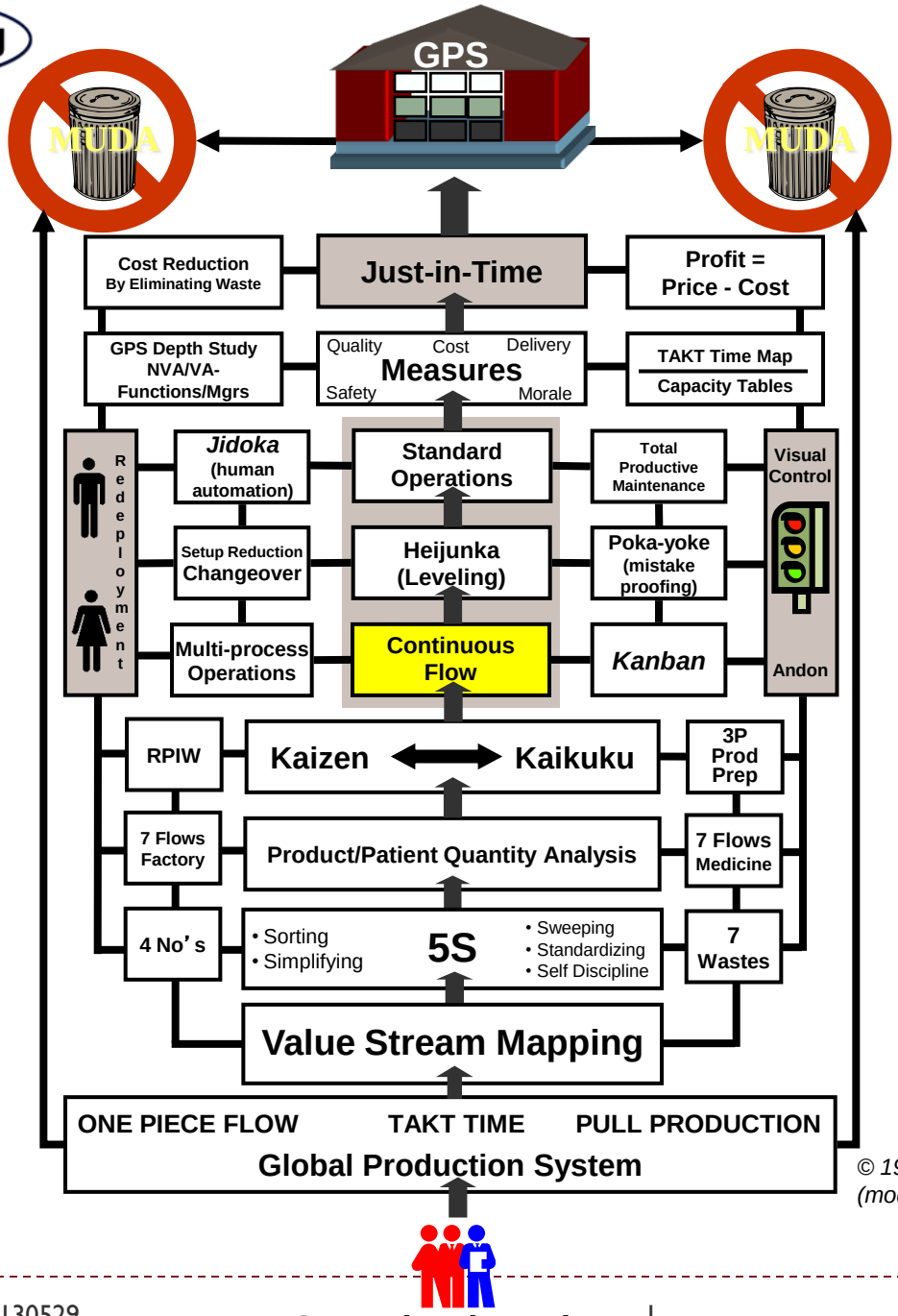


Continuous Flow Production Module 12

Continuous Flow Production: Key Points

- Flow production occurs only when in-process inventory has been eliminated. In healthcare, that would mean no patients are waiting at any point in the process
- There are 8 conditions that must be met to establish one-piece flow production.
- Using adaptable and flexible equipment, training multi-process workers, and meeting 3 key objectives will lead to success.
- How to design and implement Waterfall Scheduling.
- Principles of continuous flow production.

Continuous Flow

Summary of Benefits

- Work in process is reduced and progress is visible at a glance.
- The ability to cross train is enhanced.
- Team members take ownership of the full process and can help each other.
- Quick problem identification and feedback .
- Reduced Cycle Time.
- Improved quality through PDCAs.
- Enhanced information flow and decision making.
- Value-added ratio improved.
- Reduced waste in the process.
- Helps to identify root causes of quality problems.
- Allows for equipment dedication – can decrease set up time.

JIT Principles

1. Pace to “Takt” Time.
2. Create flow production.
3. Incorporate “pull” production.

Impact of JIT on Quality, Cost, and Delivery

Applying the elements of JIT:

- Is necessary to eliminate waste and improve quality, cost, and delivery.
- Highlights waste and provides an opportunity to eliminate it.

Flow lines must be designed to minimize waste and make it obvious when waste occurs.

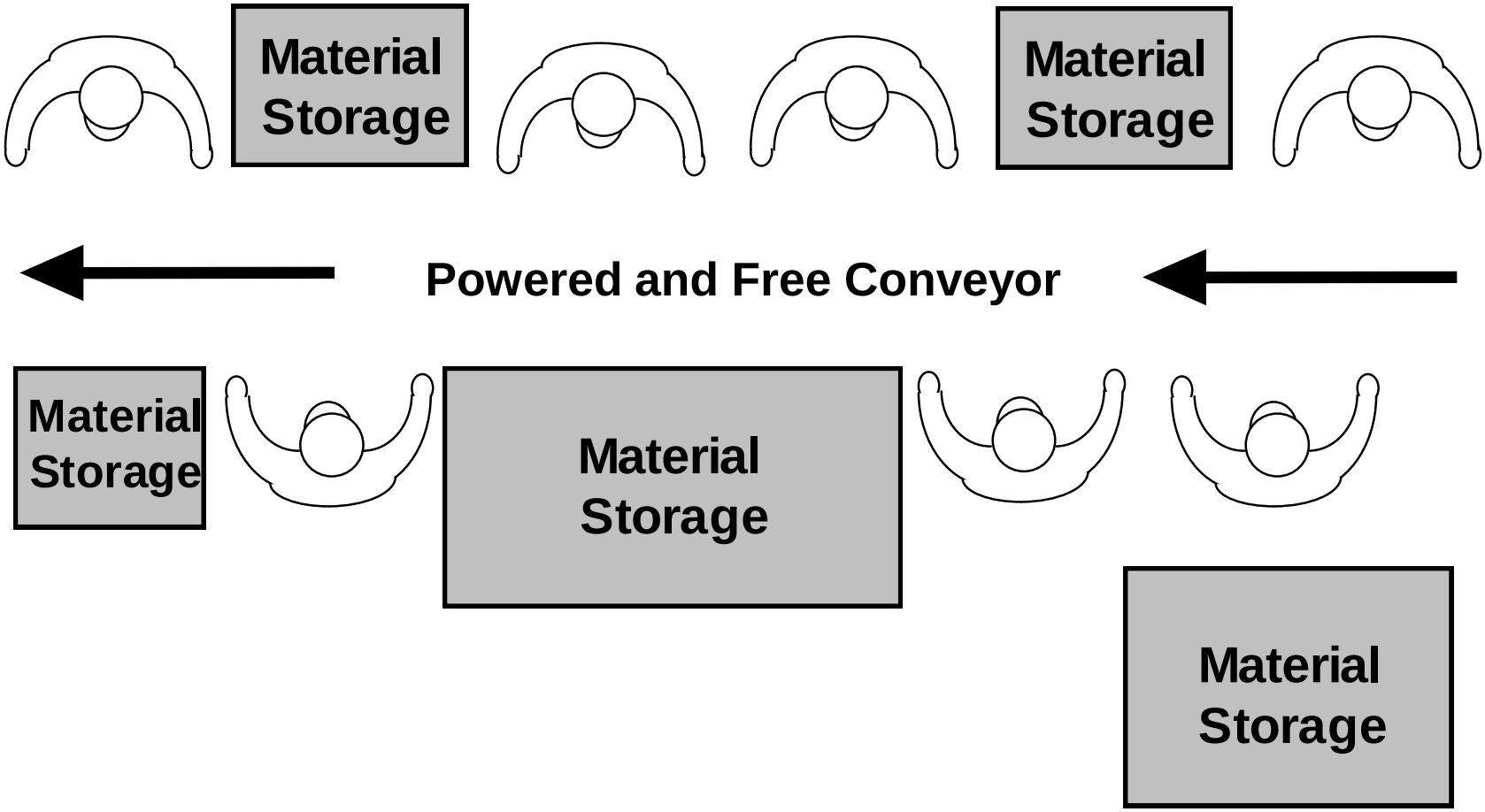
Traditional Production Line

- Traditional lines run efficiently at only one output level.
  - Typically, production is set to some forecast maximum production rate.
- No distinction is made between material handling and assembly work.
- Space constraints and team member location make it difficult to have a good balance at varying levels of production.
- Excess inventory hides quality problems.
- Quality problems are pushed to the end of the line.
- Changeovers are typically long, forcing long runs.
- Running different models at the same time is difficult.
- Investment is typically high.

Continuous Flow Model

- Workers do production work only.
- Quality is ensured at each step in both internal and external supplied products and services.
  - Feedback must be immediate.
  - Do not institutionalize on-line rework.
  - Find the root causes of problems.
  - Stop the line when a defect is detected.
  - Internal and external suppliers and workers must be given tools, information, and training to ensure good products.
- Production lines are not used as miniature warehouses.
- Lines are flexible to manage variation.
- Incorporates pacemaker.
- Workers are free to move.
  - Standing without moving is no better than sitting!

Traditional Production Line



Conditions for Continuous Flow Production

Eight conditions must be met to establish continuous flow production.

Condition 1: One-piece flow.

Condition 2: Lay out equipment according to the sequence of processes.

Condition 3: Synchronization.

Condition 4: Multi-process operations.

Condition 5: Train multi-process team members.

Condition 6: Standing while working.

Condition 7: Make equipment compact.

Condition 8: Create U-shaped process cells.

Continuous Flow Model Line Advantages:

- **Quality.**
- **Cost.**
- **Delivery.**

Continuous Flow Model
Cost Advantages

Quality problems are detected immediately and not passed on.

- *Stop the line when quality problems arise!*

Root causes are immediately identified.

- *Keep asking "why?"*

Staff are provided with the necessary tools and skills to ensure quality at each step.

- *Training in standard operations.*
- *Simple, easy-to-use quality-check devices.*

Continuous Flow Model
Cost Advantages

- Adherence to **Takt Time** and **standard operations** minimizes staffing levels.
  - *Eliminates waste and establishes a better work load balance.*
- Using a **paced** line maximizes productivity.
  - *Highlights imbalances in staff workloads or variability in staff cycle time.*
  - *Prevents over or under-production.*
- **Automation** reduces staffing with minimal investment.
  - *Separates human work from machine work.*
  - *Enables multi-process handling.*
- **Built-in flexibility** results in high productivity at varying volumes.
  - *Able to change to a different pre-planned Takt Time and staffing level to accommodate the current demand.*

Continuous Flow Model
Delivery Advantages

- Adherence to **standard operations** ensures that production schedules are met.
  - *Strict attention to daily schedules improves performance.*
- **Mixed model lines** and multiple production lines offer better response to customer demand.
  - *Flexibility and ability to respond to customer needs is improved, and the rate of obsolescence is reduced.*
- Running **daily mixed models** reduces inventories and patient waiting without affecting the patient.
- **Mixed model production** enhances customer satisfaction at low levels of finished goods.

Continuous Flow Model
Layout Goals

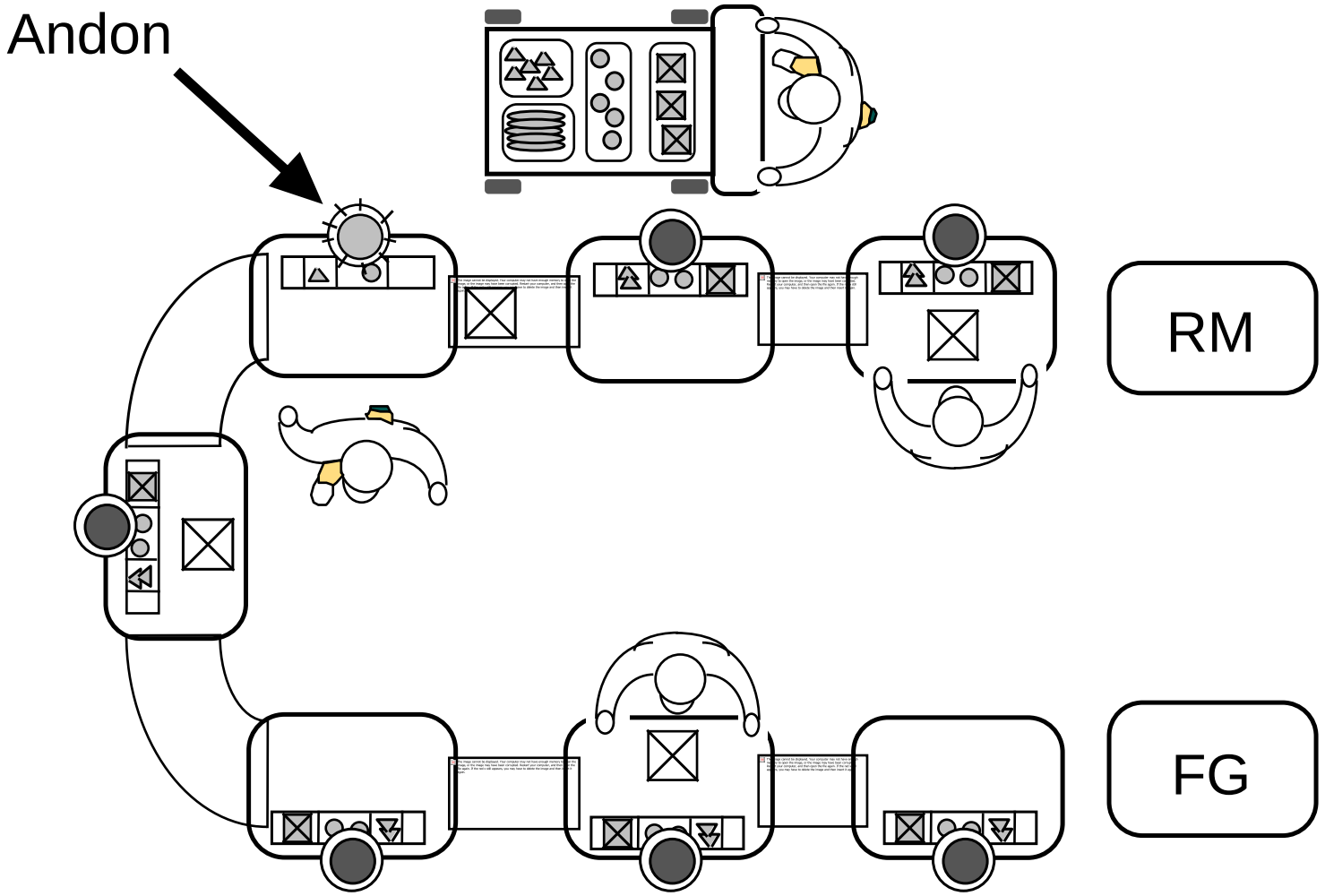
- Quality products produced to **Takt Time**.
  - *Make the correct quantity every day.*
- Productive utilization of people.
  - *Staff are there to deliver services to the patient!*
  - *Loading to Takt Time creates high staff productivity.*
  - *One team member should be able to complete the full process as dictated by customer demand.*
- Flow of supplies and staff.
  - *Work stations optimized for presentation of supplies and tools.*
  - *Workstation design minimizes staff movements.*

U-Shaped Line

Used when one team member is performing multiple steps in the process.

- Minimizes walking.
- Promotes better work balance among team members.
- Avoids creation of islands.
- Enables multi-process handling.
- Promotes better communications.
- Andons identify abnormalities.
- Water strider services all supply requirements.
  - *Delivers supplies from outside of the "U."*
  - *Picks up finished products (such as completed charts).*
- Flexible as Takt Time changes.
  - *Staffing assignments can be changed .*

U-Shaped Line



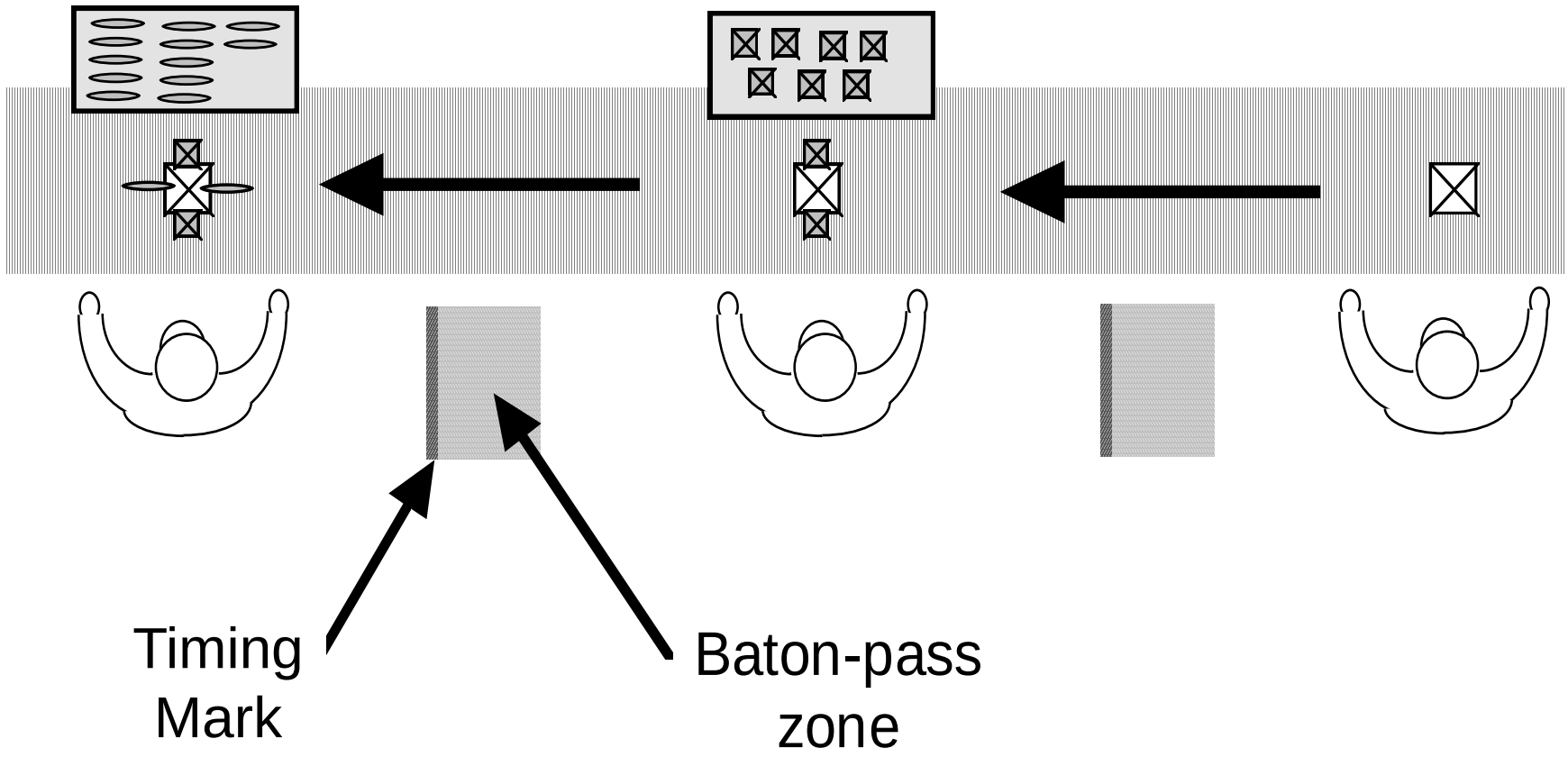
Straight Line

Used when you have one team member doing one single process.

- Line is paced by product movement.
- Production progression on line.
- Worker zones are established.
- Overlap (baton passing) is defined.
- Material is sequenced in order of use.
  - For mixed-model production.
- Non-integrated sub-assemblies are supplied as completed kits.
- Communication and feedback must be established.
  - e.g., speaker, lights.

Straight Line

Straight Line



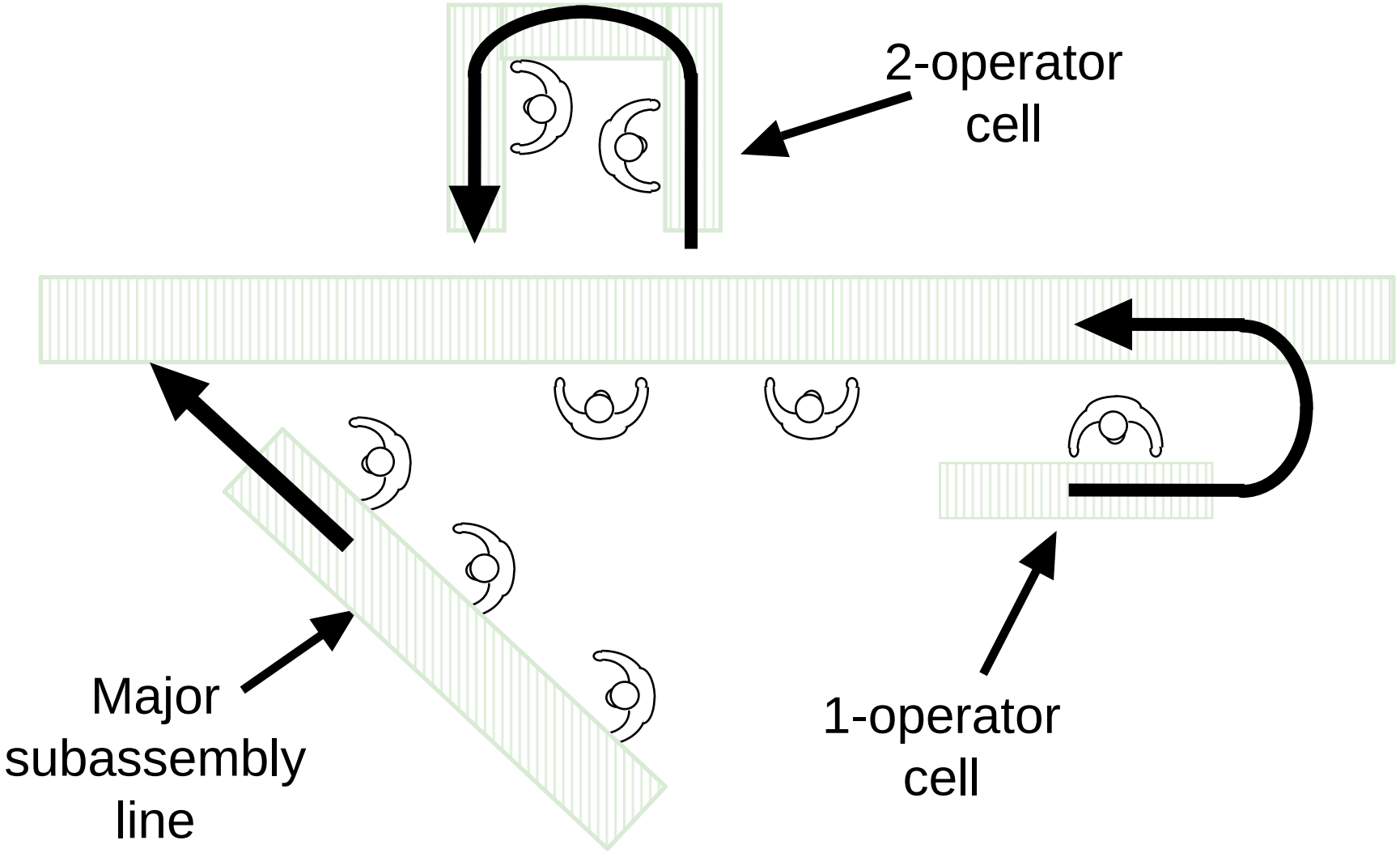
Straight Line with Feeders

Used when a sub-assembly cycle time exhibits major variations in a mixed model production environment.

- Shifts the sub-assembly experiencing the widest variation off the main assembly line.

- Pacemaker is established on the final flow line.
  - i.e., continuous movement of the line at the Takt Time rate.
- Final production "pulls" from sub-assembly.
  - Sub-assembly work is separated from final production work.
  - Sub-assemblies are completed on "spur" line/cell (attached to main line).
  - Sub-assemblies enter at point-of-use.
- Material supplied from back.
  - Multi-operator sub-assembly cell is on the back, since its output is presented to the main line operators just like other parts and materials.
- Materials are sequenced in order of use.

Straight Line with Feeders

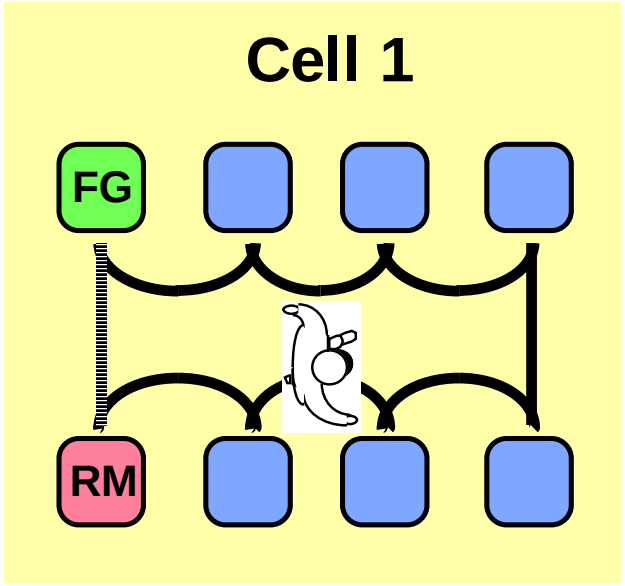


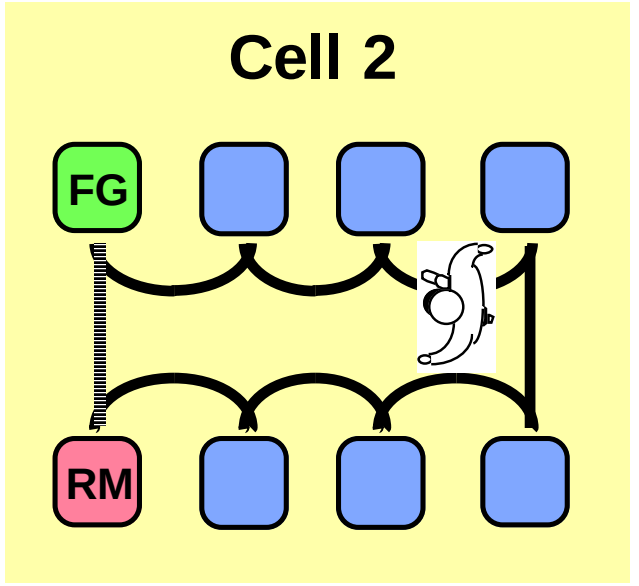
Parallel (Open Room) Layout

- Multiple Lines.
- Use inexpensive equipment.
- A single person could work 2 cells:
  - If there is lower customer demand.
  - Or higher Takt Time.
  - The 2 cells must have the same Takt Time.

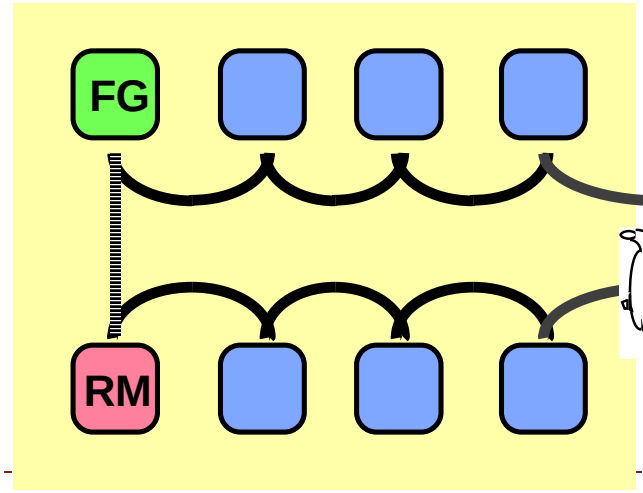
Parallel (Open Room) Layout

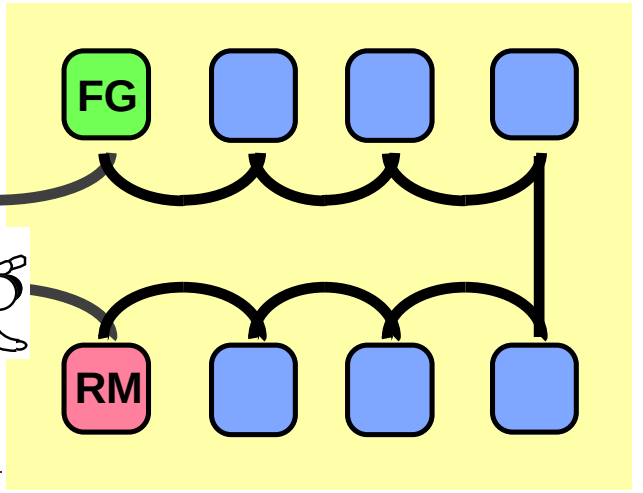
- High demand.
- Shorter Takt Time.
- 2 operators.





- Low demand..
- Longer Takt Time.
- 1 operator.





Booz-Allen and Hamilton has spent three years researching the operations of a variety of hospitals throughout the country. They found that 75 percent of healthcare personnel costs for simple hospital procedures are accounted for by infrastructure and idle time.

Common problem areas included:

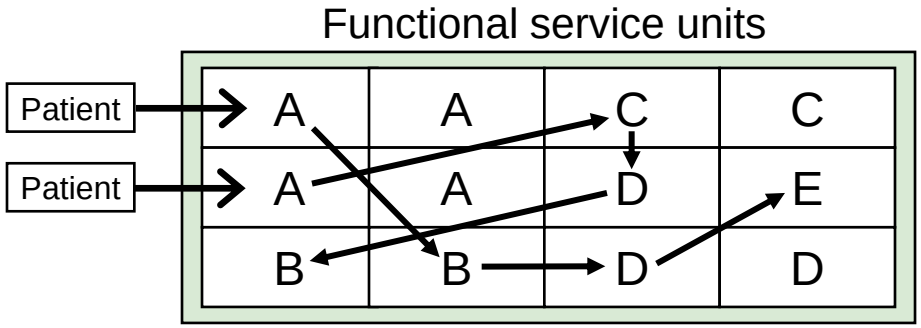
- Long turnaround times for test results,
- Decreased continuity of care.
- Excessive time spent in coordinating and scheduling centralized services such as laboratory tests, radiology exams, and EKGs.

These problems make it clear that major changes are necessary in several areas to become a patient-focused hospital. These areas include facility layouts, work practices, and process flows.

Patient-Focused Cellular Concept

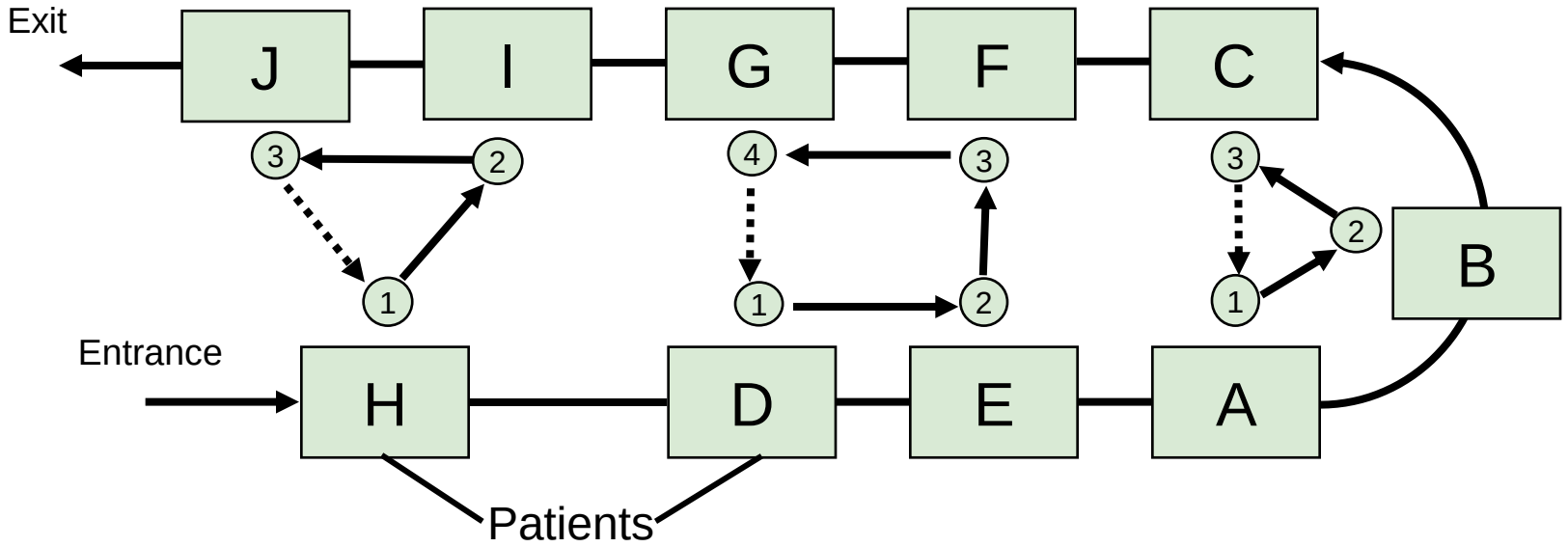
1. Hospital within a hospital that decentralizes existing fragmentation of specialized services.
2. Cross training of healthcare clinicians to enable them to work as a team.
3. Process redesign and work simplification using the Lean tools.
4. Multi-skill development with movement of care team reduced significantly.
5. Improved communication between nurse, patient care team and rounding physician.
6. Patient acuity spread equally among cells to level-load work.
7. Quicker response to patients and more time spent with patients.
8. Standard work established for bed side hand-offs.
9. Patient safety improved dramatically.

Process or Traditional Hospital Layout



Journal for Quality and Participation, July/August 1994

Cellular Hospital Layout



Nursing Cells

- Organize work of RN and patient care technician (PCT) in a geographic grouping of rooms (cell).
- Place supplies at point of use.
- Standardize work for PCT and RN from 7:00 AM to 11:00 AM (First cycle of day).
- Establish one piece flow documentation.
- Involve patient in RN:RN handoff.

Nursing Cells – Results after 90 Days

Before	After
• RN # of steps = 5,818	846
• PCT # of steps = 2,664	1256
• Time to the complete AM cycle of work = 240’	126’
• Patients dissatisfaction = 21%	0%
• RN time spent in indirect care = 68%	10%
• PCT time spent in indirect care = 30%	16%
• Call light on from 7:00 AM to 11:00 AM = 5.5%	0%
• Time spent gathering supplies = 20’	11’

Toyota Motor Hospital
"Wash Your Hands"
One Piece Flow for Patients.

1

2

3

Tokyo Fish Market "One Piece Flow" Tuna Production Line

Line Design Considerations

- Type of pacemaker.
- Flexibility of design.
  - *Flexibility for the worker.*
    - Worker must have access to adjoining stations.
    - Worker production must not be interrupted by islands.
  - *Flexibility for the facility.*
    - Utility hook-ups should be easily moved.
    - Machine/work stations should be portable.
    - Air supplies, electrical service and tools should be part of the work station.
    - Use quick disconnect services for work stations.

Line Design Considerations

- Mixed model cycle time variation.
  - Determine which work elements are causing variation.
  - Use lean principles and techniques to remove variation from production.
  - Measure amount of variation as a percentage of cycle time.
  - If cycle time variation is greater than 15%:
    - *Move the sub-assembly causing the variation to a feeder line.*
    - *Remove the model with the greatest variance from the average from the mixed model line.*
    - *Don't use a mixed-model line – use a separate, smaller line/cell for each model.*

Line Design Considerations

- High Volume.
  - Divide the work over several smaller lines, rather than concentrating all work on one large line
    - *Multiple lines/cells have a longer Takt Time than a single line.*
    - *Longer Takt Times make it easier to see the waste.*
    - *Operator productivity improves with increasing Takt Time.*
      - Motion as a percentage of operator cycle time is decreased.
      - Added-value work as a percentage of operator cycle time is increased (see example).
- Visual Control.
  - Design for line stops.
  - Andons.

Work Station Design Objectives

- Ensure a good product is produced.
- Minimize team member cycle time.
- Minimize space used.

Work Station Design Considerations

- Size the workstation for the work.
  - The ideal workstation width should not exceed the sum of the width of the work materials.
  - Be reasonable – always leave enough room for the person to work.
- Arrange supplies in the proper sequence and orientation.
- Standardize hardware and tools.
- Place fixtures and hand equipment/tools in order of use, such as stethoscopes.
- Establish visual control of tools.
- Make machines fit the process.
  - Small and simple.
  - Narrow and deep.

Work Station Design Considerations

- Optimize staff motions.
  - Motions to avoid:
    - Continuous repetitive motion (rotate operator assignments when risk of repetitive motion trauma exists).
    - Reaching above the shoulder.
    - Bending below the waist.
    - Stretching.
    - Twisting or pivoting.
    - Standing in a fixed position.
  - Keep staff comfort in mind.

Quality Considerations

- No-go gauges.
  - Use simple gauging (no-go devices).
  - Equip each station with the appropriate no-go devices.
- Flexibility of design.
  - Visual Standards.
  - Specification sheet.
  - Drawings.
- In-process tests.
  - To confirm capability at the sub-system level.
  - Ensure proper operation conditions immediately.

Quality Considerations

- Jidoka.
  - Give each staff member the authority to signal when an abnormality occurs and to stop production (if needed).
  - Give the machine the capability of detecting, shutting down, and signaling by andon when abnormalities occur.
- Poka-yoke.
  - Modify the production system so that abnormalities can't occur.
  - Implement by:
    - Creating and using checklists for standardized procedures, quality checks, etc.
    - Modify equipment to autonomously prevent abnormalities.

Waterfall Scheduling Instructions

- Review Definitions.
- Using annual data, create a PQ Analysis.
- Look for “cells” of similar work. Consider:
  - Similar services or procedures.
  - Similar room or equipment requirement.
  - Similar C/T or durations of the work.
- Understand the volumes for each unique type – this will help you to know about how many of each type should be plugged into the schedule each day.

Definitions

- **Waterfall Schedule**
  The visual view of a staggered schedule over the entire day.
- **Staggered Start Times**
  Staggering the start times so that patients are not all arriving at the same time. A schedule would need to be ramped up and ramped down.
- **Leveled Load**
  In doing a PQA of the prior months activity, you build your next "Planned" schedule – Dr. X needs 6 of these, 4 of those on Monday….
- **Standard or Planned WIP vs. Actual**
  A measurement of WIP at each predetermined sequence of time, comparing what should have been in process vs. what is actually in process.
- **Segmented Schedule or Standard Sequence**
  Create a bar graph that shows the sub-processes and C/T of each appointment type. This will be used to build the schedule.
- **Line Balancing**
  Moving sequences around on the schedule to create flow and balance.
- **Assignment Sheet/Log/Board**
  Who is assigned to what and where they should be – this is not time related.

Park Nicollet OR example, Used by permission.

Waterfall Scheduling Instructions

- Understand a Standard Sequence for each “type.”

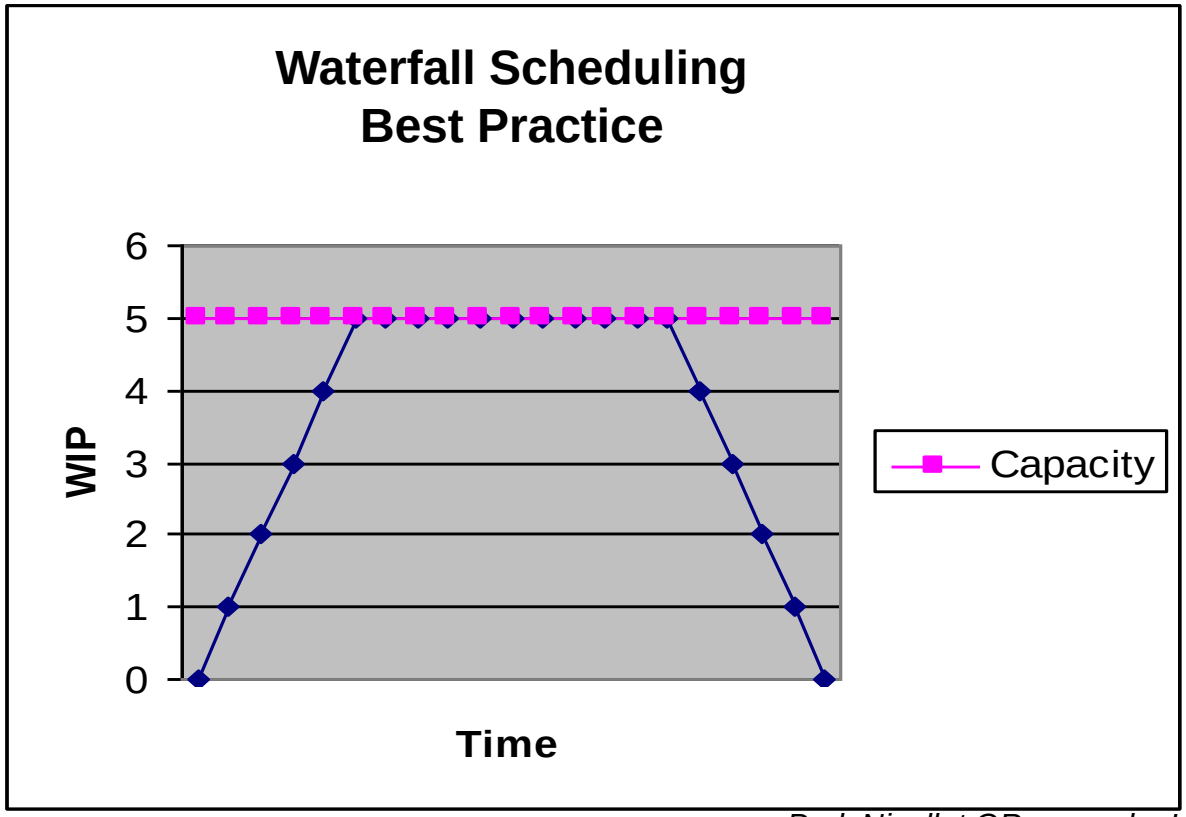
- Create a bar that shows the sub-processes and C/T through observation of each appointment/procedure type. *This will be used to build the schedule.*

- May have multiple and different types based on PQ mix.

Park Nicollet OR example, Used by permission.

Waterfall Scheduling Instructions

Stagger the start times. There will be a ramp up at the start of the day and a ramp down at the end of the day. Between these two periods the day should run at capacity.



Park Nicollet OR example, Used by permission.

Waterfall Scheduling Instructions

- Create a Waterfall schedule as part of the daily flow control board.
- Develop a process to print and post large size Waterfall schedule.
- Assign ownership and standard work on managing flow to plan.
  - All sub process start time and defects should be written on this schedule.
  - This information should be tallied continuously, looking for continued improvements.
- Train staff.

Board Evolution
OR Example
Step 1: Where we Started

Time	Room 1	Room 2	Room 3	Room 4	Room 5
	Surgeon A	Surgeon B	Surgeon C	Surgeon D	Surgeon E
6:00	Case 1	Case 1	Case 1	Case 1	Case 1
7:00	Case 2	Case 2	Case 2	Case 2	Case 2
8:00	Case 3	Case 3	Case 3	Case 3	Case 3
9:00	Case 4	Case 4	Case 4	Case 4	Case 4
10:00	Case 5	Case 5	Case 5	Case 5	Case 5
11:00	Case 6	Case 6	Case 6	Case 6	Case 6
12:00	Case 7	Case 7	Case 7	Case 7	Case 7
13:00	Case 8	Case 8	Case 8	Case 8	Case 8
14:00	Case 9	Case 9	Case 9	Case 9	Case 9

- "The board" has vertical orientation.
- Displays OR time only – no reference to readiness of patient.
- No view of planned or actual time for pre-op and post-op.
- No "real time" markers of progress for each case.
- Requires a phone call or physically review the board.
- Cases scheduled without regard to use of resources.
- "Shot gun" start.
- Predicted time not clear.
- Difficult to predict problems in advance and adapt.

Park Nicollet OR example, Used by permission.

Board Evolution
OR Example: **Step 2**

Time	Room 1	Room 2	Room 3	Room 4	Room 5
	Surgeon A	Surgeon B	Surgeon C	Surgeon D	Surgeon E
6:00	Case 1	Case 1	Case 1	Case 1	Case 1
7:00	Case 2	Case 2	Case 2	Case 2	Case 2
8:00	Case 3	Case 3	Case 3	Case 3	Case 3
9:00	Case 4	Case 4	Case 4	C	
10:00	Case 5	Case 5	Case 5	C	
11:00	Case 6	Case 6	Case 6	C	
12:00	Case 7	Case 7	Case 7	C	
13:00	Case 8	Case 8	Case 8	C	
14:00	Case 9	Case 9	Case 9	C	

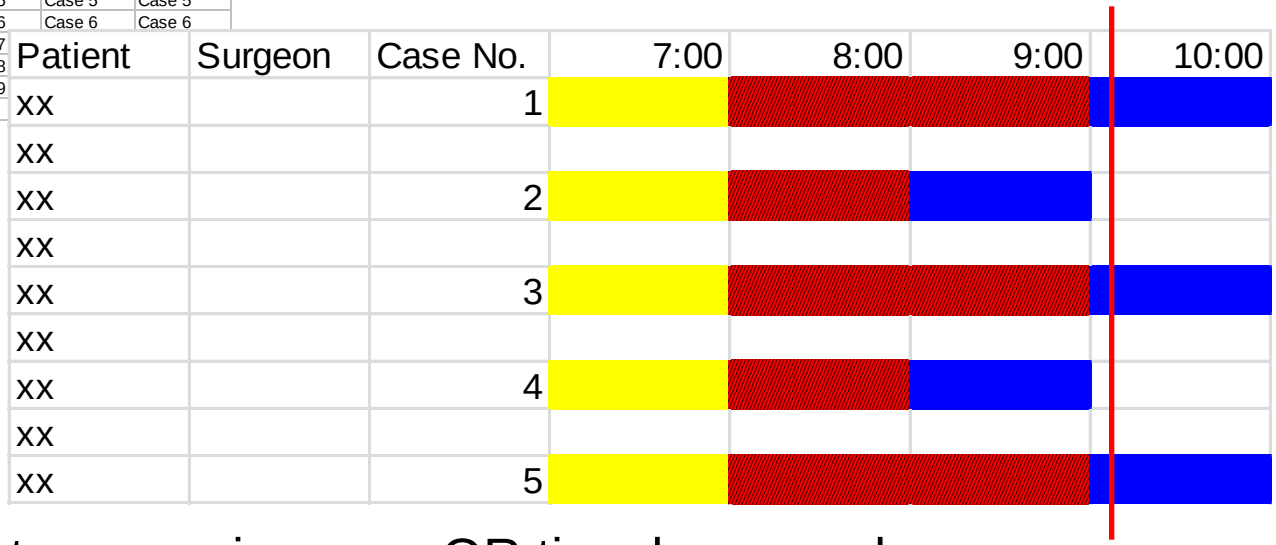
Patient	Surgeon	Case No.	7:00	8:00	9:00	10:00
xx		1				
xx		2				
xx		3				
xx		4				
xx		5				

- Phases of care displayed and available for all to see.
- Predicted time shown but no “real time” marker of progress during the day.
- Ability to visualize the schedule and see the upcoming capacity problems.
- Shot gun start, not staggered.
- Little leveling across the week.
- No cells.
- The basis to measure variance of planned to actual WIP.

Park Nicollet OR example, Used by permission.

Board Evolution
OR Example: **Step 3**

Time	Room 1	Room 2	Room 3	Room 4	Room 5
	Surgeon A	Surgeon B	Surgeon C	Surgeon D	Surgeon E
6:00	Case 1	Case 1	Case 1	Case 1	Case 1
7:00	Case 2	Case 2	Case 2	Case 2	Case 2
8:00	Case 3	Case 3	Case 3	Case 3	Case 3
9:00	Case 4	Case 4	Case 4	Case 4	Case 4
10:00	Case 5	Case 5	Case 5	Case 5	Case 5
11:00	Case 6	Case 6	Case 6	Case 6	Case 6
12:00	Case 7	Case 7	Case 7		
13:00	Case 8	Case 8	Case 8		
14:00	Case 9	Case 9	Case 9		



- Begin to recognize case OR time by procedure.
- Begin to identify future “cells” for families of procedures.
- Begin to analyze how to stagger shot gun start.
- Begin to view need for sub flow (Pre- Intra Op -Post).
- Timeline (shown in red) moves and simulates moving line.

Park Nicollet OR example, Used by permission.

Board Evolution
OR Example: **Step 4**

Time	Room 1	Room 2	Room 3	Room 4	Room 5
	Surgeon A	Surgeon B	Surgeon C	Surgeon D	Surgeon E
6:00	Case 1	Case 1	Case 1	Case 1	Cas
7:00	Case 2	Case 2	Case 2	Case 2	Cas
8:00	Case 3	Case 3	Case 3	Case 3	Cas
9:00	Case 4	Case 4	Case 4	Case 4	Cas
10:00	Case 5	Case 5	Case 5	Case 5	Cas
11:00	Case 6	Case 6	Case 6	Case 6	Cas
12:00	Case 7	Case 7	Case 7	Case 7	Cas
13:00	Case 8	Case 8	Case 8	Case 8	Cas
14:00	Case 9	Case 9	Case 9	Case 9	Cas

Names	Case No.	7:00	8:00	9:00	10:00	11:00
xx	1					
xx						
xx	2					
xx						
xx	3					
xx						
xx	4					
xx						
xx	5					
xx						
xx	6					
xx						
xx	7					
xx						
xx	8					
xx						
xx	9					
xx						
	10					

- Continue refinement of OR procedure times. Consider factors that lengthen cases. e.g., obesity, previous surgical site. Build into scheduling practices.
- Stagger starts.
- No leveling – batches.
- No cells.

Park Nicollet OR example, Used by permission.

Board Evolution
OR Example (Cells): **Step 5**

Time	Room 1	Room 2	Room 3	Room 4	Room 5
	Surgeon A	Surgeon B	Surgeon C	Surgeon D	Surgeon E
6:00	Case 1	Case 1	Case 1	Case 1	Case 1
7:00	Case 2	Case 2	Case 2	Case 2	Case 2
8:00	Case 3	Case 3	Case 3	Case 3	Case 3
9:00	Case 4	Case 4	Case 4	Case 4	Case 4
10:00	Case 5	Case 5	Case 5	Case 5	Case 5
11:00	Case 6	Case 6	Case 6	Case 6	Case 6
12:00	Case 7	Case 7	Case 7	Case 7	Case 7
13:00	Case 8	Case 8	Case 8	Case 8	Case 8
14:00	Case 9	Case 9	Case 9	Case 9	Case 9

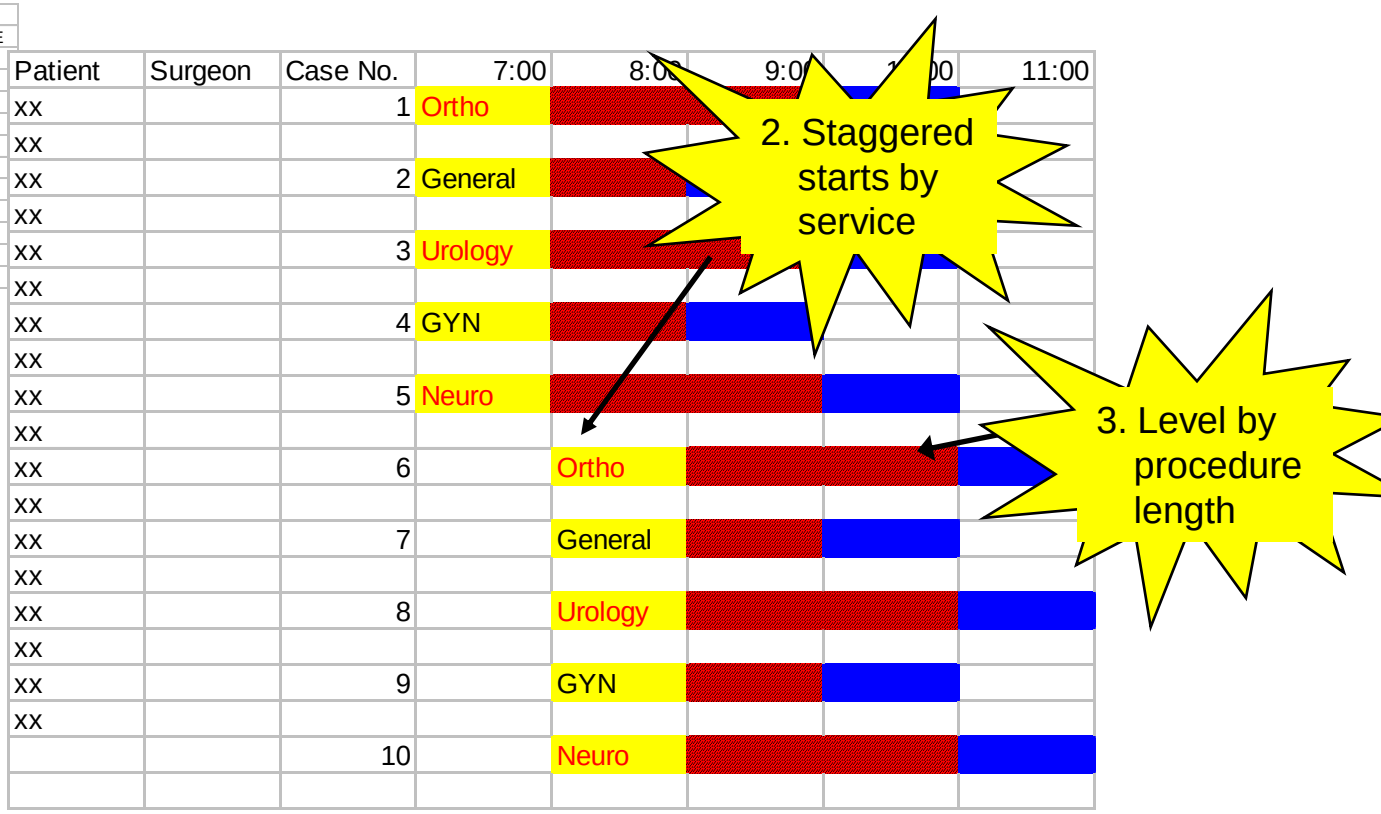
Patient	Surgeon	Case No.	7:00	8:00	9:00	10:00	11:00
xx		1	Ortho				
xx							
xx		2	General				
xx							
xx		3	Urology				
xx							
xx		4	GYN				
xx							
xx		5	Neuro				
xx							
xx		6		Ortho			
xx							
xx		7		General			
xx							
xx		8		Urology			
xx							
xx		9		GYN			
xx							
		10		Neuro			

1. Continue refinement of OR procedure times.
2. Stagger starts in identified cells (following slides).
3. Begin to level by procedure by cell (following slides).
4. Provide cell view (following slides).

Park Nicollet OR example, Used by permission.

Board Evolution
OR Example (Cells): **Step 5**

Time	Room 1	Room 2	Room 3	Room 4	Room 5
	Surgeon A	Surgeon B	Surgeon C	Surgeon D	Surgeon E
6:00	Case 1	Case 1	Case 1	Case 1	Case 1
7:00	Case 2	Case 2	Case 2	Case 2	Case 2
8:00	Case 3	Case 3	Case 3	Case 3	Case 3
9:00	Case 4	Case 4	Case 4	Case 4	Case 4
10:00	Case 5	Case 5	Case 5	Case 5	Case 5
11:00	Case 6	Case 6	Case 6	Case 6	Case 6
12:00	Case 7	Case 7	Case 7	Case 7	Case 7
13:00	Case 8	Case 8	Case 8	Case 8	Case 8
14:00	Case 9	Case 9	Case 9	Case 9	Case 9



1. Continue refinement of OR procedure times.
2. Stagger starts in identified cells.
3. Begin to level by procedure by cell.
4. Provide cell view (next slide).

Park Nicollet OR example, Used by permission.

Board Evolution
OR Example (Cells): **Step 5**

Patient	Surgeon	Case No.	7:00	8:00	9:00	10:00	11:00
xx		1	Ortho				
xx							
xx		2	General				
xx							
xx		3	Urology				
xx							
xx		4	GYN				
xx							
xx		5	Neuro				
xx							
xx		6		Ortho			
xx							
xx		7		General			
xx							
xx		8		Urology			
xx							
xx		9		GYN			
xx							
		10		Neuro			

Patient	Surgeon	Case No.	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00
xx	A	1	Ortho							
xx										
xx	B	2		Ortho						
xx										
xx	A	3			Ortho					
xx										
xx	B	4				Ortho				
xx										
xx	A	5					Ortho			

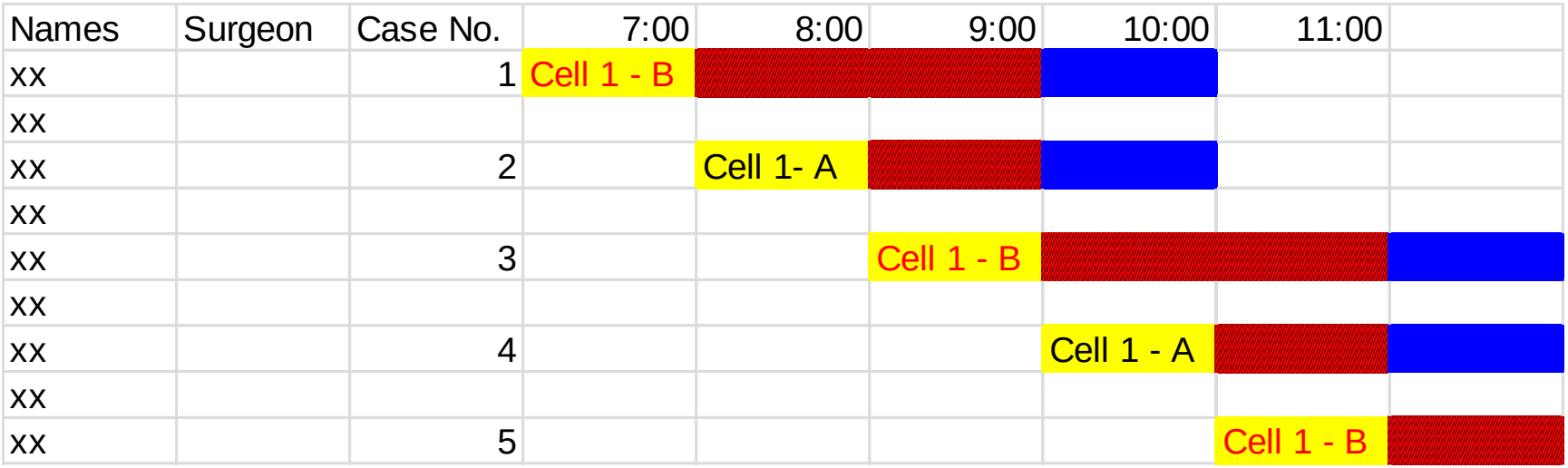
Patient	Surgeon	Case No.	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00
xx	A	1	Urology							
xx										
xx	B	2		Urology						
xx										
xx	A	3			Urology					
xx										
xx	B	4				Urology				
xx										
xx	A	5					Urology			

Patient	Surgeon	Case No.	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00
xx	A	1	General							
xx										
xx	B	2		General						
xx										
xx	A	3			General					
xx										
xx	B	4				General				
xx										
xx	A	5					General			

1. Continue refinement of OR procedure times.
2. Stagger starts in identified cells.
3. Begin to level by procedure by cell.
4. Provide cell view

Park Nicollet OR example, Used by permission.

Board Evolution
OR Example (Cells): **Step 6**



- Continue on OR procedure time refinement.
- Continue leveling by procedure by cell – incorporate sequencing into scheduling (A, B, C, etc).
- Integrated surgery scheduling between clinic schedulers and OR schedulers.
- Provide total Waterfall view plus cell waterfall view with case status in OR, PACU, and MHSC (next slide).

Park Nicollet OR example, Used by permission.

Board Evolution
OR Example (Cells): **Step 6**

Total View

Names	Surgeon	Case No.	7:00	8:00	9:00	10:00
xx		1	Cell 1			
xx						
xx		2		Cell 1		
xx						
xx		3			Cell 1	
xx						
xx		4				Cell 1
xx						
xx		5				

MHSC View

Names	Surgeon	Case No.	7:00	8:00	9:00	10:00
xx		1				
xx						
xx		2				
xx						
xx		3				
xx						
xx		4				
xx						
xx		5				

OR View

Names	Surgeon	Case No.	7:00	8:00	9:00	10:00
xx		1				
xx						
xx		2				
xx						
xx		3				
xx						
xx		4				
xx						
xx		5				

PACU View

Names	Surgeon	Case No.	7:00	8:00	9:00	10:00
xx		1				
xx						
xx		2				
xx						
xx		3				
xx						
xx		4				
xx						
xx		5				

- Continue on OR procedure time refinement.
- Continue leveling by procedure by cell.
- Integrated surgery scheduling between clinic schedulers and OR schedulers.
- Provide total Cascade view plus cell Cascade view with case status in OR, PACU, and MHSC.

Park Nicollet OR example, Used by permission.

Board Evolution
OR Example (Cells): **Step 7**

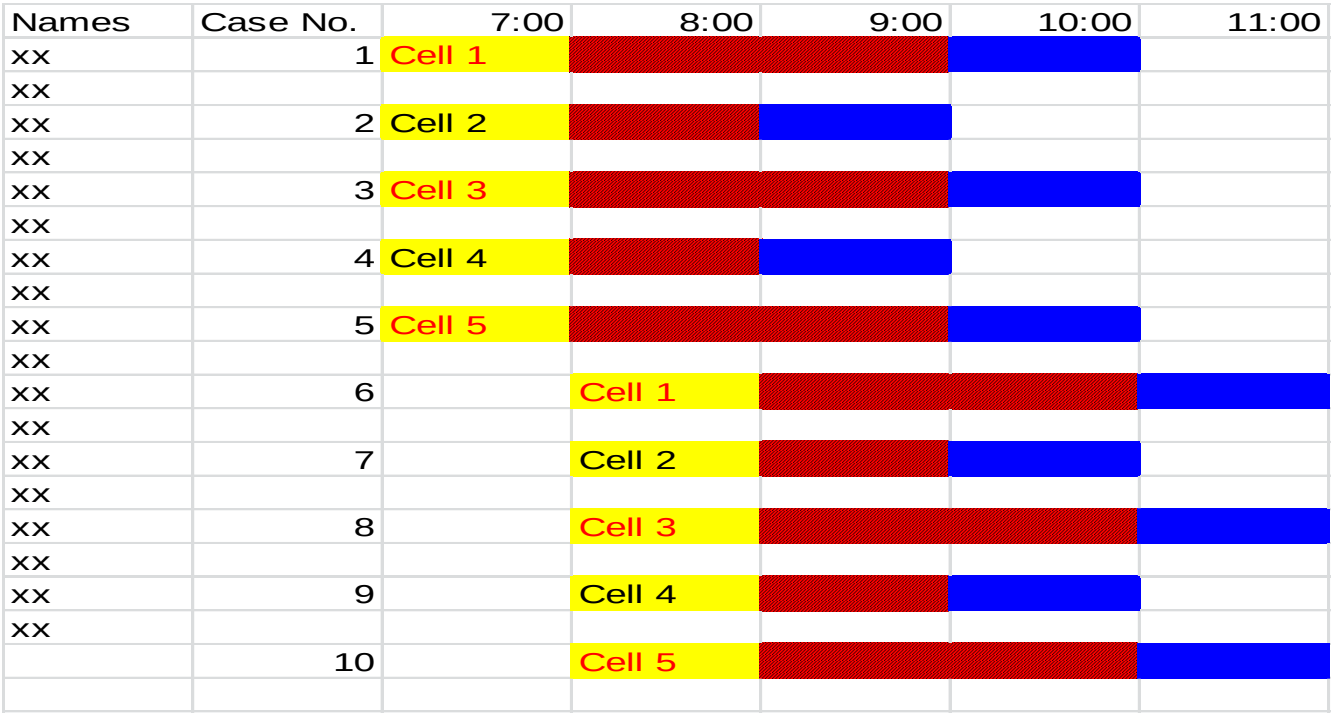
Names	Case No.	7:00	8:00	9:00	10:00	11:00
xx	1	Cell 1				
xx						
xx	2	Cell 2				
xx						
xx	3	Cell 3				
xx						
xx	4	Cell 4				
xx						
xx	5	Cell 5				
xx						
xx	6		Cell 1			
xx						
xx	7		Cell 2			
xx						
xx	8		Cell 3			
xx						
xx	9		Cell 4			
xx						
	10		Cell 5			

Names	Case No.	7:00	8:00	9:00	10:00	11:00
xx	1	Cell 1				
xx						
xx	2		Cell 1			
xx						
xx	3			Cell 1		
xx						
xx	4				Cell 1	
xx						
xx	5					Cell 1

- Cell Cascade view for OR, PACU, MHSC with case status.
- Traditional board removed.
- Portable assignment tool created for each role for the day:
  - Circulating RN.
  - CST.
  - CRNA.
  - MDA.
  - Surgeon.

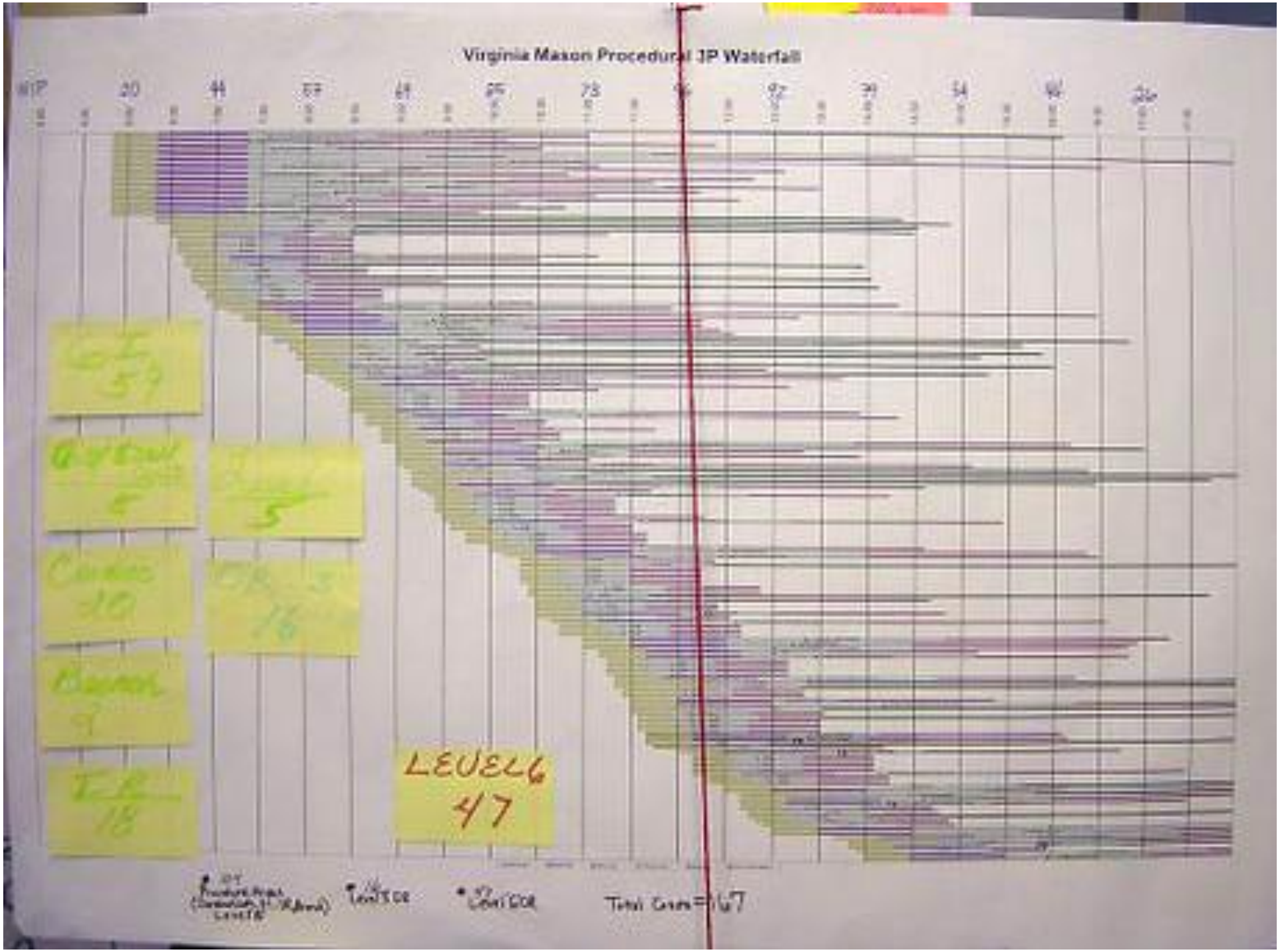
Park Nicollet OR example, Used by permission.

Board Evolution
OR Example (Cells): **Step 6**



- **OR service leveled by day of week.**
- **PACU View: case status.**

Park Nicollet OR example, Used by permission.



3P Cascade Schedule

Continuous Flow Production Summary

- Know your criteria for success.
- Sustain standard operations.
- Identify and monitor key measurements.
- Develop a line-stop support plan.
- Implement Cascade Scheduling where applicable.
- Lead the process!