A Heuristic Map of Lean and Safety Engineering Methodologies

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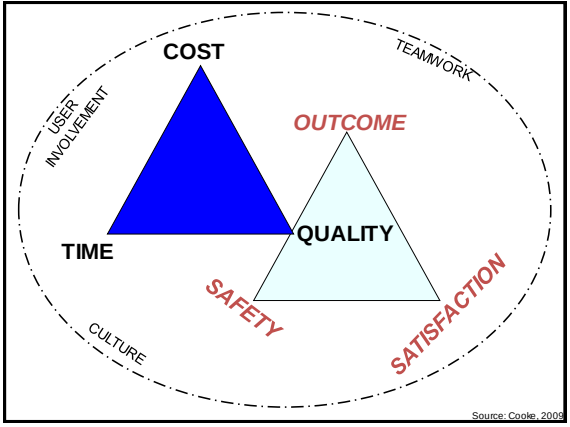
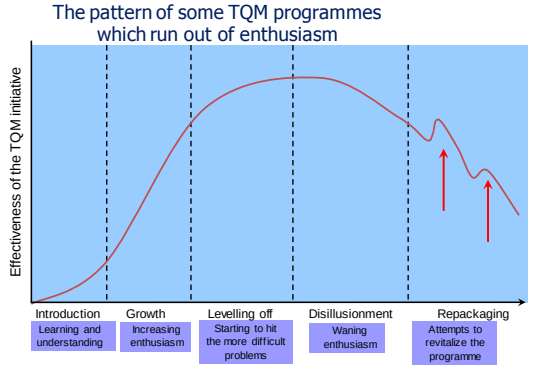
The Background

- Patient safety management
  - Never really left us but has enjoyed a renaissance for all the wrong reasons
- 'Lean' has become a dominant model
  - But there are many purveyors out there
  - The high profile US case studies dominate thinking
- Budget/Cost reduction requirements in the UK will accelerate lean programmes
- Lean and safety management
  - Were they friends or foes?

Commercial Pressures



Source: Cooke, 2009

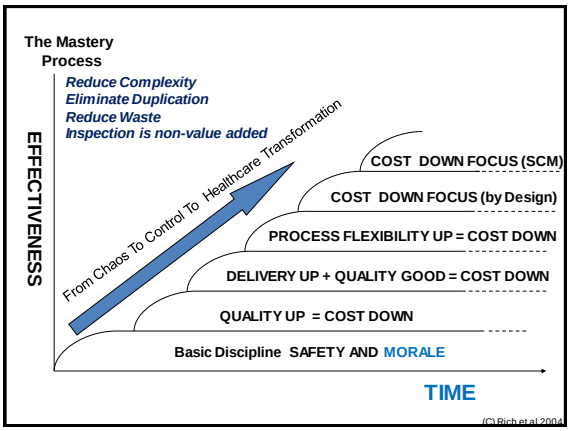


Source: Slacket al (2004)

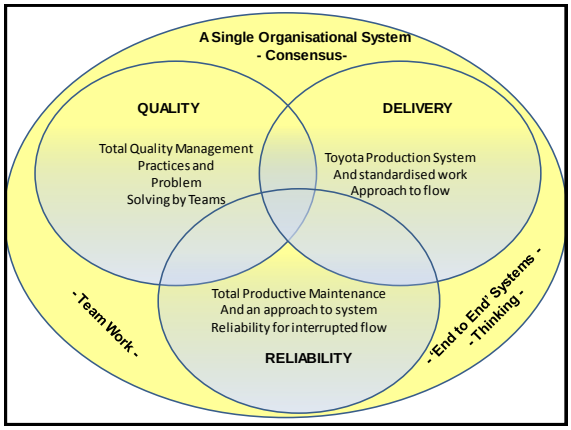
Lean has given to us?

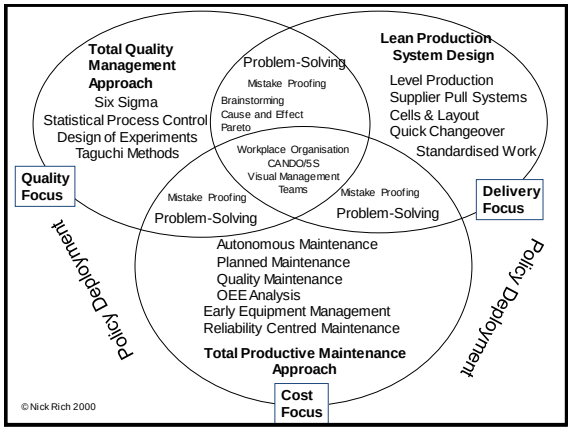
JIT
Dealer derived Production Volumes
Kanban
Level Production Volume
Mixed Model Heijunka levelling
5S
On the spot Inspection
Poka Yoke
Jidoka
Set Up Time Reduction
Andon
Total Productive Maintenance
Total Quality Control
Low Cost Automation
Quality Tools
Continuous Improvement
Value Stream Mapping
Applied Quality Function Deployment
Single Piece Flow
Policy Deployment
Standard Operating Procedures
U Cells
Cross Functional Management

All of these are SOLUTIONS to problems faced by Toyota! Lots of management study and an evolutionary approach



(C) Rich et al 2004





Lean will address Lapses

Thought there was too much paperwork to complete to report an incident – so didn't

Were not trained or supervised effectively

Patient Status Unclear

Broken Equipment

Chaotic Environment

Taken a short cut

Poor clarity of roles

Missing Information

Were distracted by Colleagues

Thought it was dealt with

Laid awake a night Worrying about your last shift

Poor Handovers

Had a near-miss

Were not aware of latest Best Practice

Followed 'Out of Date' Procedures

Saw something and felt you should have spoken up – but did not

Did not gel your hands

Lean has also helped improve micro-systems

Impact so far:

NHS Institute for Innovation and Improvement

First signs of composite improvement (4 months 1st phase testing):

Test Site 4

Staff Nurse Time Split Before:
Motion – 25%
Admin – 27%
Discussion – 16%
Direct Patient Care - 25%
Other – 7%

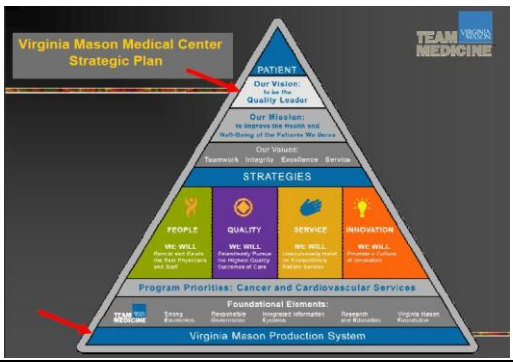
Staff Nurse Time Split After:
Motion – 11%
Admin – 13%
Discussion – 21%
Direct Patient Care – 46%
Other – 9%

Productive Ward resulted in a 21% increase in direct care time

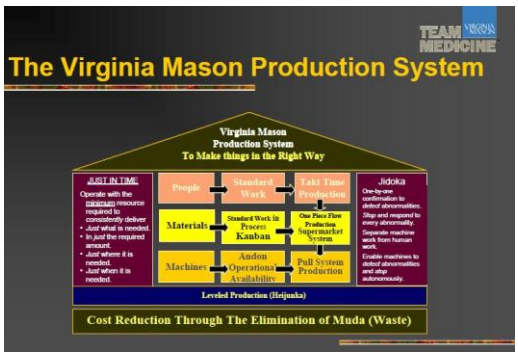
Releasing Time to Care

Source: NHSi

Improvements



The Challenge



Two Approaches

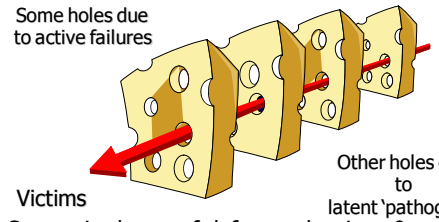
Individual Approach

- Person is at fault
- Apportion blame
- Punish and remove the individual

System Approach

- Failure is hidden in the system of healthcare and awaits the opportunity to happen
- Not an individual failure
- Systems must be changed and improved to manage safely

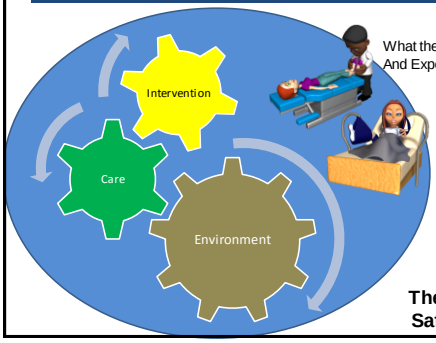
Systems Safety (Reason, 1990)



Source: Reason, 1990

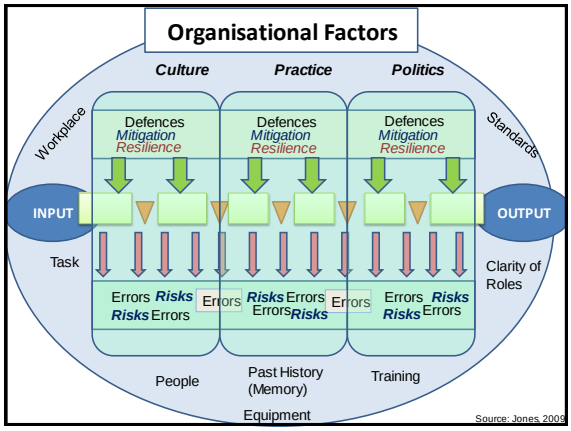
The safety world enjoys creating barriers, duplication and redundancy

The System

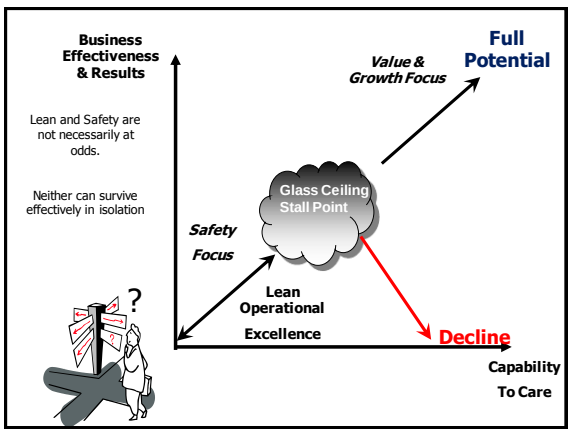


The different Safety levels

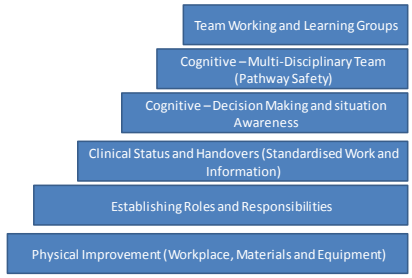
Organisational Factors

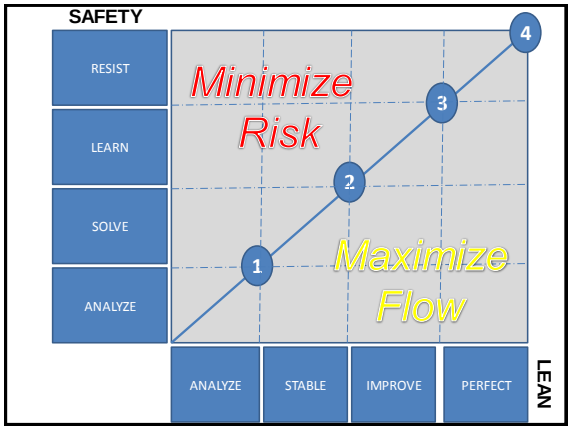


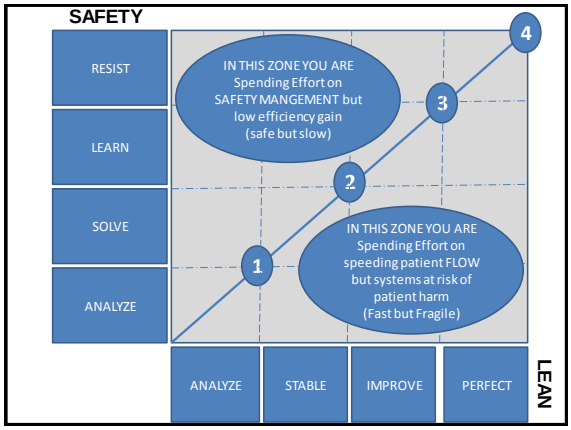
Source: Jones, 2009



Levels of Analysis

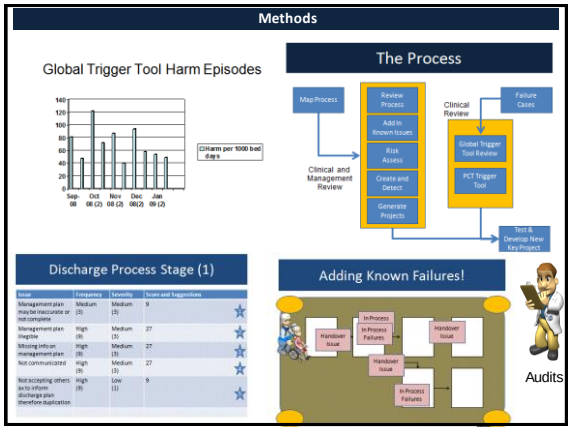






Stage One

STAGE ONE	SAFETY	LEAN
Theme	System Risk Assessment and visualisation	Awareness of Value and visualisation
Focus	Understanding of the system (risks) and the buy in of key stakeholders via participation.	Understanding of the system (wastes) and the buy in of key stakeholders
Main Issues	Risks	Costs, duplication, and delays
Tools	System Models, process maps, task analysis	Pareto of patient types (families), flow and cycle times, quality, hours of operation.
Prioritisation Tool	FMEA	Quick Fixes Basic P/solving
Measures	Risk Scores and quantified levels of risk (historic data or expert/manufacturer)	Value added time, distance, Number of incidents
Typical Stakeholders Involved in this stage	Clinical experts and human factors/safety experts with management input	Improvement specialist supported by clinical, safety, and management representatives
Education for the clinical stakeholders	Low – active through learning by doing (building the map)	Low – active through learning by doing (building the map)
Reflection	Current state map - Low because it focuses on immediate issues. Novelty through thinking about human factors and taking a systematic approach to safety.	Current state map - Low because it focuses on immediate issues but novelty is in 'seeing the whole' system



FMEA Template

Part/Product Name and No.: **Process Owner:** **Prepared By:**

Process Name: **FMEA Date (Orig):** **(Rev.)**

Part/ Process	Failure Mode	Causes	Sev	Occ	Det	RPN	Controls	Actions	Plans Owner and Timing

Severity x Occurrence x Detection = Risk Priority Number

23

Stage Two

STAGE ONE	SAFETY	LEAN
Theme	Solve Issues	Stabilise
Focus	Identify and eliminate risks	Standardised work/Std documents Organised environment
Main Issues	Risks Incident data	Process standards – Visual Management - 5 Whys Quality of Solutions
Tools	Interventions in the microsystem SBAR	Interventions in the microsystem. Rapid Improvement Events Learning how to do it right
Prioritisation Tool	FMEA	Problem-Solving – flow barriers
Measures	Number of incidents and reports	Number of events and incidents Normality vs abnormality
Typical Stakeholders Involved in this stage	Clinical experts and human factors/safety experts and teams involved with process	Teams clinical, safety, and management representatives
Education for the clinical stakeholders	High – Solutions Management	High - learning by doing PDCA
Reflection	KPIs and human factors. Incident Review	Standard work and PDCA cycle Incident review

Documentation Project

What Data is Sent
Document
Sender-Receiver
Chart

	Data Needs	BCU refer DISTRICT NURSE BCU1	BCU Tissue Viability Form BCU2	DISTRICT NURSES Refer to RBHHospice DN1	DISTRICT NURSES TISSUE VIAB DN2	DISTRICT NURSE REFERRAL 2 RBH DN3
1	Name of patient	√	√	√	√	√
2	Address	√	√	√	√	√
3	Post Code	√	√	√	√	√
	Date of Transfer	√	√	√		
	NHS Number		√	?	√	?
4	Date of Birth	√	√	√	√	√
	Age		√		√	
	MSWD			√		
5	Patient Telephone	√	√	?	√	
	Patient Mobile		√	?	√	
	Next of Kin/Carer/Key Holder					
6	Next of Kin	√		√		
	Next of Kin Address			√		

Stage Three

STAGE ONE	SAFETY	LEAN
Theme	Learning	Improvement
Focus	Training and audits	and the buy in of key stakeholders
Main Issues	Risks	Costs, duplication, and delays
Tools	System Models, process maps, task analysis	Pareto of patient types (families), flow and cycle times, quality, hours of operation. How to do it better
Prioritisation Tool	FMEA	Quick Fixes Basic P/solving
Measures	Risk Scores and quantified levels of risk (historic data or expert/manufacturer)	Value added time, distance, Number of incidents
Typical Stakeholders Involved in this stage	Clinical experts and human factors/safety experts with management input	Improvement specialist supported by clinical, safety, and management representatives
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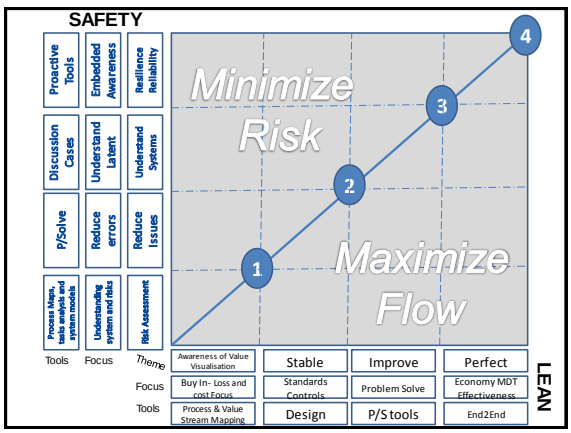
Stage Four

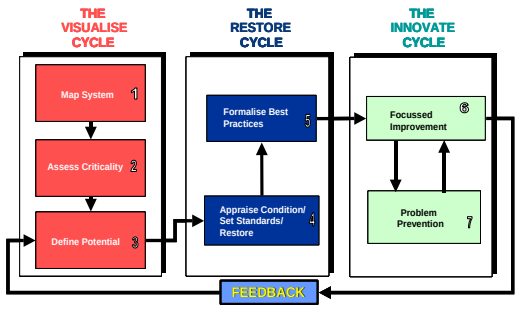
STAGE ONE	SAFETY	LEAN
Theme	Resist	Perfect
Focus	Creating reliability and systems that.	Understanding of the whole system - the buy in of other depts/organisations
Main Issues	Design of Robust, Resilient and Redundant System	End To End Management
Tools	Design Mistake Proofing Advanced situation awareness	End to End Maps - Kaizen Create and detect Mistake Proofing Learning how to learn and do things differently
Prioritisation Tool	P/solve embedded/IR1	Embedded P/Solve
Measures	Mean Time Between Failure Mean Time to Recover	Mean time between failure Mean Time to Recover (design)
Typical Stakeholders Involved in this stage	All – proactive risk monitoring	Many
Education for the clinical stakeholders	Group Learning and discourse	Group Learning and discourse
Reflection	Systematic Design for safety./Preventive/Predictive Reliability centred management	Design for safety and improved flow Reliability Centred Management

Create & Detect Chart

UNDETECTED	DETECTED: GP	Hospital	Ambulance Service	Nursing Home	District Nurse	Intmdte Care	Social Services	Other	Other
GP		No History							
Hospital	Med history		Delays TTOs				Improper Referrals		
Ambulance Service				Hand-overs					
Nursing Home			No-one to Receive						
District Nurse									
Intermediate Care									
Social Services									
Other									
Other									



Practically - Making It Happen



The Current State

- Building the model and testing with our partners
- Positioning our partners and looking at how they evolve
- How did they and do they use tools, techniques and methodologies?
- Can we predict the next stage?
- How are system efficiency and effectiveness measures used for learning?

Questions?