



# Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections

## Dr. Leo Celi, Harvard Medical School

Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)


Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections

Leo Anthony Celi, MD, MS, MPH  
 Harvard-MIT Health Sciences & Technology Division  
 Department of Pulmonary, Critical Care & Sleep Medicine, Beth Israel  
 Deaconess Medical Center, Harvard Medical School

2010 CONFERENCE  
 BACK TO THE FUTURE  
 Castle Theatre Complex  
 University of Otago  
 Dunedin

29th  
 INFECTION CONTROL

Teleclass Sponsored by  
  
[www.jnj.com](http://www.jnj.com)


September 2, 2010

### Important Caveats

- My caregivers: no intentions to give me a compartment syndrome or surgical site infection
- BUT the system was designed to give me these complications.

*Every system is perfectly designed to achieve the results that it gets.*

Donald Berwick



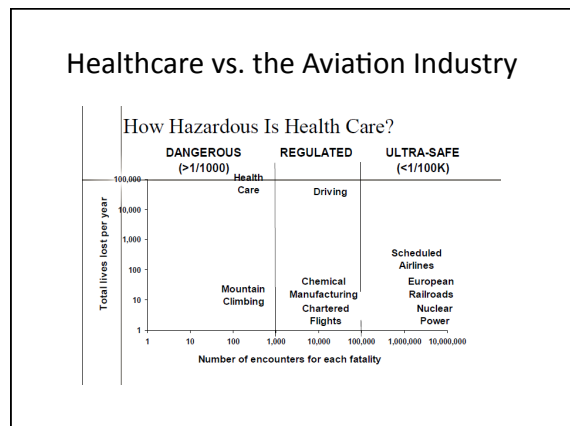
### The Extent of Medical Injury (per 100 hospital admissions)

- Australia 1994 13%
- United Kingdom 2000 11%
- New Zealand 2001 11%
- Denmark 2001 9%
- France 2002 15%

- US: 1.7 million hospital-acquired infections  
 99,000 deaths

### The Paradox of Healthcare

Well-trained workers  
 +  
 Altruistic motivations  
 +  
 Advances in science and technology  
 =  
 Shortfalls in quality



Broadcast Live from the 2010 New Zealand NDICN Conference [www.infectioncontrol.co.nz](http://www.infectioncontrol.co.nz)  
 A Webber Training Teleclass  
[www.webbertraining.com](http://www.webbertraining.com)


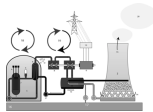
**Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections**  
**Dr. Leo Celi, Harvard Medical School**  
**Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)**

**Patients are Not Airplanes**

- Anaesthesia: 1 death per 200,000 cases  
25x more dangerous than flying
- More than 155,000 possible diagnoses, more than 7,800 possible interventions
- BUT industries of high intrinsic hazards are also complicated (and yet much safer)!
- Main difference: organization and design


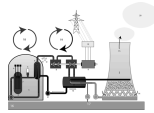
**Healthcare vs.**  
**Other High Risk Industries**

- Healthcare organized around guilds (doctors, nursing, pharmacy) and specialties
- “Design” is a result of historical, political and economic forces, not the analytical consideration of how to achieve the best results.


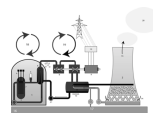
**Healthcare vs.**  
**Other High Risk Industries**

- Focused on integrating new discoveries and disciplines into well-harmonized systems
- Distinct roles for those whose responsibility is ensuring that pieces come together well


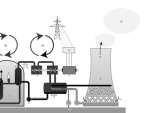
**Healthcare vs.**  
**Other High Risk Industries**

- Relentlessly rigorous in identifying when their designs are inadequate
- Constantly look out for unanticipated outcomes
- Detecting errors and converting them into expertise are crucial to operations.

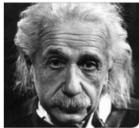
**Healthcare vs.**  
**Other High Risk Industries**

- Quality, when it occurs, is due to acts of near heroism.
- Nurses are expected to constantly make do and work around to “get the job done”.
- We fight the same battles everyday and achieve little headway in making things better.

*The definition of insanity is continuing to do the same thing over and over again and expecting a different result.*

Albert Einstein



**Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections**  
**Dr. Leo Celi, Harvard Medical School**  
**Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)**

**Infection Control is a Safety Issue**

- Medication errors and hospital-acquired infections constitute the majority of adverse events.
- 5-10% of patients acquire infection while in the hospital, and the risks have steadily increased during recent decades (Jarvis, 2001)
- 5-10% of hospital-acquired infections occur in clusters or outbreaks (Gaynes, 2001)

**Epidemiology of  
Hospital-Acquired Infections**

- Four types account for the majority
- 1/4 are acquired in the ICU, close to 70% due to bacteria resistant to one or more antibiotics (Eggimann, 2001)
- Current incidence of CLABSI is nearly 3x the incidence in 1975 (Wenzell, 2001)
- UTIs and SSIs increasingly develop after discharge due to decreases in length of hospital stay and are not routinely "captured"

**Infection Control is a Safety Issue**

- Hospital-acquired infections are NOT unfortunate, inevitable consequences of medical procedures.

*Our processes are designed to infect the patients who develop hospital-acquired infections.*

Leo Anthony Celi



How did we get here?

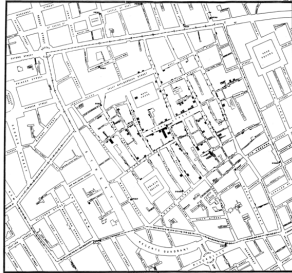
160 Years Ago



**Broadcast Live from the 2010 New Zealand NDICN Conference [www.infectioncontrol.co.nz](http://www.infectioncontrol.co.nz)**  
**A Webber Training Teleclass**  
**[www.webbertraining.com](http://www.webbertraining.com)**

**Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections**  
**Dr. Leo Celi, Harvard Medical School**  
**Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)**

160 Years Ago



Today

- About 275 patients die a day in US hospitals from hospital-acquired infections
- Majority of these infections are from drug-resistant bacteria.



*Listen, Ethel, I think we're fighting a losing game.*



### Sensemaking in Infection Control

- Sensemaking is the process through which the world is given order, within which people can orient themselves, find purpose and take effective action.

### Berwick's Preconditions for Sensemaking

1. We need to face reality.

The challenge is not to develop better ways of detecting hospital-acquired infections or inappropriate antibiotic use but have the courage to regard them as medical errors without demoralising the doctors and nurses trapped in our bad systems.

# Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections

Dr. Leo Celi, Harvard Medical School  
Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)

## Berwick's Preconditions for Sensemaking

- We drop our current tools. They are not doing the job. We can't get to where we need to go if we hold on to our current workflows.

Reporting system  
Employee vaccination  
Antibiotic use  
Handwashing campaign

## Berwick's Preconditions for Sensemaking

- We have to talk to each other, and listen.

Sensemaking is an enterprise of interdependency, and the currency of interdependency is conversation.

Healthcare can't continue to be every guild for itself (doctors, nurses, pharmacists, managers, etc.) and every specialty for itself.

## Berwick's Preconditions for Sensemaking

- Leadership

Effective leaders abandon outmoded traditions and theories on quality being about motivation and "trying harder".

They disavow perfection to encourage openness, and build and engage teams across guilds and specialties.



The screenshot shows the 'BIDMC PORTAL' with a 'QUALITY & SAFETY' dashboard. It includes a table with columns for 'DOMAIN / METRIC', 'FY10 TARGET', 'Q1 FY10', 'Q2 FY10', and 'TARGET STATUS @ Q2 FY10'. Below the table are 'Other measures of Patient Safety' and a 'Report a Fall Incident' form.

DOMAIN / METRIC	FY10 TARGET	Q1 FY10	Q2 FY10	TARGET STATUS @ Q2 FY10
Hand Hygiene Compliance: ICU Units % Compliant	90%	83%	85%	Below Target
Hand Hygiene Compliance: Med/Surg Units % Compliant	90%	81%	79%	Below Target
Cases of Serious Preventable Harm	0	27	34	Below Target
Readmissions Within 30 Days: % of Discharges	14.5%	15.2%	15.2%	Below Target

Other measures of Patient Safety:

- Most Recent Hand Hygiene Compliance Report: ICU Units
- Most Recent Hand Hygiene Compliance Report: Med/Surg Units
- Pressure Ulcers & Falls
- Infection Prevention
- Nursing Unit Based Dashboards

## Infection Control is a Safety Issue

- Infection control is the responsibility of the entire hospital, and not just the infection control practitioners.

Broadcast Live from the 2010 New Zealand NDICN Conference [www.infectioncontrol.co.nz](http://www.infectioncontrol.co.nz)  
A Webber Training Teleclass  
[www.webbertraining.com](http://www.webbertraining.com)

**Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections**  
**Dr. Leo Celi, Harvard Medical School**  
**Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)**

**Industrial Tools for Infection Control**

- Total Quality Management
- Lean

**Total Quality Management**

Assumptions:

1. Cost of poor quality is greater than the cost of developing systems that guarantee quality.
2. Employees primarily want to do good quality work.
3. Quality problems typically cross functional lines.
4. Quality is the responsibility of senior management.

**Total Quality Management**

Tactics:

1. Define and measure customer requirements.
2. Create supplier partnerships.
3. Use cross-functional teams.
4. Apply scientific method to improving performance.
5. Use management principles to enhance team effectiveness at process design and improvement.

**Total Quality Management**

Tools:

- Control chart
- Flow diagram
- Brainstorming sessions
- Pareto chart
- Fishbone diagram

**Total Quality Management**

- Adopted in the US in the 1990s
- Skepticism grew as evidence accumulated that quality did not improve despite TQM
- Reasons for failure:
  - Lack of senior management commitment and skill
  - No physician buy-in
  - Emphasis on top-down management not well-suited to healthcare

*“TQM was a bunch of administrative teams meeting, deciding on new processes or better ways of doing things, and handing it down to the rest of us.”*

**Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections**  
**Dr. Leo Celi, Harvard Medical School**  
**Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)**

**Lean**

- Based on Toyota Production System
- Eliminate *muda* – waste of time, material, space, movement, any activity that consumed resources but added no value to the customer.
- Improve production flow by mapping out and standardising processes, and using teamwork to identify and address any defects in the flow.



**Lean**

- *Kaizen* – continuous and incremental improvement
- Emphasis on the role of the frontline worker in process improvement
- Toyota: employees generate ~999,000 ideas annually – 90% of which are implemented



**Lean**

- Value-stream mapping – visually mapping the flow of information and materials through all production steps
- “Unless you understand the steps, you cannot see the waste, the defects, the opportunities for improvement.”*



**Lean in Infection Control**

- 1990s: hand washing compliance rates of 29-48%
- Infection control practitioners held responsible for holding infection rates down



**Lean in Infection Control**

- 2001 – 2004: VA Pittsburgh Healthcare System adapted principles of Toyota Production System to reduce MRSA transmission
- 70% drop in MRSA infections in the surgical ward



**Lean in Infection Control**

- Improvement did not spread beyond the pilot sites
- Cost of expanding programme to the rest of the hospital prohibitive
- Involvement of frontline staff still low



**Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections**  
**Dr. Leo Celi, Harvard Medical School**  
**Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)**

**Holy Grail of Quality Improvement**

- Is there an innovative approach that can promote and sustain cultural change that is
  - More people-driven
  - More sustainable
  - Less resource-intensive

**Positive Deviance**

- Behaviour and social change strategy
- Based on the observations of nutrition professor Marian Zeitlin
- There are well-nourished kids even among the poorest communities : “positive deviants”
- Identify what these families are doing right and amplify it rather than fixing what’s wrong with the community

**Positive Deviance**

- Save the Children’s Jerry and Monique Sternin operationalised the concept as a tool to promote behaviour and social change



**Positive Deviance**

- Problem: >65% of Vietnamese children are malnourished
- Traditional supplemental feeding programmes unable to sustain weight gains after the programmes ended

**Positive Deviance**

- Sternins sat with families to learn from them through discussions and observations
- Process
  - Enabled the community to define the problem
  - Uncovered current attitudes and feeding behaviours

**Positive Deviance**

- Villagers created their own growth charts and “discovered” well-nourished kids among them
- Parents kept these kids well-fed through “unusual” behaviours:
  - Went out to rice paddies every morning to gather fresh water shrimp, crabs and sweet potato greens
  - These foods were abundant but misconceived by the community to be inappropriate for young children



**Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections**  
**Dr. Leo Celi, Harvard Medical School**  
**Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)**

**Positive Deviance**

- Sternins encouraged villagers to *design* a plan to enable families with malnourished kids to learn the new practices
- Learning and resource families went to rice paddies, prepared meals and fed their kids together

**Positive Deviance**

*"It is easier to act your way to a new way of thinking than to think your way to a new way of acting."*



**Positive Deviance**

- Sustained 65-80% reduction in childhood malnutrition in Vietnamese communities
- Increase in primary school student retention in Misiones, Argentina
- Reduction in girl trafficking in East Java, Indonesia
- Decrease in neonatal deaths and sickness in Pashtun, Pakistan

**Positive Deviance  
and Infection Control**

- 2005: Jerry Sternin introduced Positive Deviance to VA Pittsburgh Healthcare System to scale initiative to reduce MRSA
- "There are hundreds of experts here. The key is recognising that the solutions exist among the staff and the patients."*

**Positive Deviance and Infection Control:  
The Strategy**

- 2 facilitators "sat at the feet" of >1000 "touchers" - including nurses, doctors, housekeeping, dietary workers, pastoral care givers, visitors – and patients
- Local behaviours, strategies, and ideas for prevention were elicited
- Allowed staff from wards with high MRSA rates to observe in wards with low MRSA rates

**Positive Deviance  
and Infection Control**

- Hundreds of participants from all disciplines created thousands of penny solutions
  - Front-line staff discovered, analyzed, designed and implemented newly crafted strategies
- "Because the staff owns the solutions they propose, they complied with them."*

# Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections

Dr. Leo Celi, Harvard Medical School  
Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)

## Positive Deviance and Infection Control

- Patients with MRSA were seen last during rounds
- ICU nurses disinfects patients' side rails several times during a shift
- Consultants decide to stop wearing ties, white coat and long sleeves

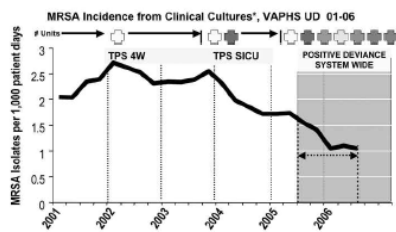
## Positive Deviance and Infection Control

- MRSA information broadly shared among hospital units
- Every unit receives its hand washing adherence rate regularly
- Patient-produced brochure, *A Guide to MRSA: A simple way to shorten your stay*

*"MRSA results from failure of the hospital, NOT the patient."*

## Positive Deviance and Infection Control

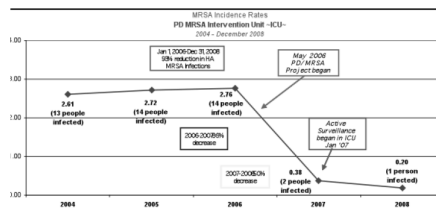
- Hospital-wide reduction of more than 50% in MRSA infection rates that has continued to the present time



## Positive Deviance and Infection Control

- Robert Wood Johnson Foundation funded Positive Deviance/MRSA prevention initiatives in 6 hospitals from 2006-2008
- Aggregate decline in MRSA infection rates was 72% with rate decreases from 53-85%
- Massachusetts Coalition for the Prevention of Medical Errors launched a 29-hospital collaborative to reduce *C. difficile* infection using Positive Deviance on 24 June 2010.

## Positive Deviance and Infection Control



## Positive Deviance and Infection Control

- New behaviours came from within rather than imposed from the outside.
- Solutions were owned by the people, not imported by outside experts.
- Focus not on eliminating errors and defects, but on what is going right and providing the framework to do more of it

Broadcast Live from the 2010 New Zealand NDICN Conference [www.infectioncontrol.co.nz](http://www.infectioncontrol.co.nz)  
A Webber Training Teleclass  
[www.webbertraining.com](http://www.webbertraining.com)

# Creating a Culture of Quality and Safety to Reduce Hospital-Acquired Infections

## Dr. Leo Celi, Harvard Medical School

Sponsored by Johnson & Johnson Medical [www.jnj.com](http://www.jnj.com)

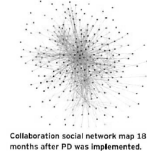
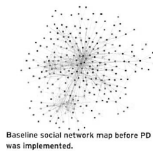
### Positive Deviance and Infection Control

- Infection control practitioners: from having sole responsibility for infection control to providing support and technical assistance for staff-initiated improvements
- MRSA prevention became the focal point for unlikely partners – multi-disciplinary clinical staff, clerical staff, patients and families

### Positive Deviance and Infection Control

- Brought many more people into the MRSA prevention initiative
- Fostered many new working relationships
- Greatly enhanced connectivity among people within units and throughout the hospital

### Networks from Positive Deviance



*Go to the people. Live with them. Learn from them. Love them. Start with what they know. Build with what they have. But with the best leaders, when the work is done, the task accomplished, the people will say "We have done this ourselves".*

Lao Tzu



**2010 SOUTH PACIFIC TELECLASS SERIES**

**17 FEB. 10**  
**INFLUENZA H1N1 – THE SOUTHERN HEMISPHERE EXPERIENCE**  
**SPEAKER: DR. LANCE JENNINGS, NEW ZEALAND**

**21 APR. 10**  
**MRSA – THE PATIENT EXPERIENCE**  
**SPEAKER: DR. RUTH BARRATT, NEW ZEALAND**

**9 JUN. 10**  
**FROM OBSCURITY TO "SUPERBUG": THE RISE OF CLOSTRIDIUM DIFFICILE INFECTION**  
**SPEAKER: DR. TOM RILEY, AUSTRALIA**

**1 SEP. 10**  
**LIVE BROADCAST FROM THE NEW ZEALAND INFECTION CONTROL CONFERENCE**  
**SPEAKER: DR. LEO CELI, UNITED STATES**

**13 OCT. 10**  
**INFECTION CONTROL IN THE TROPICS**  
**SPEAKER: DR. CLAIRE BOARDMAN, AUSTRALIA**

[www.webbertraining.com/schedulep1.php](http://www.webbertraining.com/schedulep1.php)

[www.infectioncontrol.co.nz](http://www.infectioncontrol.co.nz)

**THE ROAD TO EFFECTIVE INFECTION CONTROL**

NEW ZEALAND | RESOURCES | PEOPLE | EVENTS | LITERATURE | PUBLICATIONS | SUBSCRIBE | ABOUT US | HOME

**have mail haere mail haere mail**

Ngā mahara huarangi, ngā rangitira me, hira kōwhiri, haere mai.

Visitors from afar, respected guests, greetings to you all and welcome.

He pūta huarangi  
 he pūta rangitira mai,  
 a hira a hira.

A large single purpose group will not be formed.

**The NZND National Division of Infection Control Nurses**

The NZND was formed as a special interest section of the New Zealand Nurses Organisation some 30 years ago, in the 1970s.

From small beginnings when the role of an Infection Control Nurse was a pioneer role within nursing and related health care programmes were unattached into health care organisations to the current day.

Today we boast a large membership and have many highly skilled infection prevention & control nurses amongst us. The infection prevention & control nurse role has evolved into a highly specialised role with a job description scope that covers almost all aspects of health care delivery.

New Zealand infection prevention & control programmes are supported formally through the New Zealand Division NZNDIA 51008.

The NZNDIA holds an annual Conference and accompanying Annual General Meeting. The Division is represented by its National Coordinator which meets regularly to conduct Division business. (See <http://www.infectioncontrol.co.nz/2008/08/08/> for the current constitution)

**INFECTION CONTROL**

**NEW ZEALAND NURSES**

**Broadcast Live from the 2010 New Zealand NDICN Conference [www.infectioncontrol.co.nz](http://www.infectioncontrol.co.nz)**  
**A Webber Training Teleclass**  
**[www.webbertraining.com](http://www.webbertraining.com)**