Proficiency and Certification in Fundamental Lean Tools

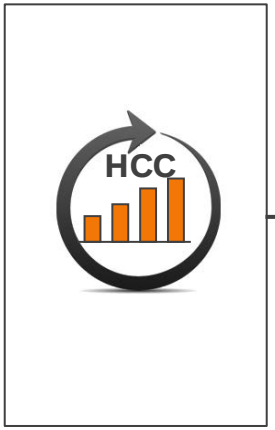
Inventory Management by Kanban, Daily Management, Visual Management, Selecting and Using KPI's in the Laboratory

Dr. Katja Lehmann

Topics

- **Introduction**
- Inventory Management through Kanban
- Key Metrics to measure success
- Visual Management
- Daily Management
- Summary

Who am I?



GLOBAL HEALTHCARE CONSULTANT since 2016

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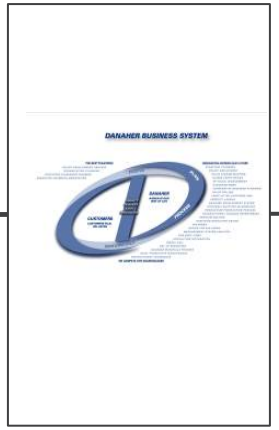
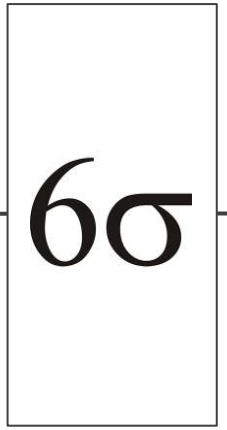
WORKFLOW CONSULTING

2009- 2012



DBSL

2005- 2009



SIX SIGMA BLACK BELT

2003- 2005

QUALITY MANAGEMENT

2001- 2003

Why Inventory Management?

- Pictures of pallets in hallways
- Supplies everywhere in the laboratory

Todays Laboratory Challenges

- Increased Workload
- Difficult to find staff
- Same Budget
- Do more with less…….

- **What are your challenges?**

Topics

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- Key Metrics to measure success
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Why is Inventory Management Important?

- **Impacts the budget**
  - Reagent expiration dates
  - Costly overnight shipments
- **Impacts the workflow**
  - Inventory shortage
- **Impacts Productivity**
  - Inventory replenishment and restocking done by tech
  - Cumbersome inventory reordering process

The Principle of Flow

The progressive movement of products through the value stream without stoppage, scrap or backflow

Strive for Single Piece Flow vs Batch Processing

Eliminate Inventory (work in progress)

Eliminate Rework

“PUSH” versus “PULL” Principle

- A material management system is based on a **“push”** methodology if
  - You have huge mountains of uncontrolled inventory scattered throughout the facility
  - Even when you have not used all of your inventory, standing orders will ensure inventory keeps coming
  - There is no mechanism to shut off the pipeline

- A material management system is based on a **“pull”** methodology if
  - Material flow is initiated based on consumption
  - Your inventory is controlled
    - You never have more of anything than planned
  - Material flow is visually controlled
  - Material arrives “just in time”

Kanban – Materials Management

- Literally translates from Japanese to “signal” or “trigger”
- Healthcare / Laboratory Inventory Management
  - Installs a process for inventory management
  - Simplifies inventory tracking at storage locations
  - Tracks expiration dates
  - Optimizes storage needs
- The link between supply chain and laboratory processes
- A pull system with a buffer
- Material used is pulled from standard inventory buffer
- Standard inventory buffer required due to supply chain not being capable of delivering “just-in-time”
- Inventory levels will be dynamic and driven by consumption rate, replenishment time, (supplier lead time), and size of delivery

Kanban – Purpose

- **Kanban is a Supply Chain Work Order**
  - To replenish supplies (consumables, reagents, etc)
  - Contains information:
    - What to reorder
    - When to reorder
    - How many to reorder
    - Supplier
    - Where to deliver it
    - Where to store it

- **Kanban is a Visual Control**
  - Open communication system
  - Prevents inventory outages
  - Simplifies material control
  - Better product identification

What Triggers / Signals can be used

- Card
- Empty rack
- Empty container
- Color coded space on the wall
- Color coded space on floor
- Colored golf ball

- **Other Ideas?**

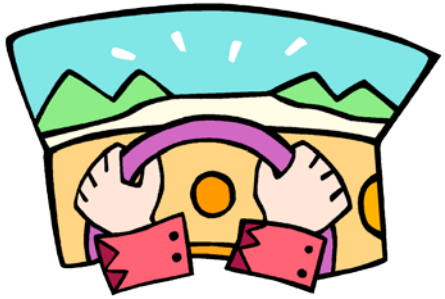
Imagine a World Without…

- Laboratory staff
  - Counting inventory
  - Moving pallets of boxes out of their way

  - **How do we get there….?**

Who Should be in the Drivers Seat?

- Technician ?
- Laboratory Manager / Supervisor?
- Supply Chain?



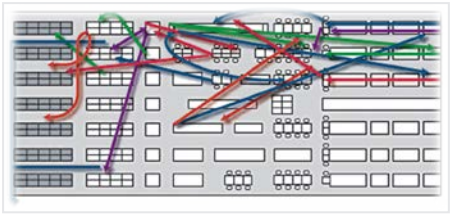
- **What do you think?**

Step 1 – Create and Inventory Master List

- Compile a list for all supplies needed to run a facility or a certain process
  - Report from your supply chain inventory management program
  - Ask you inventory management partner, if outsourced

- Information to gather
  - Part Name
  - Part Number in your system
  - Supplier Name
  - Supplier Part Number
  - Consumption Data (ideally one year)
  - Current Ordering Size
  - Information about any standing orders
  - Lead time from supplier to your facility
  - Current lot sizes and container sizes (packaged and unpackaged)

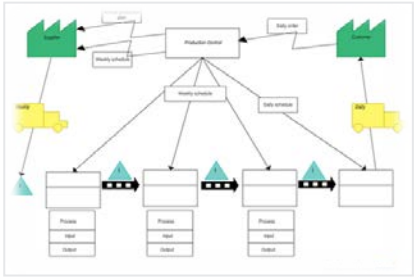
Step 2 – Map the Current Inventory Path



- Identify the current path the supplies / consumables take from receipt into the facility to consumption in the laboratory
- Create a material flow plan - spaghetti map or VSM
- If you facility spans multiple processes, either color code the spaghetti map or map supplies by process
- Include all the locations where the supplies are being stored or used on their way to their final point of consumption or until discarded
- Count how much Work In Progress (WIP) is being held at each location

Does a processed sample count as inventory?

Step 3 – Map the Current Information Flow



- Map the current information flow
  - What information is required at each step of the process?
  - How does the next person know what to do with the supplies received?

Step 4 – Identify Future Standard Inventory Buffer(s)

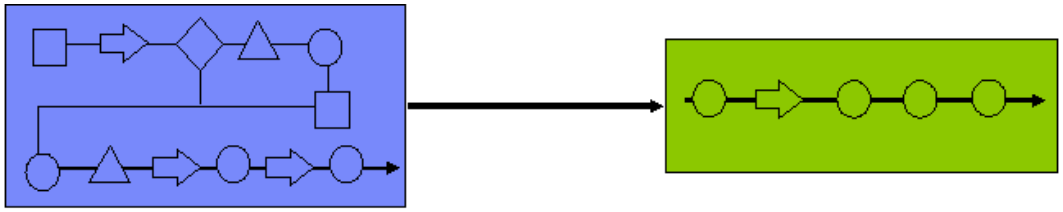
- Inventory replenishment levels
  - How much inventory should the facility stock?
    - 1 week, 2 weeks, etc.
    - Based on consumption and lead time from supplier
  - Identify amount of supplies to be re-ordered for every part number
  - How much safety stock should be present?

- Work In Progress (WIP) level in the laboratory based on
  - process capabilities
    - average daily throughput
    - supplies needed at every stage of the process

- Where will the WIP physically be located
  - between which process steps

Step 5 – Develop Kanban Process

- How will the supplies flow through the system?
  - Quantity, container type, standard container sizes, standard WIP
- What are the triggers to replenish materials?
  - Determine information flow
  - Schedule boards, kanbans, mailboxes
- What decision rules are necessary within system?
  - When to increase safety stock due to seasonality



"As-Is Flow" "To-Be Flow"

Step 6 – Identify Job Responsibilities

- Who is responsible for supplies at inventory storage locations and staging areas
- Who takes the cards off the empty containers?
- Who moves the cards to the supplying department?
- Who authorizes seasonal supply increase?
- Who audits the Kanban process?

Step 7 – Identify Materials Needed for Kanban Implementation

- Inventory storage areas
  - Racks, cabinets, etc.
- Devices and containers the supplies will be stored in
  - Boxes, taped off shelves, containers, etc
- Kanban cards
  - Manual or electronically printed
  - Laminated paper, sleeves, etc.

- Mailboxes to drop off and collect cards
- Kanban Board to track orders and inventory shortages

Step 8 – Conduct User Training

- How is the system going to work in their area?
- What are the responsibilities of each person in the system?
- How are audits conducted?
- What are the consequences of a broken system?

Step 9 – Implement Kanban System

- Adjust existing inventory up or down to reflect new inventory levels
- Adjust any standing orders
- Set up orders according to identified inventory level incl. safety stocks
- Install storage and staging areas
- Make kanban cards
- Set up Kanban board and mailbox
- Start using kanban as only means to replenish supplies

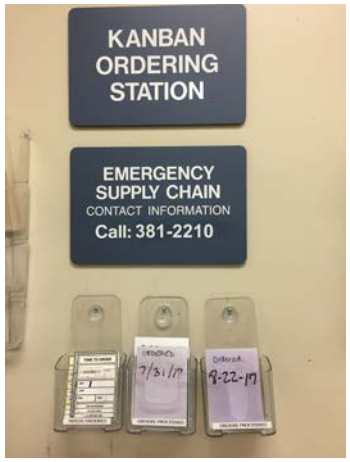
Kanban System Example

Main Storage Location

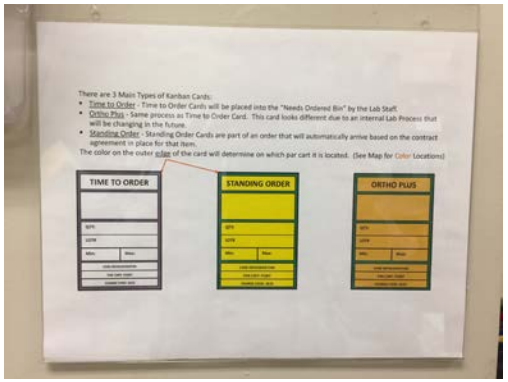
“Supermarket” in laboratory

Shelf in “Supermarket”

Kanban Card



Kanban Drop Off Station



Kanban SOP’s

Step 10 – Sustainability and Continuous Improvement

- Monitor and re-adjust inventory levels on a regular basis
  - Quarterly, bi-annually, annually

- It is the responsibility of every employee to
  - Enforce
  - Maintain
  - Improve the system

Allow for comments and continuous improvement suggestions

Topics

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- **Key Metrics to measure success**
- Visual Management
- Daily Management
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Identify and measure Key Performance Indicators (KPI's)

Metrics need to be

- Actionable
- Meaningful to your area
- A measure to drive Improvement

KPI Examples

- Turn Around Time
- Defects / Re-Work
- % of Unstained Slides Used
- Instrument Up\Downtime
- Stock out of Inventory (Control Slides, Consumables, Reagents)
- Safety Incidents
- On Time Delivery (OTD)
- Productivity

- **What are you tracking?**

Leading and Lagging Indicators

A **“leading indicator”** is a metric that can drive **future** developments and drivers/causes

- # Plates to be read
- # of tissue cassettes to be embedded
- # of inventory to be replenished
- # of samples to be repeated

A **“lagging indicator”** is a metric that mainly refers to **past** developments and effects/results, e.g. reflects history and outcomes of certain actions and processes. Examples of these would be

- Turn Around Time
- Inventory levels
- Monthly Throughput

Identifying the Right KPI's

Know what are important goals for your organization

- develop a vision if no goals exist

Analyze current process performance to identify which steps in the process you will measure

- Data Analysis, Process Mapping, Value Stream Mapping

Identify Leading and Lagging Indicators

- Define monthly/ weekly / daily metrics

Tip

✓ LESS IS MORE

Don't measure metrics that you are not planning on improving

✓ If in doubt

Pick metrics that you are struggling with to limit the number

Define KPI Baseline and Goals

- Gather Historical Data to identify Jump Off Point (JOP)
- Define goal (monthly / weekly / daily)

Tip

✓ Lack of historical data

Gather data manually for one to two month to define a first JOP

Adjust JOP and Goal once more data is available

✓ Setting goals

Improve current performance by at least 20%

The more aggressive the goal the more likely your organization will be forced to improve and implement sustainable processes

Exercise (15 min)

- Split into groups
- Brainstorm 5 important metrics to track in your laboratories
- Categorize metrics as “leading” or “lagging”
- Share with the audience

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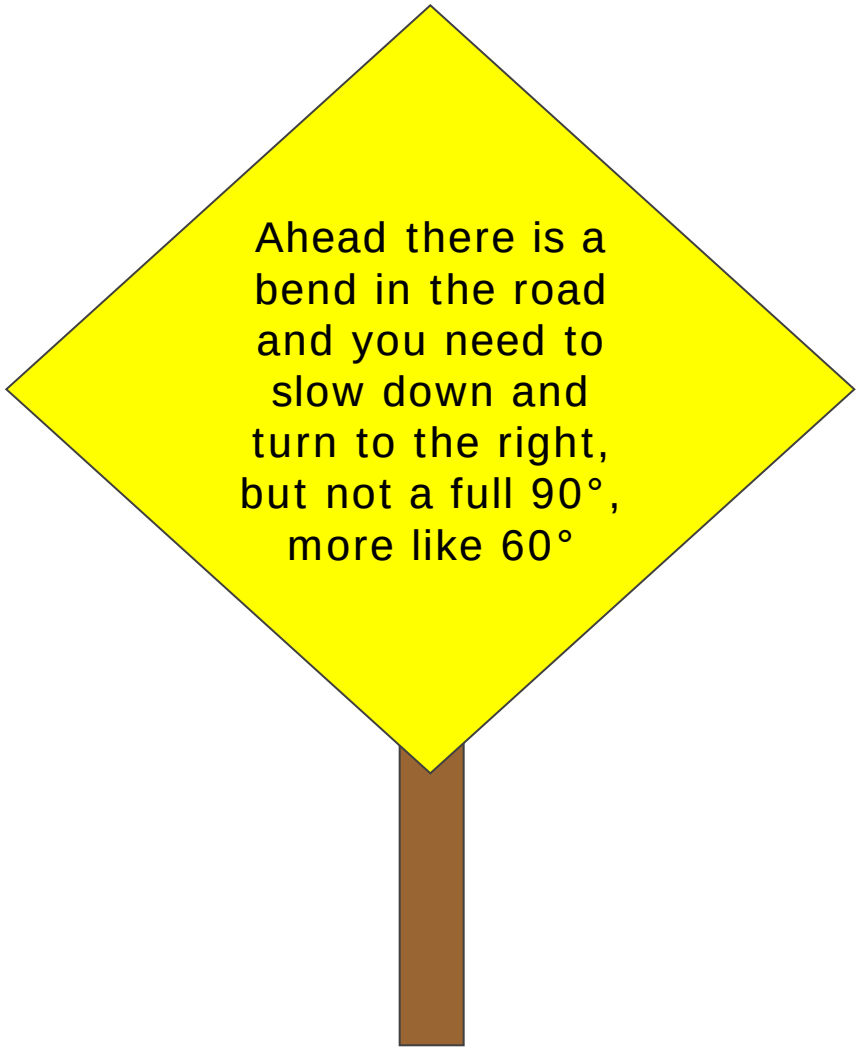
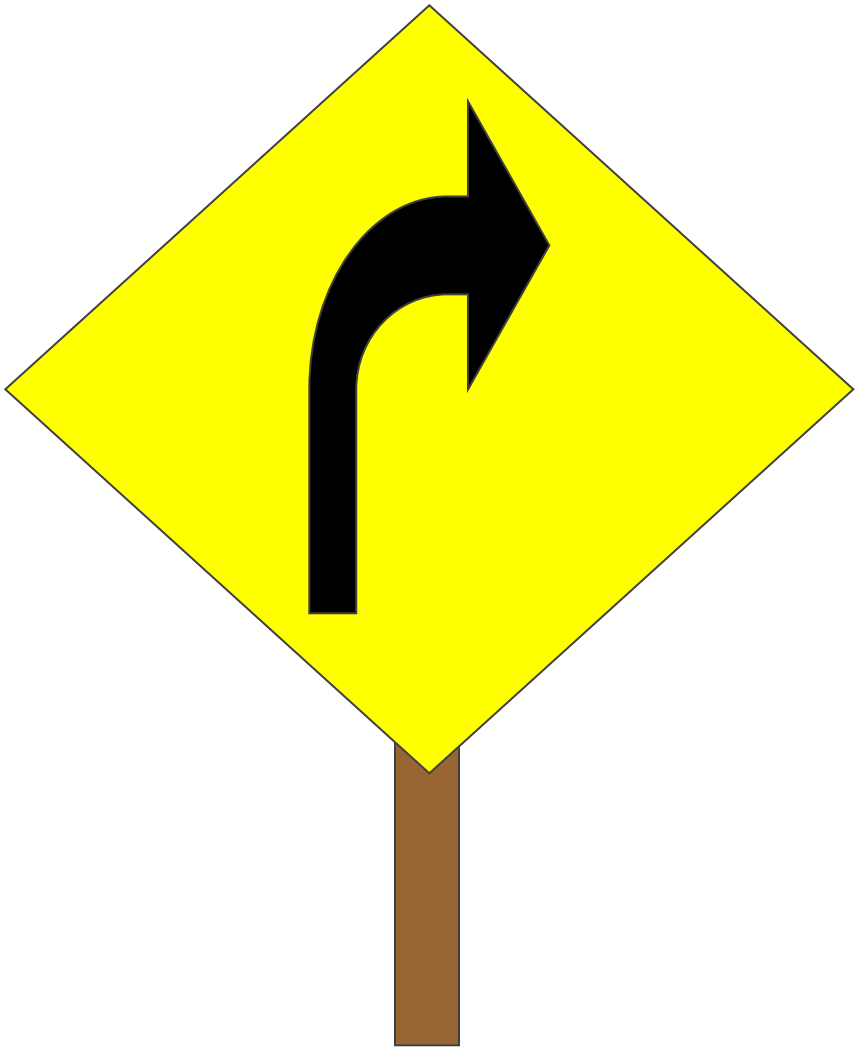
Why Visual Management?

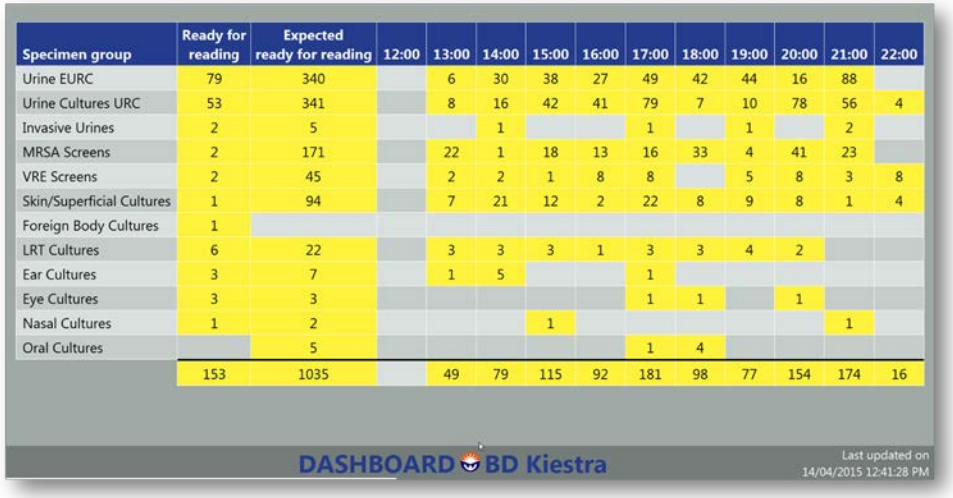




Visual Management Can Facilitate

Managing Key Metrics

- Helps work towards common goals as they are visible for everybody
- Helps manage goals



Specimen group	Ready for reading	Expected ready for reading	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00
Urine EURC	79	340		6	30	38	27	49	42	44	16	88	
Urine Cultures URC	53	341		8	16	42	41	79	7	10	78	56	4
Invasive Urines	2	5			1			1		1		2	
MRSA Screens	2	171		22	1	18	13	16	33	4	41	23	
VRE Screens	2	45		2	2	1	8	8		5	8	3	8
Skin/Superficial Cultures	1	94		7	21	12	2	22	8	9	8	1	4
Foreign Body Cultures	1												
LRT Cultures	6	22		3	3	3	1	3	3	4	2		
Ear Cultures	3	7		1	5			1					
Eye Cultures	3	3						1	1		1		
Nasal Cultures	1	2				1						1	
Oral Cultures		5						1	4				
	153	1035		49	79	115	92	181	98	77	154	174	16

DASHBOARD BD Kiestra

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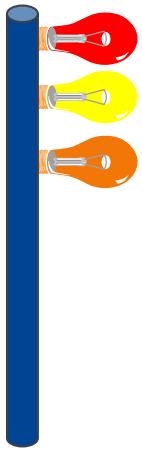
Visual Management Can Facilitate

Visualization

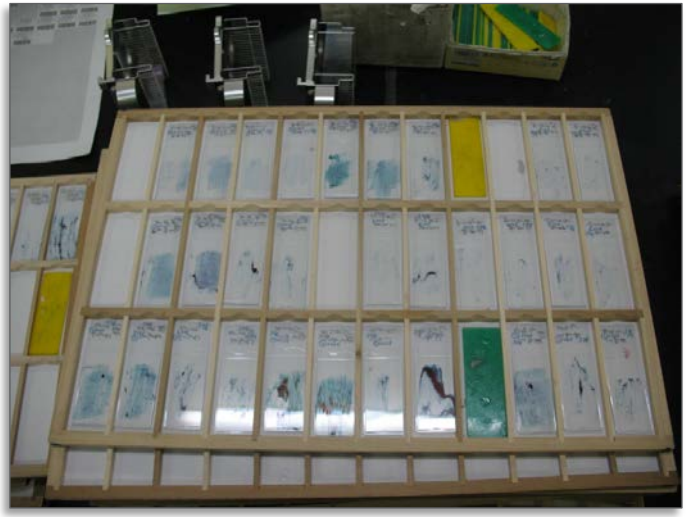
- Helps to detect safety hazard
- Helps to detect if equipment is not working correctly (andon lights)



Visual Management Can Facilitate

Problem Solving

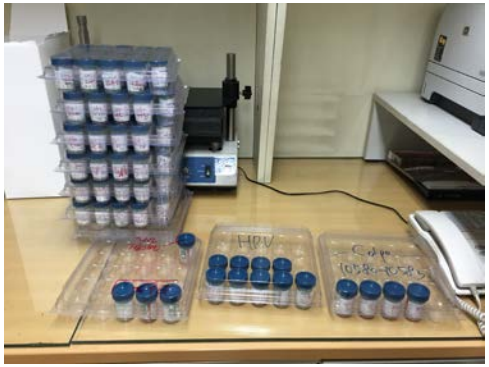
- Facilitates to identify problems faster



Visual Management Can Facilitate

Leadership

- Enables to see “at a glance” what happens in an area or at a workplace



Visual Management Checklist

- ✓Must be visible from a distance to quickly assess a situation
- ✓Visuals should communicate a goal and actual
- ✓Serves as check how “healthy” the processes in a specific areas are
- ✓Should be tailored to the audience
- ✓Needs to on an actionable level
- ✓All employees should be familiar and contribute to the visual management process
- ✓Longterm Standardized across departments
- ✓Is directed toward a group, not individuals where appropriate
- ✓Fosters solving problems in a blameless environment

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- **Daily Management**
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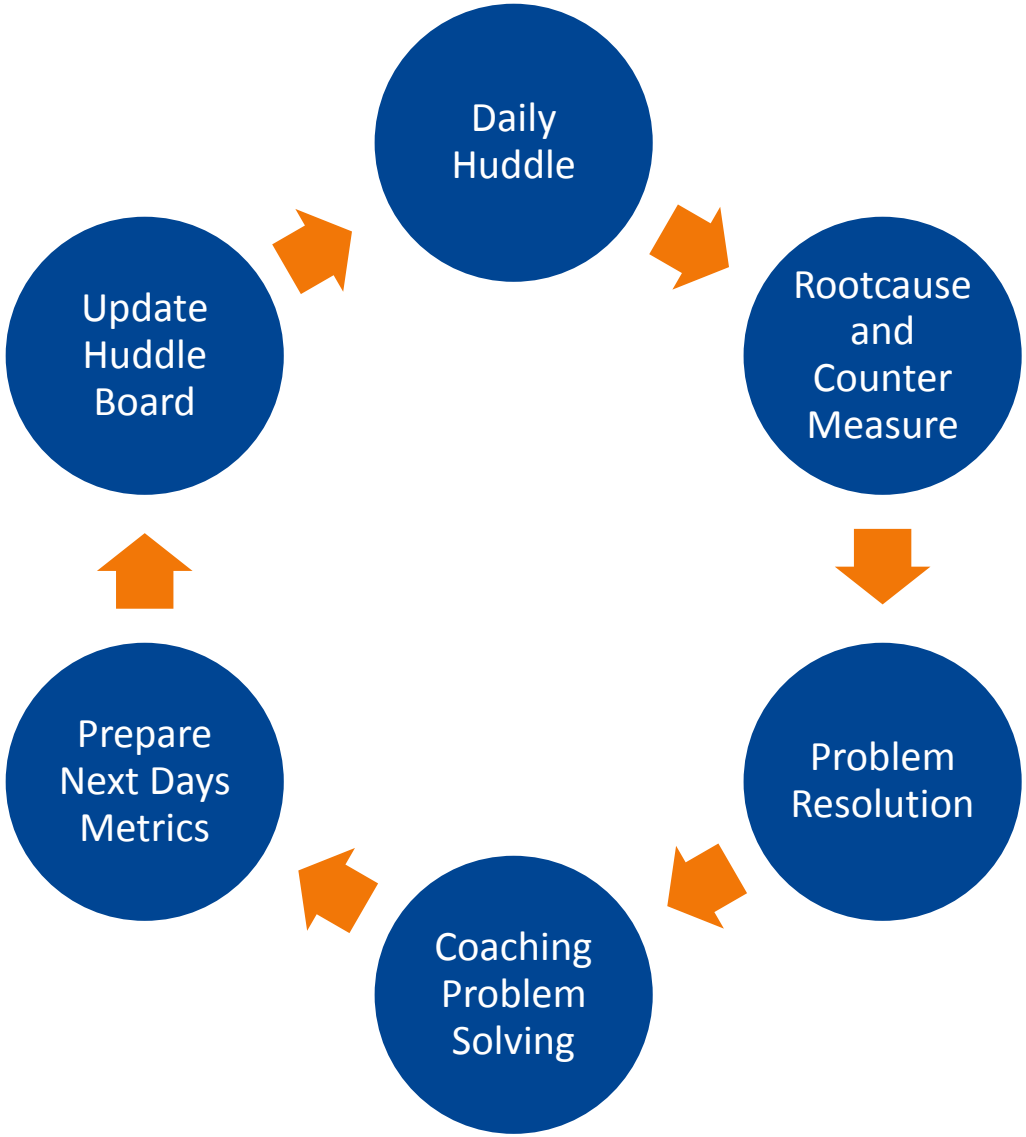
Daily Management Purpose

- Leadership Tool
  - Get a feel for your organization
  - Involve experts from other areas to built understanding for each others work / goal / problems
  - Gather employee input

- Communication Tool
  - Communicate goals of your organization
  - Identify root causes for problems and brainstorm countermeasures
  - Communicate SOP changes
  - Celebrate successes

Daily Management Process Example

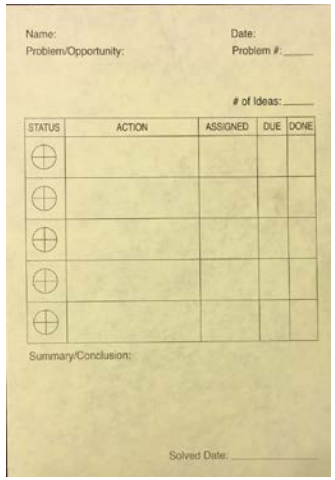


Daily Management Visualization

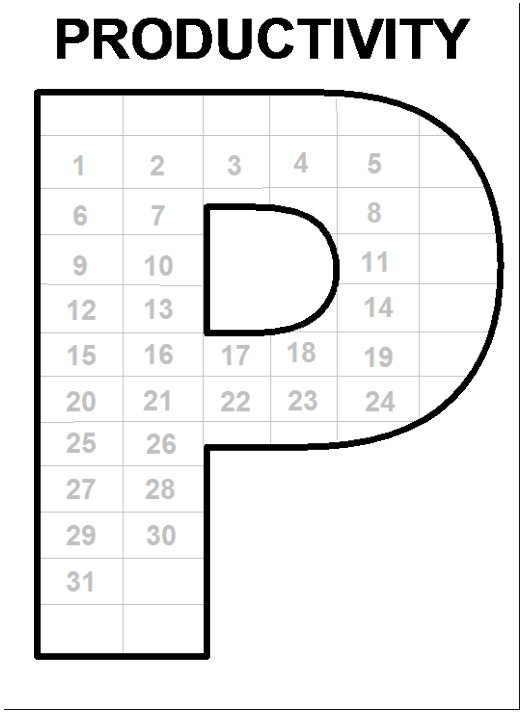
- Display in central location

- Display Elements
  - Daily Key Performance Indicators
  - Problem Solving Data
  - Action Plans Countermeasures

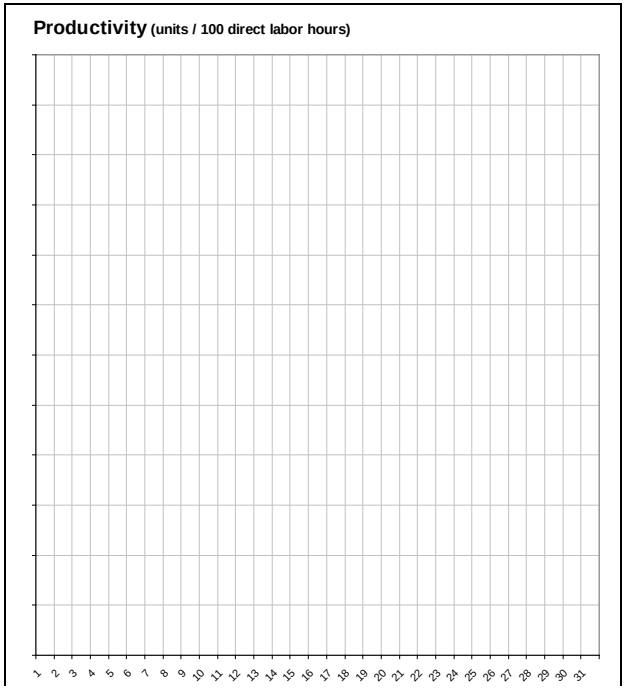
- Discuss Daily with Employees (daily Huddle)
  - Meet with supervisor, employees, pathologists
  - “Hand-off” between shifts in person



Daily Management Board Elements



ISSUE	ACTION	WHO	DUE	STATUS



Metric – hit or miss

Root Cause and Countermeasure – Action Plan

Historic Data – Trend

Daily Huddle Example

Topics

- Today's workload
- Today’s priorities
- Assign people to special tasks
- Re-Assign employees if somebody is sick or on pto
- Difficulties occurred yesterday
- Include Rewards if applicable
- Include “fun part” e.g. motivational daily quote

Exercise (15 min)

- Split into groups
- Brainstorm topics / categories you would want to address during a “Daily Huddle”
- Share with the audience

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Questions?