Making Hospitals Work
How to improve patient care while saving everyone’s time and hospitals’ resources

With Ian Taylor and Marc Baker
Senior Faculty Members of the UK’s Lean Enterprise Academy and authors of Making Hospitals Work
Lean in Healthcare Workshops
Philadelphia

- *Key Concepts of Lean in Healthcare*
  September 29-30

- *Making Hospitals Work*
  September 30-31

- *Value-Stream Mapping for Healthcare*
  October 1

- More information: lean.org, click Education
Introductory Comments

Author:

Mark Graban
Senior Fellow, LEI

Lean Hospitals:
Improving Quality, Patient Safety, and Employee Satisfaction

Making Hospitals Work
Lean Enterprise Institute
Why Lean in Healthcare? (U.S.)

Making Hospitals Work
Universal Problems

- Waste
- Costs
- Work-Arounds
- Errors
- Silos
- Waiting
- Staff Frustration

Making Hospitals Work
Lean Enterprise Institute
Lean Works in Healthcare

- Purpose
- Process
- People

Benefits of Lean

Patients

Staff & Providers

Healthcare Organization

Making Hospitals Work
Results from Lean

• Safety
  • Zero central line infections for patients

• Quality
  • Zero medication reconciliation errors

• Time
  • “Door to Balloon” time in 37 minutes (national goal = 90)

• Cost
  • 12% productivity improvement in 3 years

• Morale
  • Better employee satisfaction scores, lower turnover
Healthcare Value Leaders

www.healthcarevalueleaders.org
Our Initial Network

Group Health Cooperative - Seattle, WA
Gundersen Lutheran Health System - La Crosse, WI
Harvard Vanguard Medical Associates - Boston, MA
Hotel Dieu-Grace Hospital - Windsor, Ontario,
Iowa Health System - Des Moines, IA
Johns Hopkins Medicine - Baltimore, MD
Lawrence & Memorial Hospital - New London, CT
Lehigh Valley Health Network, Allentown, PA
McLeod Health - Florence, SC
Mercy Medical Center - Cedar Rapids, IA
Park Nicollet Health Services - Minneapolis, MN
St. Boniface General Hospital - Winnipeg, Manitoba,
St. Joseph Health System - Orange, CA
ThedaCare - Appleton, WI
UCLA Health System - Los Angeles, CA
University of Michigan Health System - Ann Arbor, MI
Grasping the Situation: What is our Problem?

Part One: Grasping the Situation: What is our Problem?
The sort of changes we are predicting

Figure 1: Middleton’s improvements quantified

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<tr>
<th></th>
<th>Current</th>
<th>Future</th>
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<tbody>
<tr>
<td><strong>Comparison between Middleton’s Current State and Future State</strong></td>
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<td>ED Performance (against 98% &lt; 4 hours target)</td>
<td>96.70%</td>
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<td>Average Medical Admissions (by the day)</td>
<td>72</td>
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<td>Average LoS for Medical Patients (days)</td>
<td>7.6</td>
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<td>Medical Patients awaiting discharge (% by the hour)</td>
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<td>Medical outliers in Surgical Beds (by the hour)</td>
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<td>Elective Surgical Patient RTT (weeks)</td>
<td>42.6</td>
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<td>Referred Elective Surgical Patients that receive Treatment (by the day)</td>
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*Limited by Patient choice
Working out what the real problem is
What is the problem?

Medical LoS is our BIG problem and is having an adverse effect on our other Big 4

Current condition:

Proposed countermeasures:

Plan:

Target condition:

Root Cause Analysis:

Responsible: JB  Team members: BW/NE/JE/ML/HW

Follow Up:

Agreed by:  Date:
How Big is the BIG Problem?

What does this Medical Demand Look Like?

- Who are they?
- How many of them are there?
- How similar or different are they?
- Where do they come from?
- What happens to them?
- Where do they go?
Seeing where different types of patients & demand rates

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<th>Presenting Problem and (%) Demand</th>
<th>15%</th>
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Diagram showing flow of patients and demand rates between different departments.
Capturing *where the patient comes from* & *where they are discharged to*. The *spine* – Where the patient physically experiences a *step* where they experience a *wait or delay* & if they are *pushed or pulled*.

Making Hospitals Work

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Adding the **data boxes & the time line** capturing the time taken experiencing **steps** & the time experiencing **waits or delays** (totalling both)

A completed Data Box

**Ward Round**

P/A = No

Working Hrs = 09:00 - 17:00

Capacity = 89%

Freq = 1/Day

Making Hospitals Work
Capturing the *information flow* – notes & electronic data or transactions & their *connections* with the spine.
Capturing the **scheduling** and **management** processes & their **connections** with the spine
Don’t worry if yours ends up looking like this !!!!
Title: Justification for Middletons’s Emergency Medical

What is the problem?
Medical LoS is our BIG problem and is having an adverse effect on our other Big 4

Current condition:
1571 minutes (15%) Treatment Time
V’s
9415 minutes (85%) Waiting Time

Target condition:

Root Cause Analysis:

Responsible: J8 Team members: BW/NE/JE/ML/HW

Process Re-Design

Proposed countermeasures:

Plan:

Follow Up:

Agreed by: Date:
Title: Justification for Middleton's Emergency Medical

What is the problem?
Medical LoS is our BIG problem and is having an adverse effect on our other Big 4

Current condition:
1571 minutes (15%) Treatment Time
V's:
9415 minutes (85%) Waiting Time

Target condition: Reduce Waiting Time by 50%, therefore reduce average LoS for Medical Patients by 3.25 days

Root Cause Analysis:

Responsible: J8 Team members: BW/NE/JE/ML/HW

Process Re-Design

Proposed countermeasures:

Plan:

Follow Up:

Agreed by: Date:
1. No plans for patients (therefore status checks impossible).
2. Departmental working hours are not synchronised
3. Capacity (staff) are not calculated to meet demand
4. The frequency of interventions are not designed to meet demand
### Staff/Departmental Availability

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#### Key:
- **Full Availability**
- **Limited Availability**
- **Not Available**

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**Making Hospitals Work**

Lean Enterprise Institute
# Nursing Availability to Discharge from Wards

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<th>Meals</th>
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*Full Availability to Discharge* (Green)

*Limited Availability to Discharge* (Yellow)

*No Availability to Discharge* (Red)
Title: Justification for Middleton's Emergency Medical

What is the problem?

Medical LoS is our BIG problem and is having an adverse effect on our other Big 4

Current condition:

1571 minutes (15%) Treatment Time

V’s

9415 minutes (85%) Waiting Time

Target condition: Reduce Waiting Time by 50%, therefore reduce average LoS for Medical Patients by 3.25 days

Root Cause Analysis:

- No real plan for patients (hence no actual)
- Departmental working hours are not synchronized
- Capacity (staff) not calculated to meet Demand
- Frequency of interventions not designed to meet Demand

Responsible: JB  Team members: BW/NE/IE/ML/HHW

Proposed countermeasures:

Plan:

Follow Up:

Agreed by: Date:
1. What is/are takt times?
2. Where can we remove the triangles (waiting)?
3. What can we do where we cannot remove the triangles?
4. Which process should we make our single point of schedule?
Demand: What are your takt times?
"Takt" = rate of patient/customer demand for services

Demand to Access

Demand to Get Out

Making Hospitals Work
Where can we take out the triangles (waiting)?

Continuous Flow..... Eliminating the Waits

- Handover 10 mins
- Nurse Obs 9 mins
- Junior Doctor 10 mins
- Imaging 10 mins
- Senior Doctor 6 mins

20 mins 20 mins 22 mins 20 mins 43 mins 35 mins

80 mins 35 mins

205 mins

Saving (125 mins)
A fishbone icon identifying the key support service in treating a patient on a ward.
Zooming into the Fishbone
What can we do where we can’t remove triangles?

Need Bed Signal

Customer Process

Buffer containing a constant number of empty beds

Supply Bed Signal

Supplier Process

Reversing the Polarity (You cannot ‘pull’ the customer) – In Healthcare (as in some other service industries) the Patient is actually present in Door to Door system & is therefore both the Customer & the Product, moving from left to right. Unique to an Emergency Care environment is the fact that you cannot prevent the Customer, should they need to, from entering the system.
Buffer Enabling Visual Escalation

1. Code Green - Low Level Escalation
2. Code Yellow - Medium Level Escalation
3. Code Red - Locked, Request Key to open - High Level Escalation
Fact - Local Scheduling Creates Triangles

Schedule

Schedule

Schedule
At which single point will you schedule?....The Pacemaker

The schedule is sent to a single point in the entire process which works to that schedule, with all other parts of the process subordinate to it.

If the pacemaker is told to ‘speed up,’ every other bit of the process speeds up, to keep pace.

If the pacemaker is told to ‘slow down,’ every other part of the process slows down in response.
The Visual Hospital in Action – with the Master Patient Scheduler
4: Where is the single point of schedule (pacemaker)?

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<th>Every Day</th>
<th>Every Hr</th>
<th>Every 2 Hrs</th>
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<tr>
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<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Cardio</td>
<td>6</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>Resp</td>
<td>18</td>
<td>1.5</td>
<td>3</td>
</tr>
<tr>
<td>Elderly</td>
<td>6</td>
<td>0.5</td>
<td>1</td>
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<tr>
<td>Total</td>
<td>72</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

Making Hospitals Work

[Image: 4: Where is the single point of schedule (pacemaker)?]
What Happens at the Pacemaker

1. Pick up 'Next Patient Card' from 'Visual Hospital Box'
2. Drop 'Next Patient Card' at Specialist Diagnostics/Treatment Cell
3. Pick up Patient featured on previous 'Next Patient Card'
4. Deliver Patient to Discharge Lounge or Transportation
Flow, Pull & Pacemaker

Beat, Takt(s)          Balanced
Flow, Flow, Flow       Flexible
Synchronized           Standardized
Designing the Future State

Part Four:
Designing the Future State

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The Future State: With the Questions Answered

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Pacemaker

Flow

Buffers

Material Requirements Planning (MPS)

Master Patient Scheduling

Flow

P/A = 85% OTIF
Working Hrs: To Demand
Capacity: 100%
Freq: Takt

Flow

P/A = 85% OTIF
Working Hrs: To Demand
Capacity: 100%
Freq: Takt

Home

Referral

ED

Word and Offline Services

Need Space Signal

Home

Rehabilitation Hospital

50 64 750 2850 120

WT = 920

PT = 2.944
Title: Justification for Middleton’s Emergency Medical

What is the problem?
Medical LoS is our BIG problem and is having an adverse effect on our other Big 4

Current condition:
1571 minutes (15%) Treatment Time
Vs
9415 minutes (85%) Waiting Time

Target condition: Reduce Waiting Time by 64%, therefore reduce average LoS for Medical Patients by 4.94 days

Root Cause Analysis:
- No real plan for patients (hence no actual)
- Departmental working hours are not synchronised
- Capacity (staff) not calculated to meet Demand
- Frequency of interventions not designed to meet Demand

Responsible: JB  Team members: BW/NE/JE/ML/HW

Proposed countermeasures:
- Place ‘offline’ services ‘online’ & get them operating to takt
- Create Continuous Flow
- Introduce Buffers where we cannot Flow
- Create a Single Point of Schedule (Pacemaker)

Plan:

Follow Up:

Agreed by:  Date:
Achieving the Future State: Creating an Action Plan

Part Five:
Achieving the Future State:
Creating an Action Plan

Making Hospitals Work
Create Stability through Ops Management

P/A = 85% OTIF
Working Hrs: To Demand
Capacity = 100%
Freq = Takt

Word and Online Services
P/A = 85% OTIF
Working Hrs: To Demand
Capacity = 100%
Freq = Takt

50 64 750 2800 120
WT = 920
PT = 2,944

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## Figure 9: A populated Action Plan

**Date:** 01/11/2007  **Patient Family:** Emergency Medical

| Loop | Burst | Like Item (objective) | Metric (Goal) | Lead | Related persons | Start/Complete | J | F | M | A | M | J | J | A | S | O | N | D | 30d | 60d | 90d |
|------|-------|-----------------------|---------------|------|-----------------|----------------|---|---|---|---|---|---|---|---|---|---|---|---|----|----|----|-----|
| All  | 1. Develop & execute Cotton Plan | Proposed re-design communicated | 100% Staff aware | M3 | L/LT/KM | Jan-Yr1 - Feb Yr1 | ○ | △ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1. Continuity | 2. Opt Mgmt throughout CS | Plan for Every Patient | Average OTEP 85% | IT | LT/AN/LT | Jan-Yr1 - Feb Yr1 | ○ | △ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3. Really understand demand | Demand In & Out known | By Hour/Day/Week/Season | IT | IR/M3 | Jan-Yr1 - Feb Yr1 | ○ | △ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2. Post CS N/AU | 4. Establish Pascak | Scheduled by MPS | 90% leasing | PL | BS/OG/TE | Jan-Yr1 - Feb Yr1 | ○ | △ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5. Size & implement buffers | 1. Pre Ward Buffer in place | Max LoS <12.5 hours | PL | DM/MB/PB | Jan-Yr1 - Feb Yr1 | ○ | △ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2. Discharge Buffer in place | Max LoS > 2 hours | PL | DM/MB/PB | Jan-Yr1 - Feb Yr1 | ○ | △ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 6. Pull offline services into flow | Top 80% into fishbone model | All 80% working to Takt | IT | JJ/GR/KE | Jan-Yr1 - Feb Yr1 | ○ | △ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8. Size & implement buffer | Pri ED Buffer | Max LoS > 2 hours | RJ | DM/MB/PB | Jan-Yr1 - Feb Yr1 | ○ | △ |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**Key**
- ○ Planned Start
- △ Planned Completion
- Red Start late

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**Making Hospitals Work**  
Lean Enterprise Institute
Title: Justification for Middletons’s Emergency Medical

What is the problem?
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Responsible: JB Team members: BW/NE/JE/ML/HW

Process Re-Design

Proposed countermeasures:
- Create Stability throu’ Ops Management
- Place ‘offline’ services ‘online’ & get them operating to takt
- Create Continuous Flow
- Introduce Buffers where we cannot Flow
- Create a Single Point of Schedule (Pacemaker)

Plan:

Follow Up:
- Conflicting Cost Improvement Initiatives in departments & divisions
- Who will do this work
- How will we know if the actions have the impact needed?

Agreed by: MT Date: 08/11/07

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Who’s going to make sure all this happens ????

The Value Stream Manager:

• Preparing the Business Case
• Implementation of the Transition Plan
• Cuts across all Departments & Divisions (silos) - who all have different targets and objectives

And when it’s in place:

• Responsible for all Medical Patients - the ‘Patient Representative’
• Ensures that Medical patient’s needs are met ‘On Time & In Full’
• Responsible for resolving any issues that prevent this – At the very highest level if required

Who ‘currently’ has the time to do all this ????
Healthcare Resources

Books & DVDs

Workshops

• Key Concepts of Lean in Healthcare

• Value-Stream Mapping for Healthcare

• Making Hospitals Work

Website

Articles, case studies, videos, forums, templates, and more at:

• lean.org
• leanuk.org
• healthcarevalueleaders.org

Connection Center @lean.org
Find and communicate with other lean thinkers in healthcare
Questions & Answers

Ian Taylor  Marc Baker

Selected questions not answered in the webinar are posted on the webinar archive page
Next Steps:

• Share the webinar link

• Read Lean Hospitals and Making Hospitals Work

• Lean-in-Healthcare Workshops, Philadelphia Sept. 29 to Oct.1:
  • Value-Stream Mapping for Healthcare.
  • Key Concepts of Lean in Healthcare
  • Making Hospitals Work

More info: lean.org