

# Utilizing Lean / Six Sigma in Healthcare

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# Introduction: The Evolution of Healthcare Quality

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# Foundation of Medicine

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- American Revolution (1775-1883)
- Approximately 10% of Physicians with Formal Medical Training
  - 6-8 Months of Medical School
  - 3 Year Apprenticeship



# Industrial Revolution (1760-1840)

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- Mass production and repetitive work practices were instituted.
- Aim was to produce large numbers of the same goods in a faster amount of time
- Industrial Pioneers
  - Eli Whitney (December 8, 1765 – January 8, 1825)
  - Frederick Winslow Taylor (March 20, 1856 – March 21, 1915)
  - Karl Friedrich Benz (November 25, 1844 – April 4, 1929)
  - Henry Ford (July 30, 1863 – April 7, 1947)

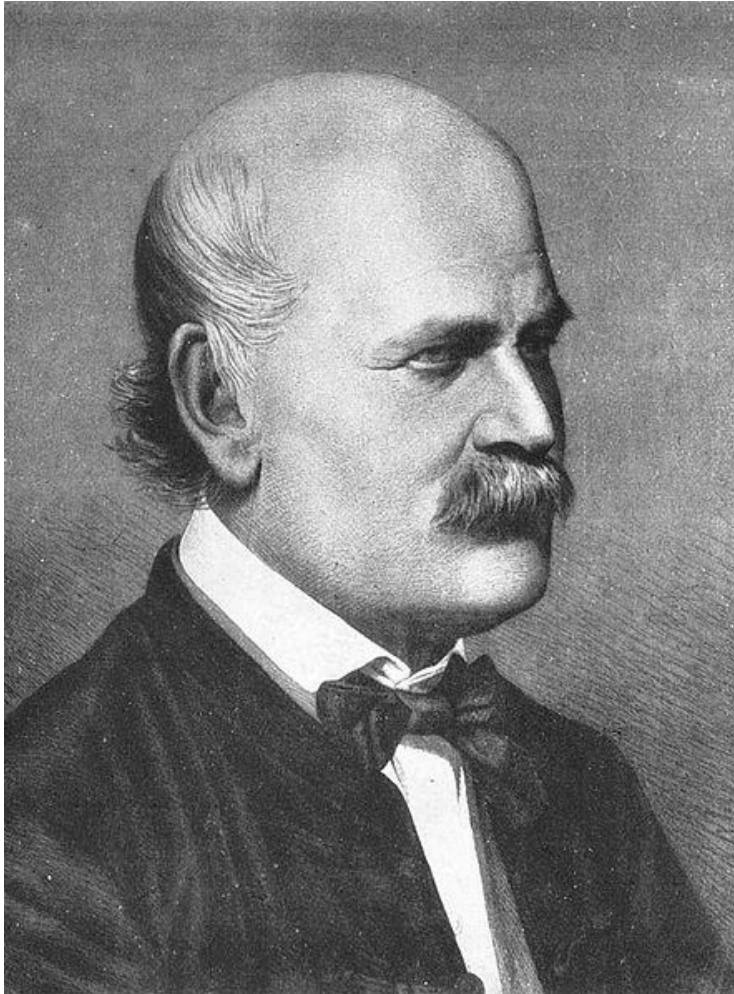
# 19<sup>th</sup> -20<sup>th</sup> Century Brings Change

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- 1847 – American Medical Association Formed
- 1910 - Abraham Flexner's *Report to the Carnegie Foundation*
  - “Deplorable state of the nation’s medical schools and major hospitals” (Luce, Bindman, & Lee, 1994)
- 1910 - Ernest Codman
  - Improve hospital conditions
  - Track patient’s outcomes

# Ignaz Philipp Semmelweis

July 1, 1818 – August 13, 1865



- Early Pioneer of Aseptic Procedures
- Reduce infections in obstetric clinics by utilizing hand disinfection
- Father of Infection Prevention

Photo Retrieved from:

[http://en.wikipedia.org/wiki/Ignaz\\_Semmelweis](http://en.wikipedia.org/wiki/Ignaz_Semmelweis)

# Florence Nightingale

May 12, 1820 – August 13, 1910

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- Social reformer and statistician
- Founder of modern nursing after taking care of wounded soldiers in the Crimean War
- Hand Hygiene



Photo Retrieved  
from:[http://en.wikipedia.org/wiki/Florence\\_Nightingale](http://en.wikipedia.org/wiki/Florence_Nightingale)

# Minimum Standards

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- 1917 - American College of Surgeons (ACS)
- 5 Standards for Care (Luce, et. al. 1994)
  1. *Organizing hospital medical staffs*
  2. *Limiting staff membership to well-educated, competent and licensed physicians and surgeons*
  3. *Framing rules and regulations to ensure regular staff meetings and clinical review*
  4. *Keeping medical records that included the history, physical examination, and laboratory results*
  5. *Establishing supervised diagnostic and treatment facilities such as clinical laboratories and radiology departments*



# Walter A. Shewhart (1891-1967)

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- 1924 Shewhart created a method for quality control for production: Statistical Process Control (SPC)
- Types of Variation
  - Assignable Cause Variation
  - Chance Cause Variation
- Control Chart
  - Importance of reducing variation in a manufacturing process
  - Continual process-adjustment in reaction to non-conformance actually increased variation and degraded quality
- Problem Solving Methodology: Plan-Do-Check-Act (PDCA)

# Hospital Quality Assessment

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- 1918 – ACS begins to inspect hospitals on the minimum standards
- 1952 - The Joint Commission on Accreditation of Hospitals Formed
- 1966 – Avedis Donabedian “*Evaluating the Quality of Medical Care*” (Donabedian, 1966)
  - Who provides care and where – Structure
  - How care is provided – Process
  - Consequences of care - Outcome

# Federal Regulations

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- 1906 - Food and Drug Administration
  - Regulations on medications
- 1935 - Social Security Act
  - Standards for maternal and children's services
- 1946 Hospital Survey and Construction Act (Hill-Burton)
  - Minimum code for new structures built with federal assistance
- 1965 – Title XVIII of the Social Security Act
  - Medicare Part A (Hospital Insurance) and Part B (Medical Insurance)

# W. Edwards Deming (1900-1993)

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- 1950's - Taught SPC to Japanese business leaders after World War II
- Out of the Crisis (1982)
- 14 Points
- Sources of Variation
  - Common Cause Variation
  - Special Cause Variation
- Problem Solving Methodology: Plan-Do-Study-Act (PDSA)

# Lean / Six Sigma

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- Philip Crosby (1926-2001)
  - Zero defects approach to quality improvement
  - Price for nonconformance
  - Prevention costs
- Toyota's Lean Enterprise (1980's)
- Motorola's Six Sigma (Late 1980's)



## Late 20<sup>th</sup> Century in Healthcare Quality

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- 1986 – Health Care Quality Improvement Act
  - National Practitioner Data Bank
- 1987 – The Joint Commission Agenda for Change (Radawski, 1999)
- 1991 – National Healthcare Quality Assurance (NCQA)
  - Healthcare Effectiveness Data and Information Set (HEDIS)

# Institute of Medicine (IOM)

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- 1999 – *To Err is Human: Building A Safer System* (Institute of Medicine, 1999)
  - Safety gaps in US healthcare
  - 98,000 deaths each year to preventable medical errors
- 2001 – *Crossing the Quality Chasm: A New Health System for the 21<sup>st</sup> Century* (Institute of Medicine, 2001)
  - Consistent, high-quality medical care to all people



## 6 Aims for Improvement

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The health system frequently lacks “...the environment, the processes, and the capabilities needed to ensure that the services are safe, effective, patient-centered, timely, efficient and equitable.”  
(Institute for Medicine, 2001)





# High Reliability in Healthcare

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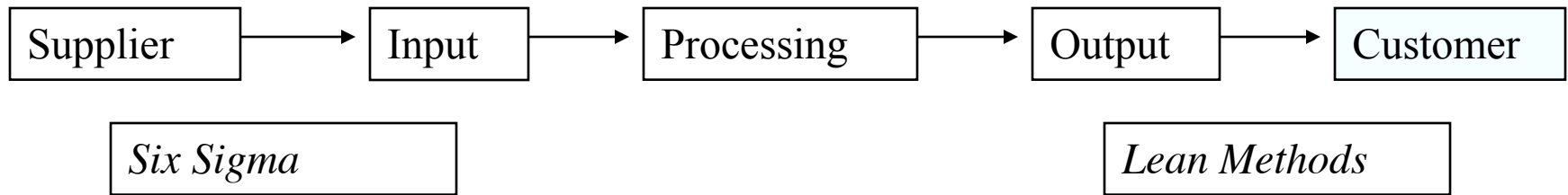
- Consistency in Performance
- Studying Organizational Culture
  - Leadership
  - Safety Culture
  - Robust Process Improvement

# Lean/Six Sigma at Spartanburg Regional Healthcare System

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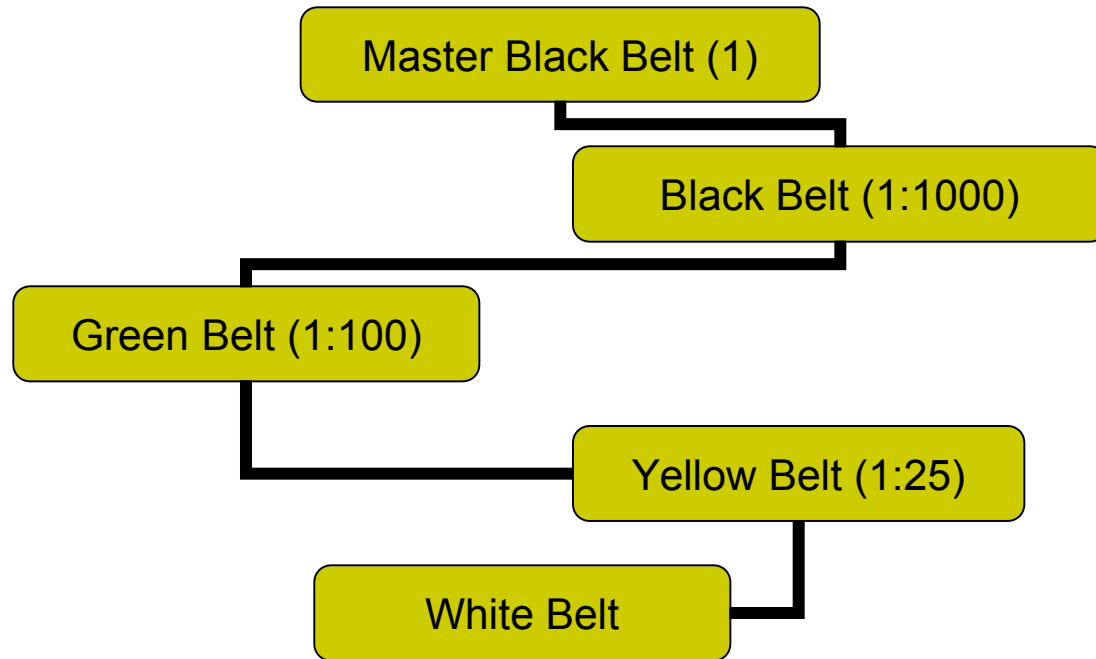
# Value Stream

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# Standard LSS Hierarchy/Ratios

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# SRHS Framework

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- Decentralized Model
  - 1 Master Black Belt
  - 6 Black Belts
  - 98 Green Belts
  - 325 Yellow Belts
- Green Belt Led Teams
- Black Belts Manage 3-5 Teams
- Education Completed in House



# SRHS Case Study

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- Who Owns Infection Prevention?
  - History of Infection Prevention
  - Outcomes Based
  - Specified Roles and Responsibilities
  
- What role does staff play in Infection Prevention?



# Viewing Infection Prevention as a Process

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- How Do We Impact the Outcome??
  
- Ultimately, Infection Prevention is a **PROCESS!!!**



# Process Measures Versus Outcomes

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- Types of Data
  - Qualitative
  - Quantitative
- Turn Around Time





# Central Line Maintenance Team

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- Define: Current state
- Measure: Data collection and validation of current state metrics
- Analyze: Defect detection
- Improve: Pilot communication and timely documentation
- Control: Hand back improvements to the champion with a measurement method to sustain the improvement



# CL Team Results

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- Utilization of technology to drive improvements and sustained achievement
- Decreased Central Line Associated Blood Stream Infection (CLABSI) rate
- Decreased variation in timeliness of documentation
- Electronic Hospital Infection Disclosure Act (HIDA) validation
- SRMC better than the US National Average of CLABSI's

# Future of Public Policy

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# Fusion of Infection Prevention and Quality

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- ❑ Healthcare associated infection measures are part of the Inpatient Quality Reporting (IQR) program under the Federal Inpatient Prospective Payment System (IPPS)
- ❑ Making the switch from outcomes to process
- ❑ Driving the improvements to the bedside caregivers
- ❑ Proactive approach to improving infection rates

# Using Health Information Technology to Drive Improvement

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- ❑ Electronic Health Record (EHR) Rule for Meaningful Use
- ❑ Value Based Purchasing (VBP)
- ❑ ICD-10 (International Classification for Diseases)
- ❑ National Healthcare Safety Network for Data Collection
- ❑ Quality Data Model (QDM)

Questions?

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# References

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- Chassin, Mark R. & Loeb, Jerod M. (2011) *The Ongoing Quality Improvement Journey: Next Stop, High Reliability*, Health Affairs. 30(4): 559-568.
- Donabedian, Avedis. (1966) *Evaluating the Quality of Medical Care*, The Millbank Quarterly. 44(2): 166-203.
- Luce, John, M. Bindman, Andrew B. & Lee, Philip, R. (1994) *A Brief History of Health Care Quality Assessment and Improvement and the United States*, West J Med. 160: 263-268.
- Radawski, Dan. (1999) *Continuous Quality Improvement: Origins, Concepts, Problems and Applications*, Perspective of Physician Assistant Education. 10(1): 12-16.