

- **Safe Surgery Saves Lives**

***USE OF SURGICAL CHECKLIST  
TO REDUCE POST-OP  
COMPLICATIONS***

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# Error is Inevitable Because of Human Limitations

- Limited memory capacity – 5-7 pieces of information in short term memory
- Negative effects of stress – error rates
- Tunnel vision
- Negative influence of fatigue and other physiological factors
- Limited ability to multitask

# The Faces of Harm





# Evidence that checklist works



## The NEW ENGLAND JOURNAL of MEDICINE

### **An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU**

*Peter Pronovost, Dale Needham, Sean Berenholtz, David Sinopoli, et al.* *The New England Journal of Medicine*. Boston: Dec 28, 2006. Vol. 355, Iss. 26; pg. 2725, 9 pgs

#### **Abstract (Summary)**

Catheter-related bloodstream infections occurring in the intensive care unit (ICU) are common, costly, and potentially lethal. We conducted a collaborative cohort study predominantly in ICUs in Michigan. An evidence-based intervention was used to reduce the incidence of catheter-related bloodstream infections. Multilevel Poisson regression modeling was used to compare infection rates before, during, and up to 18 months after implementation of the study intervention. Rates of infection per 1000 catheter-days were measured at 3-month intervals, according to the guidelines of the National Nosocomial Infections Surveillance System. A total of 108 ICUs agreed to participate in the study, and 103 reported data. The analysis included 1981 ICU-months of data and 375,757 catheter-days. The median rate of catheter-related bloodstream infection per 1000 catheter-days decreased from 2.7 infections at baseline to 0 at 3 months after implementation of the study intervention ( $P \leq 0.002$ ), and the mean rate per 1000 catheter-days decreased from 7.7 at baseline to 1.4 at 16 to 18 months of follow-up ( $P < 0.002$ ). The regression model showed a significant decrease in infection rates from baseline, with incidence-rate ratios continuously decreasing from 0.62 (95% confidence interval [CI], 0.47 to 0.81) at 0 to 3 months after implementation of the intervention to 0.34 (95% CI, 0.23 to 0.50) at 16 to 18 months. An evidence-based intervention resulted in a large and sustained reduction (up to 66%) in rates of catheter-related bloodstream infection that was maintained throughout the 18-month study period.



# The Checklist and Communication

## ORIGINAL ARTICLE

### Evaluation of a Preoperative Checklist and Team Briefing Among Surgeons, Nurses, and Anesthesiologists to Reduce Failures in Communication

Lorelei Lingard, PhD; Glenn Regehr, PhD; Beverley Orser, MD, PhD; Richard Reznick, MD, MEd; G. Ross Baker, PhD; Diane Doran, RN, PhD; Sherry Espin, RN, PhD; John Bohnen, MD; Sarah Whyte, MA

**Objective:** To assess whether structured team briefings improve operating room communication.

**Design, Setting, and Participants:** This 13-month prospective study used a preintervention/postintervention design. All staff and trainees in the division of general surgery at a Canadian academic tertiary care hospital were invited to participate. Participants included 11 general surgeons, 24 surgical trainees, 41 operating room nurses, 28 anesthesiologists, and 24 anesthesia trainees.

**Intervention:** Surgeons, nurses, and anesthesiologists gathered before 302 patient procedures for a short team briefing structured by a checklist

comes were the number of checklist briefings that demonstrated “utility” (an effect on the knowledge or actions of the team) and participants’ perceptions of the briefing experience.

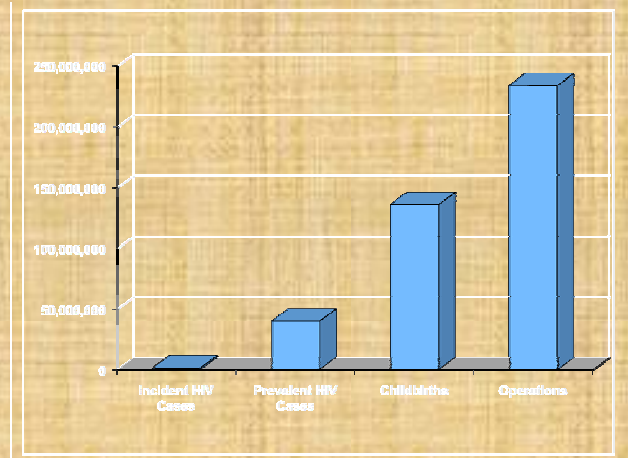
**Results:** One hundred seventy-two procedures were observed (86 preintervention, 86 postintervention). The mean (SD) number of communication failures per procedure declined from 3.95 (3.20) before the intervention to 1.31 (1.53) after the intervention ( $P < .001$ ). Thirty-four percent of briefings demonstrated utility, including identification of problems, resolution of critical knowledge gaps, decision-making, and follow-up actions.



## 3 Central Problems in Surgical Safety

1. Unrecognized as a public health issue
2. Lack of data on surgery and outcomes
3. Failure to use existing safety know-how

# Problem 1: Unrecognized as public health issue



234 million operations are done globally each year

Source: Weiser, Lancet 2008.



# Problem 1: Unrecognized as public health issue (cont.)

- Burden of surgical disease is increasing worldwide
  - Cardiovascular disease
  - Traumatic injuries
  - Cancer
  - Longer life expectancies



# Problem 1: Unrecognized as public health issue (cont.)

- Known surgical complications of 3-16%

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At least 7 million disabling complications – including 1 million deaths – worldwide each year

- Known death rates of 0.4-0.8%

## Problem 2: Lack of Data on Surgery and Outcomes

- Improvements in maternal mortality depended on routine surveillance
- Such surveillance is lacking for surgical care



## Problem 3: Failure to use existing safety know-how

- High rates of preventable surgical site infection result from inconsistent timing of antibiotic prophylaxis
- Anesthetic complications are 100-1000x higher in countries that do not adhere to monitoring standards
- Wrong-patient, wrong-site operations persist despite high publicity of such events

# The Safe Surgery Saves Lives Strategy

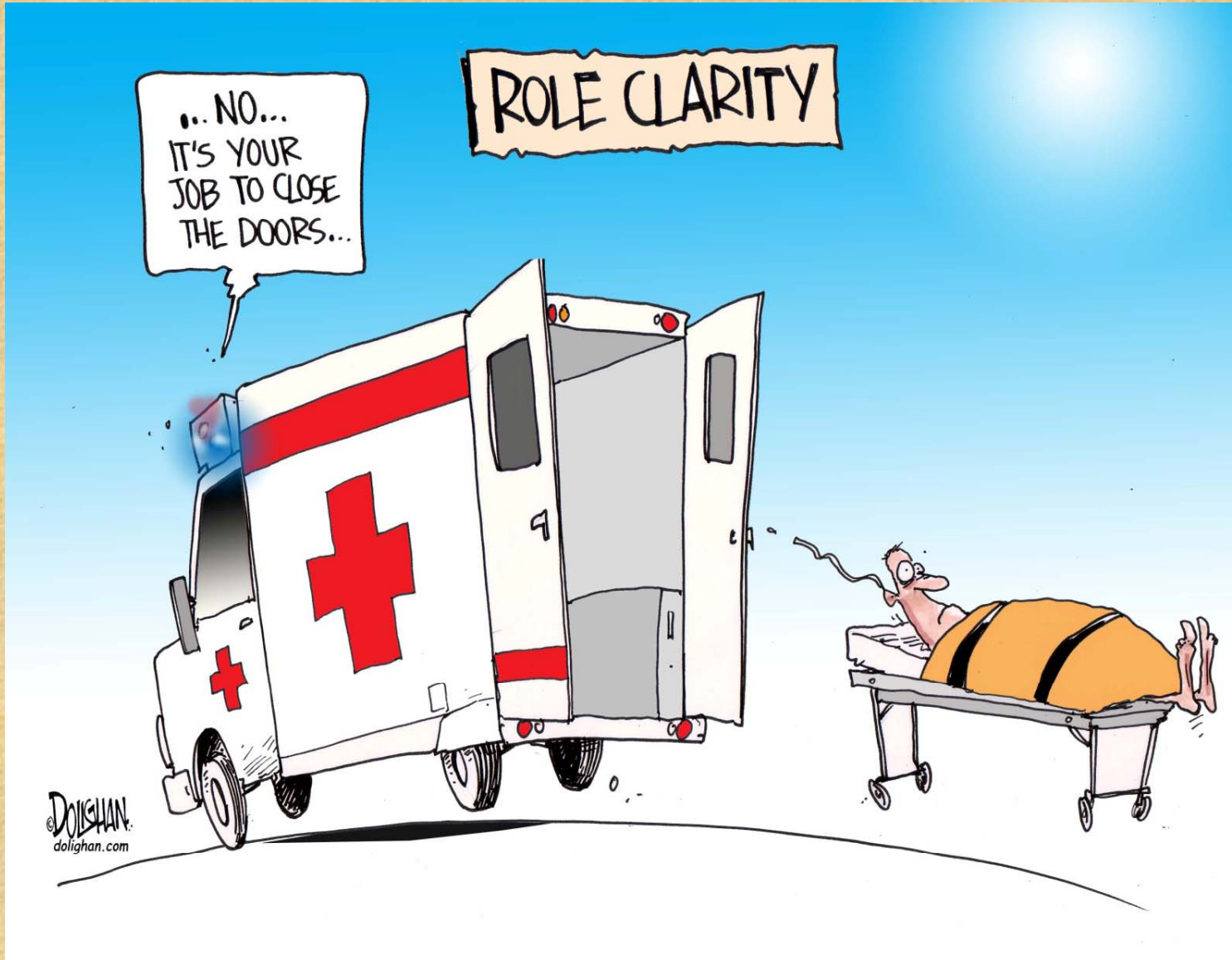
1. Promotion of surgical safety as a public health issue
2. Creation of a checklist to improve the standards of surgical safety
3. Collection of “Surgical Vital Statistics”



# WHO's 10 Objectives for Safe Surgery

1. The team will operate on the correct patient at the correct site.
2. The team will use methods known to prevent harm from administration of anaesthetics, while protecting the patient from pain.
3. The team will recognize and effectively prepare for life-threatening loss of airway or respiratory function.
4. The team will recognize and effectively prepare for risk of high blood loss.
5. The team will avoid inducing an allergic or adverse drug reaction for which the patient is known to be at significant risk.

# Doors closed? Checked!





**Slide 14**

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**p1**

This slide needs to be referenced if we use it. I believe it was developed by CHSRF.

pbeard, 6/16/2009

# Findings published on January 2009

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

## A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population

Alex B. Haynes, M.D., M.P.H., Thomas G. Weiser, M.D., M.P.H.,  
William R. Berry, M.D., M.P.H., Stuart R. Lipsitz, Sc.D.,  
Abdel-Hadi S. Breizat, M.D., Ph.D., E. Patchen Dellinger, M.D.,  
Teodoro Herbosa, M.D., Sudhir Joseph, M.S., Pascience L. Kibatala, M.D.,  
Marie Carmela M. Lapitan, M.D., Alan F. Merry, M.B., Ch.B., F.A.N.Z.C.A., F.R.C.A.,  
Krishna Moorthy, M.D., F.R.C.S., Richard K. Reznick, M.D., M.Ed., Bryce Taylor, M.D.,  
and Atul A. Gawande, M.D., M.P.H., for the Safe Surgery Saves Lives Study Group\*

# The Safe Surgery Saves Lives Strategy

1. Promotion of surgical safety as a public health issue
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# WHO's 10 Objectives for Safe Surgery

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5. The team will avoid inducing an allergic or adverse drug reaction for which the patient is known to be at significant risk.

## WHO's 10 Objectives for Safe Surgery (cont.)

6. The team will consistently use methods known to minimize the risk for surgical site infection.
7. The team will prevent inadvertent retention of instruments or sponges in surgical wounds.
8. The team will secure and accurately identify all surgical specimens.
9. The team will effectively communicate and exchange critical information for the safe conduct of the operation.
10. Hospitals and public health systems will establish routine surveillance of surgical capacity, volume and results.



# Reality Check

Currently, hospitals do MOST of the right things, on MOST patients, MOST of the time.

The Checklist helps us do ALL the right things, on ALL patients, ALL the time



A **checklist** is a type of informational job aid used to reduce failure by compensating for potential limits of human memory and attention. It helps to ensure consistency and completeness in carrying out a task. A basic example is the "to do list." A more advanced checklist would be a schedule, which lays out tasks to be done according to time of day or other factors.

# Advantages of Using a Checklist

- **Customizable** to local setting and needs
- **Supported** by evidence
- **Evaluated** in diverse settings around the world
- **Promotes** adherence to established safety practices
- **Minimal resources** required to implement a far-reaching safety intervention

# What is this tool that addresses the 10 objectives?

## Surgical Safety Checklist



World Health Organization

Patient Safety

A World Alliance for Safer Health Care

### Before induction of anaesthesia

(with at least nurse and anaesthetist)

Has the patient confirmed his/her identity, site, procedure, and consent?

- Yes

Is the site marked?

- Yes  
 Not applicable

Is the anaesthesia machine and medication check complete?

- Yes

Is the pulse oximeter on the patient and functioning?

- Yes

Does the patient have a:

Known allergy?

- No  
 Yes

Difficult airway or aspiration risk?

- No  
 Yes, and equipment/assistance available

Risk of >500ml blood loss (7ml/kg in children)?

- No  
 Yes, and two IVs/central access and fluids planned

### Before skin incision

(with nurse, anaesthetist and surgeon)

Confirm all team members have introduced themselves by name and role.

Confirm the patient's name, procedure, and where the incision will be made.

Has antibiotic prophylaxis been given within the last 60 minutes?

- Yes  
 Not applicable

#### Anticipated Critical Events

To Surgeon:

- What are the critical or non-routine steps?  
 How long will the case take?  
 What is the anticipated blood loss?

To Anaesthetist:

- Are there any patient-specific concerns?

To Nursing Team:

- Has sterility (including indicator results) been confirmed?  
 Are there equipment issues or any concerns?

Is essential imaging displayed?

- Yes  
 Not applicable

### Before patient leaves operating room

(with nurse, anaesthetist and surgeon)

#### Nurse Verbally Confirms:

- The name of the procedure  
 Completion of instrument, sponge and needle counts  
 Specimen labelling (read specimen labels aloud, including patient name)  
 Whether there are any equipment problems to be addressed

#### To Surgeon, Anaesthetist and Nurse:

- What are the key concerns for recovery and management of this patient?



## Before induction of anaesthesia

(with at least nurse and anaesthetist)

**Has the patient confirmed his/her identity, site, procedure, and consent?**

Yes

**Is the site marked?**

Yes

Not applicable

**Is the anaesthesia machine and medication check complete?**

Yes

**Is the pulse oximeter on the patient and functioning?**

Yes

**Does the patient have a:**

**Known allergy?**

No

Yes

**Difficult airway or aspiration risk?**

No

Yes, and equipment/assistance available

**Risk of >500ml blood loss (7ml/kg in children)?**

No

Yes, and two IVs/central access and fluids planned

## Before skin incision

(with nurse, anaesthetist and surgeon)

- Confirm all team members have introduced themselves by name and role.**
- Confirm the patient's name, procedure, and where the incision will be made.**

**Has antibiotic prophylaxis been given within the last 60 minutes?**

- Yes
- Not applicable

### Anticipated Critical Events

**To Surgeon:**

- What are the critical or non-routine steps?
- How long will the case take?
- What is the anticipated blood loss?

**To Anaesthetist:**

- Are there any patient-specific concerns?

**To Nursing Team:**

- Has sterility (including indicator results) been confirmed?
- Are there equipment issues or any concerns?

**Is essential imaging displayed?**

- Yes
- Not applicable

## Before patient leaves operating room

(with nurse, anaesthetist and surgeon)

### **Nurse Verbally Confirms:**

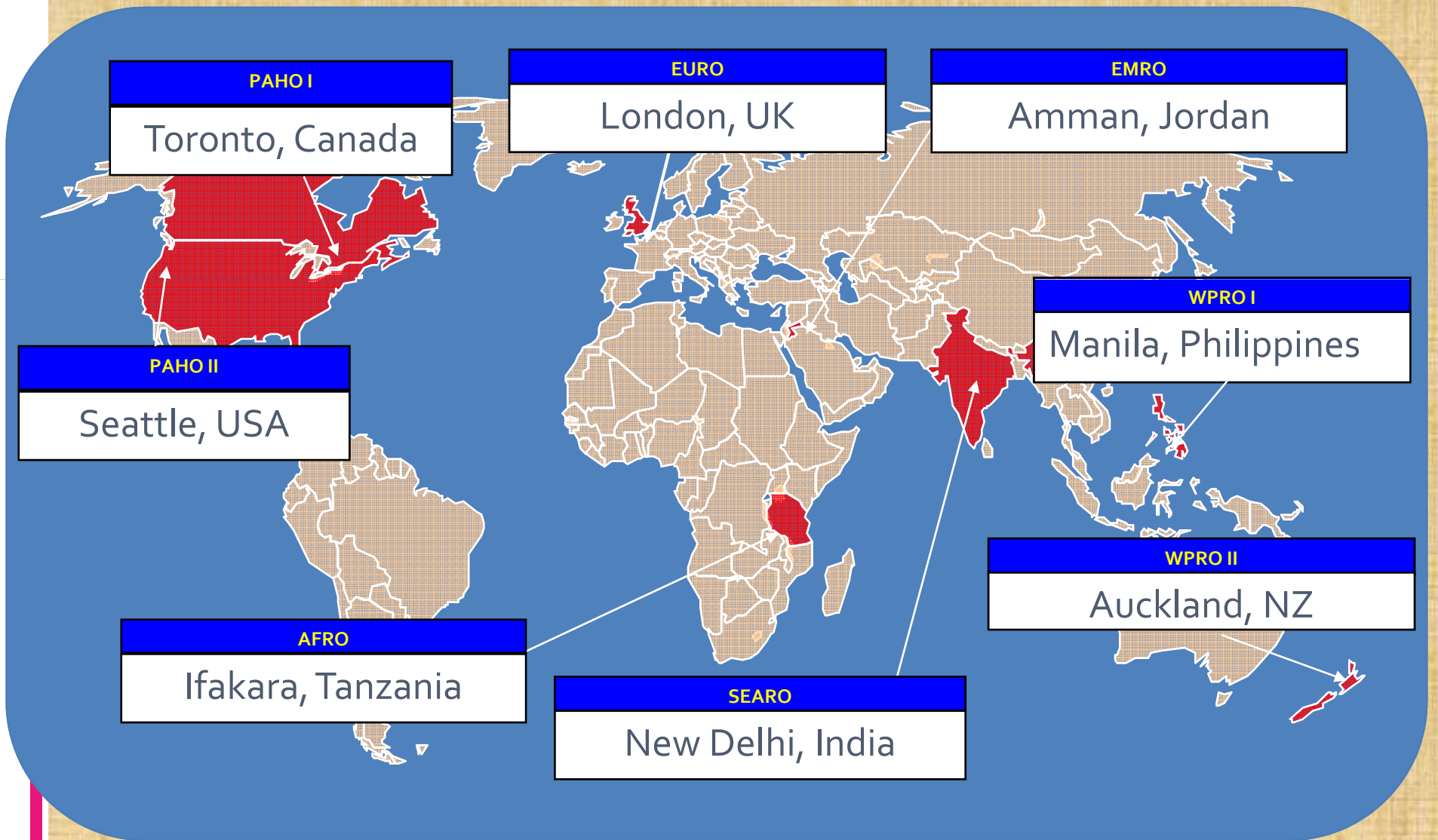
- The name of the procedure
- Completion of instrument, sponge and needle counts
- Specimen labelling (read specimen labels aloud, including patient name)
- Whether there are any equipment problems to be addressed


### **To Surgeon, Anaesthetist and Nurse:**

- What are the key concerns for recovery and management of this patient?



# The Checklist was piloted in 8 cities...





...and was found to reduce  
the rate of postoperative  
complications and death by  
more than one-third!

Haynes et al. A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population. *New England Journal of Medicine* 360:491-9. (2009)

# Results – All Sites

	Baseline	Checklist	P value
Cases	3733	3955	-
Death	1.5%	0.8%	0.003
Any Complication	11.0%	7.0%	<0.001
SSI	6.2%	3.4%	<0.001
Unplanned Reoperation	2.4%	1.8%	0.047

Haynes et al. A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population. New England Journal of Medicine 360:491-9. (2009)



# Change in Death and Complications by Income Classification

	Change in Complications	Change in Death
High Income	10.3% -> 7.1%*	0.9% -> 0.6%
Low and Middle Income	11.7% -> 6.8%*	2.1% -> 1.0%*

\* p<0.05

Haynes et al. A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population. New England Journal of Medicine 360:491-9. (2009)

# What problems does this checklist address?

Before induction of anaesthesia:

**Has the patient confirmed his/her identity, site, procedure, and consent?**

Yes

**Is the site marked?**

Before skin incision:

**Confirm the patient's name, procedure, and where the incision will be made.**

Before patient leaves operating room:

**Nurse Verbally Confirms:**

The name of the procedure

- Correct patient, operation and operative site
  - There are between 1500 and 2500 wrong site surgery incidents every year in the US.<sup>1</sup>
  - In a survey of 1050 hand surgeons, 21% reported having performed wrong-site surgery at least once in their career.<sup>2</sup>

<sup>1</sup> Seiden, Archives of Surgery, 2006.

<sup>2</sup> Joint Commission, Sentinel Event Statistics, 2006.

# What problems does this checklist address? (cont.)

Before induction of anaesthesia:

**Is the anaesthesia machine and medication check complete?**

Yes

**Is the pulse oximeter on the patient and functioning?**

Yes

**Difficult airway or aspiration risk?**

No

Yes, and equipment/assistance available

Before skin incision:

**To Anaesthetist:**

Are there any patient-specific concerns?

## ■ Safe Anaesthesia and Resuscitation

- An analysis of 1256 incidents involving general anaesthesia in Australia showed that pulse oximetry on its own would have detected 82% of them.<sup>1</sup>

<sup>1</sup> Webb, Anaesthesia and Intensive Care, 1993.



# What problems does this checklist address? (cont.)

Before skin incision:

**Has antibiotic prophylaxis been given within the last 60 minutes?**

- Yes
- Not applicable

**To Nursing Team:**

- Has sterility (including indicator results) been confirmed?

- Minimizing risk of infection
  - Giving antibiotics within one hour before incision can cut the risk of surgical site infection by 50%<sup>1, 2</sup>
  - In the eight evaluation sites, failure to give antibiotics on time occurred in almost one half of surgical patients who would otherwise benefit from timely administration

<sup>1</sup> Bratzler, The American Journal of Surgery, 2005.

<sup>2</sup> Classen, New England Journal of Medicine, 1992.

# What problems does this checklist address? (cont.)

## ■ Effective Teamwork

Before skin incision:

- Confirm all team members have introduced themselves by name and role.**

Before patient leaves operating room:

**To Surgeon, Anaesthetist and Nurse:**

- What are the key concerns for recovery and management of this patient?

- Communication is a root cause of nearly 70% of the events reported to the Joint Commission from 1995-2005.<sup>1</sup>
- A preoperative team briefing was associated with enhanced prophylactic antibiotic choice and timing, and appropriate maintenance of intraoperative temperature and glycemia.<sup>2, 3</sup>

<sup>1</sup> Joint Commission, Sentinel Event Statistics, 2006.

<sup>2</sup> Makary, Joint Commission Journal on Quality and Patient Safety, 2006.

<sup>3</sup> Altpeter, Journal of the American College of Surgeons, 2007.

# Data Collection at a National Level (Surgical Vital Statistics)

- Number of surgical procedures performed in the operating theatre per 100,000 population per year
- Number of Operating Theatres per 100,000 population
- Number of surgeons per 100,000 population
- Number of anesthesia professionals per 100,000 population
- Day-of-surgery mortality rate
- Postoperative in-hospital mortality rate



# Goals of the Safe Surgery Saves Lives Program

- Enroll 250 hospitals in the program by January 1st, 2009 and 2,500 hospitals by 2010.
- Enroll hospitals in countries representing one fourth of the world's population by 2009 and representing half of the world's population by 2010.
- Collect surgical vital statistics for one country in each WHO region by 2010

# Easy Math

234 million people are operated on each year, and >1 million of these individuals die from complications

+ At least  $\frac{1}{2}$  are avoidable with the Checklist

500,000 lives on the line each year

# Why should your hospital adopt the Checklist?

- It is a primary recommendation in the new WHO Guidelines for Safe Surgery
- The Checklist has been endorsed by over 200 surgical, anaesthesia, and nursing organizations across the world
- At least 3 nations have committed to instituting the Checklist in all operating rooms




# What can you do?

- Register on the WHO website as a participating hospital
- Implement the Surgical Safety Checklist in your hospital
- Measure results such as deaths and complications and give feedback on checklist implementation based on your personal experience

# Why should you get involved?

- Save lives and prevent complications
- Reduce medical costs related to errors
- Become a part of a supportive international online network of providers and hospitals using the checklist
- Participate in a program that identifies your hospital as a leader in patient safety

- 
- Set the Standard
  - Follow the Standard
  - Look for a Better Way