



Lean and Six Sigma Deployments in Hospitals

American Society for Quality



Lean and Six Sigma

- Many industries and businesses have turned to Lean and/or Six Sigma to improve their organizations
 - Manufacturing
 - Service companies
 - Retailers
- Two distinct approaches, though some use a collective approach called “Lean Six Sigma”
- Lean and Six Sigma both have had staying power beyond previous “hot” improvement methods
 - Reengineering
 - Theory of Constraints
 - Etc.



Lean improvement method

- Emerged from work of Jim Womack and MIT colleagues studying Toyota and other firms in Japan
- Focus on satisfying customer demand (what they want, and when and how they want it)
- Use of scientific method, specifically PDCA (plan, do, check, adjust/act)
- Minimize waste in satisfying demand:
 - Overproduction - more than demand dictates
 - Waiting - idleness
 - Transport - unnecessary movement of material
 - Processing - unnecessary processing
 - Inventory - more than needed
 - Motion - wasteful or harmful
 - Correction - redo, rework



Six Sigma improvement method

- Management strategy developed by Motorola
- “Six Sigma” literally defined by quality standard of 3.4 defects per 1 million opportunities
- Statistical emphasis on eliminating errors and reducing product and process variation
- Infrastructure of improvement agents (e.g., black belts)
- Use of DMAIC process (similar to PDCA)
 - Define
 - Measure
 - Analyze
 - Improve
 - Control



Attention on Lean and/or Six Sigma in healthcare

- Urgency for healthcare improvement coming from various perspectives
 - Government emphasis on improvement
 - Profit and not-for-profit facilities need to manage costs better
 - Quality of care always a concern
- Many early efforts and successes with Lean and/or Six Sigma well-publicized



Lean and/or Six Sigma successes in healthcare:

- **Virginia Mason, Seattle** — Using lean since 2002 to eliminate wastes (rework); improve quality, productivity and program capacity; and control capital expenses.¹
- **Massachusetts General, Boston** — Lean increases throughput in proton center, increasing patient access to rare form of radiology oncology therapy.²
- **Mayo Clinic, Rochester, MN** — Lean and Six Sigma address multiple processes, including decreasing times to get patients suffering acute ST elevation myocardial infarction to clinic for angioplasty.²
- **Clearview Cancer Institute, Huntsville, AL** — Physicians and staff use lean concepts to reengineer processes and patient flow in a new facility, eliminating wasted time (waiting for both patient and physician), and improving capacity to serve cancer patients as well as overall patient experience.²

¹ Institute for Healthcare Improvement

² Lean Enterprise Institute



Difficulty gauging the extent of Lean and Six Sigma

- Most proof of proliferation of these methods has been anecdotal
- Case studies point to success, but is it the hospital, the inherent traits of improvement methods, or both?
- Need to establish a statistical baseline for examining Lean and Six Sigma deployment in hospitals



***ASQ Hospital Study* launched**

- American Society for Quality fields the *ASQ Hospital Study* in 2008
- Attempts to answer what hospital executives and practitioners want to know:
 - Are hospitals deploying Lean and/or Six Sigma?
 - Why do hospitals deploy — or not deploy?
 - In which departments are hospitals deploying Lean and/or Six Sigma?
 - Are Lean and/or Six Sigma efforts generating benefits/success?



ASQ Hospital Study completed

- Responses provided on 77 hospitals from March to October 2008
- Primarily senior-level responses — 70% of responses came from CEO, COO, CFO, VP, Chief Medical Officer, Chief Quality Officer, or Lean/Six Sigma leader
- Overall study responses provide a confidence interval of approximately ± 11 at 95% confidence level; subquestions for only Lean and/or Sigma deployers less statistically significant ...
- But all Study analysis provides a range of excellent benchmarks for hospitals considering Lean and/or Six Sigma



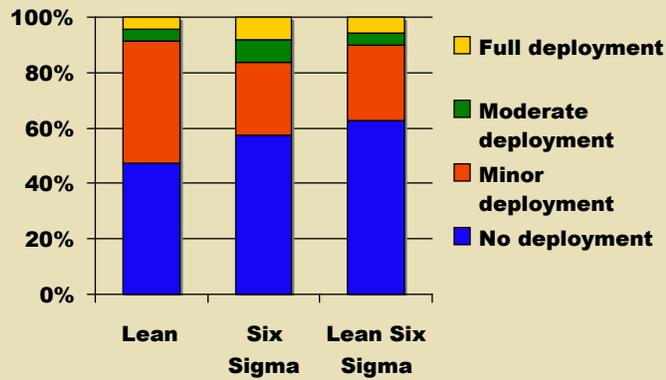
ASQ Hospital Study participating hospitals

• For-profit or non-profit		• Days of patient care	
– Profit	5%	– Median	38,691
– Non-profit	95%	– Average	59,936
• Independent hospital		• Gross revenue	
– Independent	49%	– Less than \$100 M	24%
– Part of system	51%	– \$101 M to \$250 M	32%
• Teaching hospital		– \$251 M to \$500 M	29%
– Yes	24%	– More than \$500 M	15%
– No	76%	• Payer mix (averages)	
• Staffed beds		– Private payers	28%
– Median	161	– Government payers	60%
– Average	231	– Self-pay	7%
• Admissions		– Other	6%
– Median	8,402		
– Average	11,441		



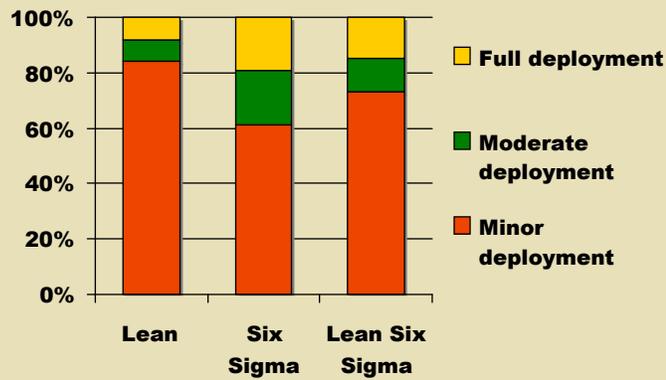
Level of deployment — All hospitals

Level of hospital wide deployment:



Level of deployment — Among deploying hospitals only

Level of hospital wide deployment:





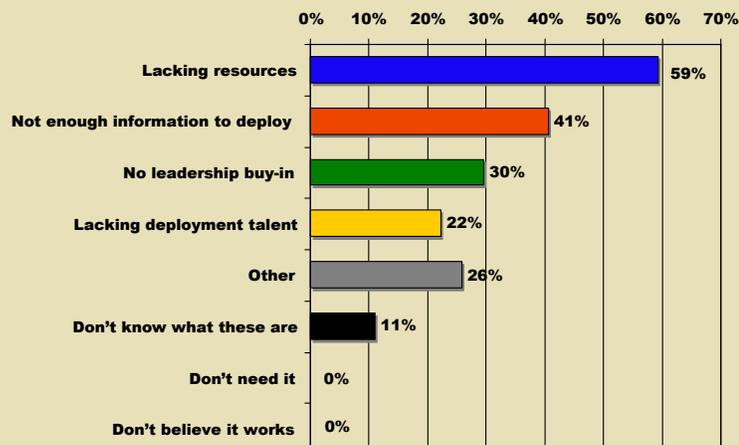
Have hospitals deployed Lean and/or Six Sigma?

- Many U.S. hospitals have deployed Lean and/or Six Sigma
 - 53% report some level of deployment of Lean
 - 42% some level of deployment of Six Sigma
 - 37% some level of deployment of Lean Six Sigma)
 - 68% of Lean users also deployed Six Sigma; 86% of Six Sigma also deployed Lean
- Most deployments not extensive:
 - 84% of hospitals that have deployed Lean report “minor deployment”



Hospitals don't deploy Lean and/or Six Sigma because ...

If no deployments, primary reasons:





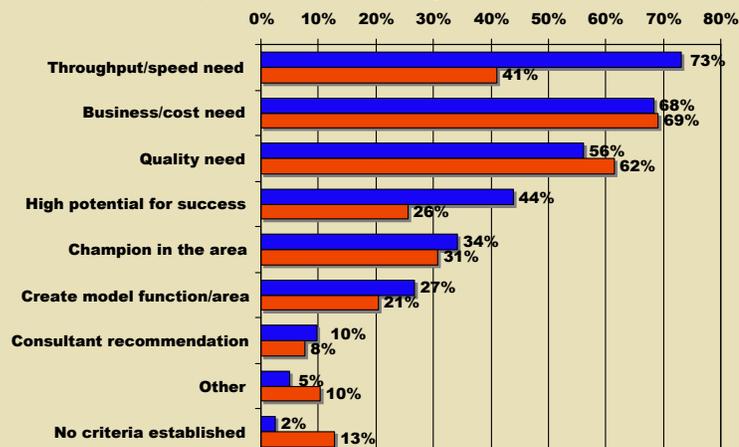
Do hospitals believe Lean and/or Six Sigma can work?

- None of the hospitals that know what Lean and/or Six Sigma are:
 - Believe they don't need it
 - Doubt the efficacy of the methods
- A need for resources and information tops list of primary reasons for no deployment
- But surprisingly, one in 10 don't know what these methods are — and that's among study participants who were alerted in advance what the study would cover



Hospitals deploy Lean and Six Sigma because

Most frequent criteria for deploying in an area among hospitals that have deployed Lean and/or Six Sigma:





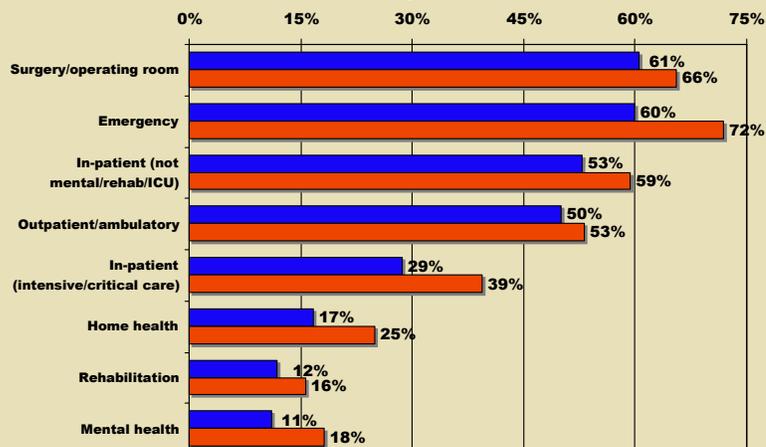
What are criteria for deploying Lean and/or Six Sigma?

- Three reasons dominate why hospitals are driven to pursue Lean and/or Six Sigma:
 - Throughput need
 - 73% of Lean deployers
 - 41% of Six Sigma deployers
 - Business/cost need
 - 68% of Lean deployers
 - 69% of Six Sigma deployers
 - Quality need
 - 56% of Lean deployers
 - 62% of Six Sigma deployers
- One difference in reasons to deploy between methods — High potential for success



Lean and Six Sigma deployment targets — Clinical

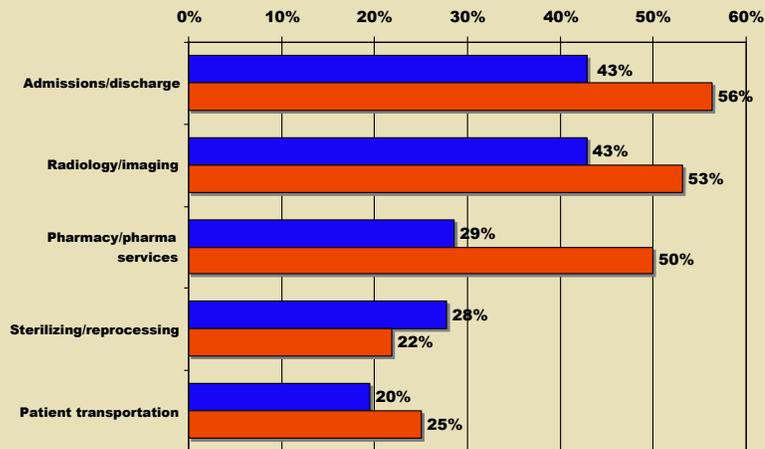
Deployment by hospital departments/areas among hospitals that have deployed Lean and/or Six Sigma:





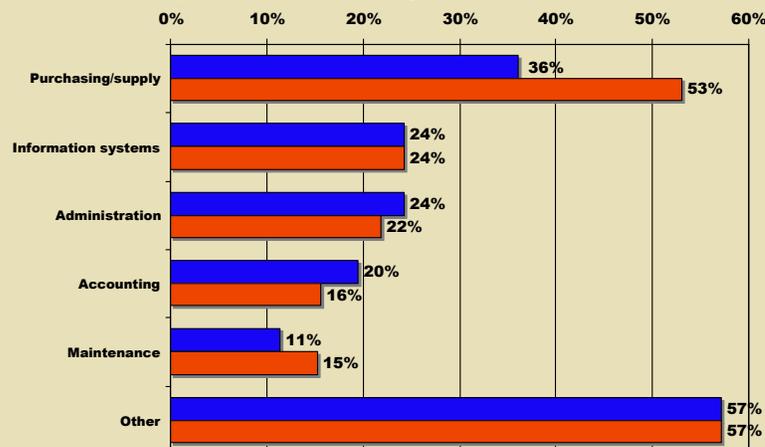
Lean and Six Sigma deployment targets — Ancillary/support

Deployment by hospital departments/areas among hospitals that have deployed Lean and/or Six Sigma:



Lean and Six Sigma deployment targets — Non-clinical support

Deployment by hospital departments/areas among hospitals that have deployed Lean and/or Six Sigma:





Where are hospital deploying Lean and/or Six Sigma?

- Half (50% median) of both Lean and Six Sigma deployments cut across departments
- Common areas of focus for the two methods:
 - **Clinical**
 - Lean deployers: Surgery/operating room (61%) and emergency (60%)
 - Six Sigma deployers: Emergency (72%) and surgery/operating room (66%)
 - **Ancillary/support services**
 - Lean deployers: Admissions/discharge (43%) and radiology/imaging (43%)
 - Six Sigma deployers: Admissions/discharge (56%)
 - **Non-clinical/support**
 - Lean deployers: Purchasing/supply (36%)
 - Six Sigma deployers: Purchasing/supply (53%)



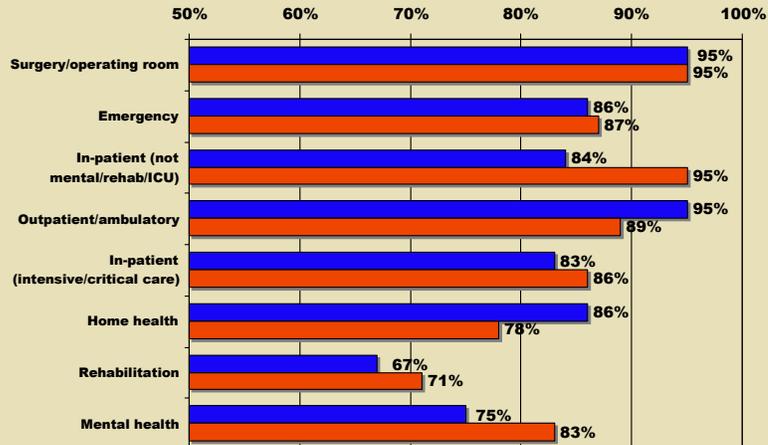
Where are hospital deploying Lean and/or Six Sigma?

- Clinical focus on operating rooms and emergency rooms
 - Addresses the top three reasons why methods are being deployed
 - Quality always a healthcare focus
 - Throughput (i.e., optimizes revenue generating abilities of operating rooms)
 - Which then addresses business need (increase revenues, lower costs)
- Six Sigma generally more in use in each area, possibly because it's more accepted among data-oriented medical and scientific professionals (i.e., analyze data at desk/computer?)



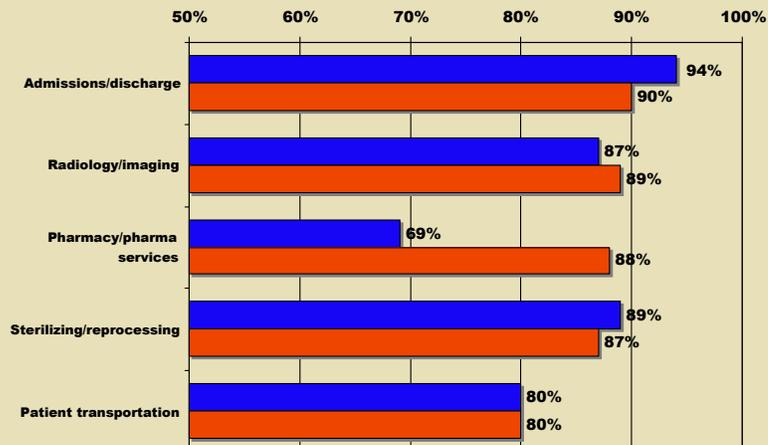
Lean and Six Sigma somewhat or highly successful — Clinical

Deployment efforts somewhat or highly successful in departments/areas where Lean and/or Six Sigma was deployed:



Lean and Six Sigma somewhat or highly successful — Ancillary

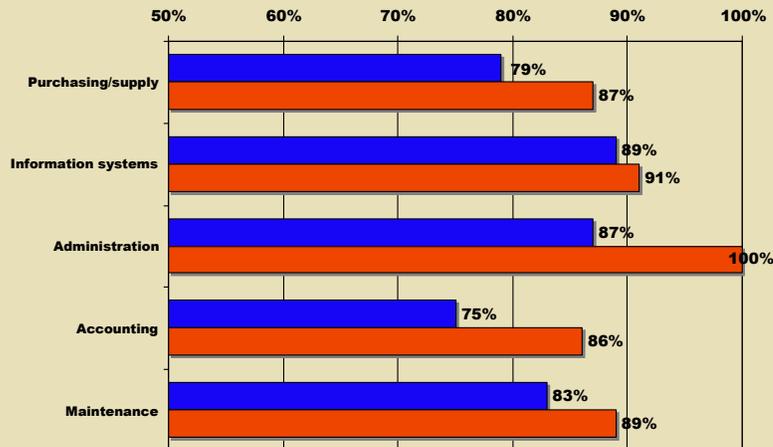
Deployment efforts somewhat or highly successful in departments/areas where Lean and/or Six Sigma was deployed:





Lean and Six Sigma somewhat or highly successful — Non-clinical

Deployment efforts somewhat or highly successful in departments/areas where Lean and/or Six Sigma was deployed:



Is Lean and/or Six Sigma providing benefit?

- Most hospitals are seeing some benefit (“somewhat” or “highly” successful) from their Lean and/or Six Sigma deployments
- Small sample sizes make it difficult to apply much granularity to this analysis
- Nonetheless, hospitals should be encouraged by ability to make an impact with small investment for entire hospital:
 - Lean \$25,000 (median)
 - Six Sigma \$96,485 (median)
- Note: Success-rate percentages are based on departments/areas where deployment has occurred



Does Lean and/or Six Sigma affect hospital-wide performance?

- *ASQ Hospital Study* also sought data on variety of operations and financial measures (e.g., length of stay, operating margin)
- Correlating Lean and/or Six Sigma with hospital-wide improvement was equivocal and complicated by:
 - Small percentages/sample of deployment hospitals
 - Smaller percentages/sample of “moderate” or “full” deployment hospitals in which enterprise improvement would be expected
 - Some hospitals, especially those without Lean and/or Six Sigma, don’t track some metrics (e.g., 27% do not track formal patient complaints as a percentage of admissions)
- Questions:
 - Would deeper and broader levels of deployment lead to expected performance measures/improvements?
 - What if hospitals without Lean and/or Six Sigma tracked all the measures and provided answers to the Study?
 - What if other hospitals — those unaware of Lean and/or Six Sigma — had participated in the Study?



Q&A

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