model Number: SLP
Model Name: Internal Medicine

STANDARD WORK SHEET

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270 feet per day
From storage to exam room to storage

Quality Check | Safety Precaution | Standard WIP | # of pieces of WIP | TAKT time | NET time | Operator Number |
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<td></td>
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<td></td>
<td>4</td>
<td>4:39 min</td>
<td>5:30 min</td>
<td>EKG Cart</td>
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Post-Kaizen

15 feet per day
-94% reduction

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<td>4</td>
<td>4:39 min</td>
<td>5:30 min</td>
<td>EKG Cart</td>
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<tr>
<td>Measures</td>
<td>Baseline</td>
<td>Final</td>
<td>Percent Change</td>
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<td>Walking Distance (ft)</td>
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<tr>
<td>Overall average per day</td>
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<tr>
<td>• Clinician A</td>
<td>7920</td>
<td>3960</td>
<td>-50%</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Nurse A</td>
<td>3775</td>
<td>203</td>
<td>-95%</td>
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<td>• Technician A</td>
<td>540</td>
<td>21</td>
<td>-96%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Patient A</td>
<td>1188</td>
<td>252</td>
<td>-79%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Family A</td>
<td>1188</td>
<td>252</td>
<td>-79%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part Travel Distance (ft)</td>
<td>270</td>
<td>15</td>
<td>-94%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EKG cart moved to exam room and back to storage.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Leadtime (mm:ss)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall average per day</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Patient visit</td>
<td>46:24</td>
<td>31:02</td>
<td>-33%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• VA time (non wait)</td>
<td>56%</td>
<td>93%</td>
<td>66%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• NVA time (wait)</td>
<td>44%</td>
<td>7%</td>
<td>-84%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cycle Time(mm:ss)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily weighted average cycle time by operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Clinician A</td>
<td>20:02</td>
<td>17:15</td>
<td>-14%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Nurse A</td>
<td>15:42</td>
<td>10:56</td>
<td>-30%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Technician A</td>
<td>30:07</td>
<td>24:12</td>
<td>-20%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Summary of Impact**

**Daily Impact:**
2 more patients seen per day.

**Monthly Impact:**
40 more patients seen per month.

**Yearly Impact:**
480 more patients seen per year.

*For 1 clinician!*