Evidence Based Practice

Introduction and Overview

NAP 302: Evidence Based Practice

Phebe-Esther Bacon College of Health Sciences, Nurse Anesthesia Program

October 2024

EBP | What is it?

- Problem-solving approach to practice intended to improve care.
- Integrates the best available scientific evidence with the best available experiential (clinical) evidence.
  - Research evidence, quality improvement projects and policy recommendations.
- Encourages critical thinking.
- Supports clinical decision making.
- Requires an understanding of the health care systems in which best practices are implemented.
- Ensures that clinical decisions are made based on the best available evidence.
- Improves access, quality and safety of practice.

Table 1.1 Differentiating Three Forms of Nursing Inquiry

	Quality Improvement	Research	EBP
Starting point	Gap in performance for practice, process, or system	Gap in knowledge evidence	Gap in knowledge of best available evidence
Method used	Plan-Do-Study-Act (PDSA)	Scientific process	Practice Question, Evidence, Translation (PET)

- **Identify a practice problem**: (inadequate acute pain management post-op in your hospital)

- **Search the evidence** for strategies to mitigate the problem: (what is effective in treating post-op pain). (**EBP**)

- **There is eviden**ce that a strategy has been shown to mitigate the problem (practice gap): Design a **Quality Improvement Project**

- **There is no evidence** that identifies a strategy to mitigate the problem (knowledge gap): Design a **Research Study**

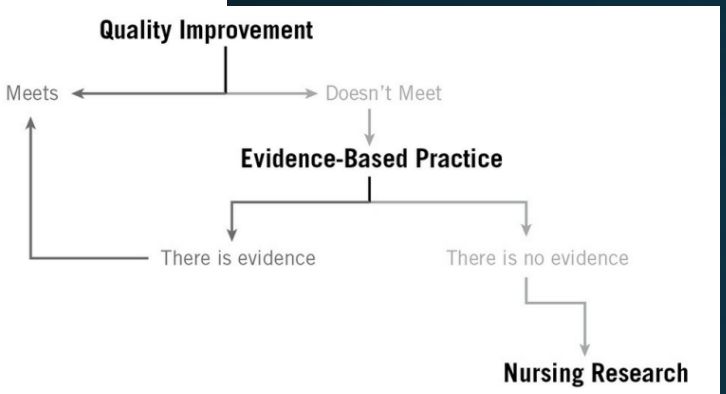


Figure 1.1 Choosing a form of inquiry for practice problems.

EBP and Outcomes

- Morbidity and mortality
- Process outcomes
- Clinical outcomes (e.g., hospital-acquired infection, falls, pressure ulcers),
- Functional outcomes (e.g., performance of daily activities), quality-of-life outcomes (e.g., physical and mental health),
- economic outcomes (e.g., direct, indirect, and intangible costs).
- EBP is an explicit process by which clinicians conduct critical evidence reviews and examine the link between healthcare practices and outcomes to inform decisions and improve the quality of care and patient safety.

What attributes and skills are needed for EBP?

- Identify practice problems
- Curiosity: don’t assume there is nothing that can be done, ask good questions, be curious
- Critically appraise the evidence (experimental research, non-experimental research, quality improvement, case reports, expert opinions, guidelines, policy statements).
- Interpret the evidence found in the literature to your setting.
- Translate evidence to practice tailored for local relevance (experience, patient preference, cost)

Exemplar

1. Practice Problem: Unacceptably high rates of surgical complications/adverse events, with variation across countries and within countries.
2. Evidence
3. Recommendations for practice
4. Translation of evidence to practice (implementation strategies)

World Health Organization | Patient Safety

A World Alliance for Safer Health Care

Surgical Public Health:

Lifebox

WHO and the Safe Surgery Saves Lives Campaign

Safe Surgery Checklist

Janet Dewan PhD CRNA
Phebe Ester Bacon BS nurse anesthesia progeam



© World Health Organization 2009. All rights reserved.

The First Study

Team tasked with improving surgical safety by WHO

Determine the numerical impact of anesthesia and surgery mortality and complications world wide

350,000,000 surgeries annually

3-16% complication rate, probably under reported

Surgical mortality and complications rank as significant public health concerns

>the reported crude mortality rate after major surgery is 0.5-5%;

>complications after inpatient operations occur in up to 25% of patients;

>in industrialized countries, nearly half of all adverse events in hospitalized patients are related to surgical care;

>at least half of the cases in which surgery led to harm are considered preventable;

>mortality from general anaesthesia alone is reported to be as high as one in 150 in some parts of sub-Saharan Africa.

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

- **Known surgical complications of 3-16%**
- **Known death rates of 0.4-0.8% globally**

=

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

Problem 2:
Lack of data on surgery and outcomes

- **Improvements in maternal mortality depended on routine surveillance**

- **Such surveillance is lacking for surgical care**

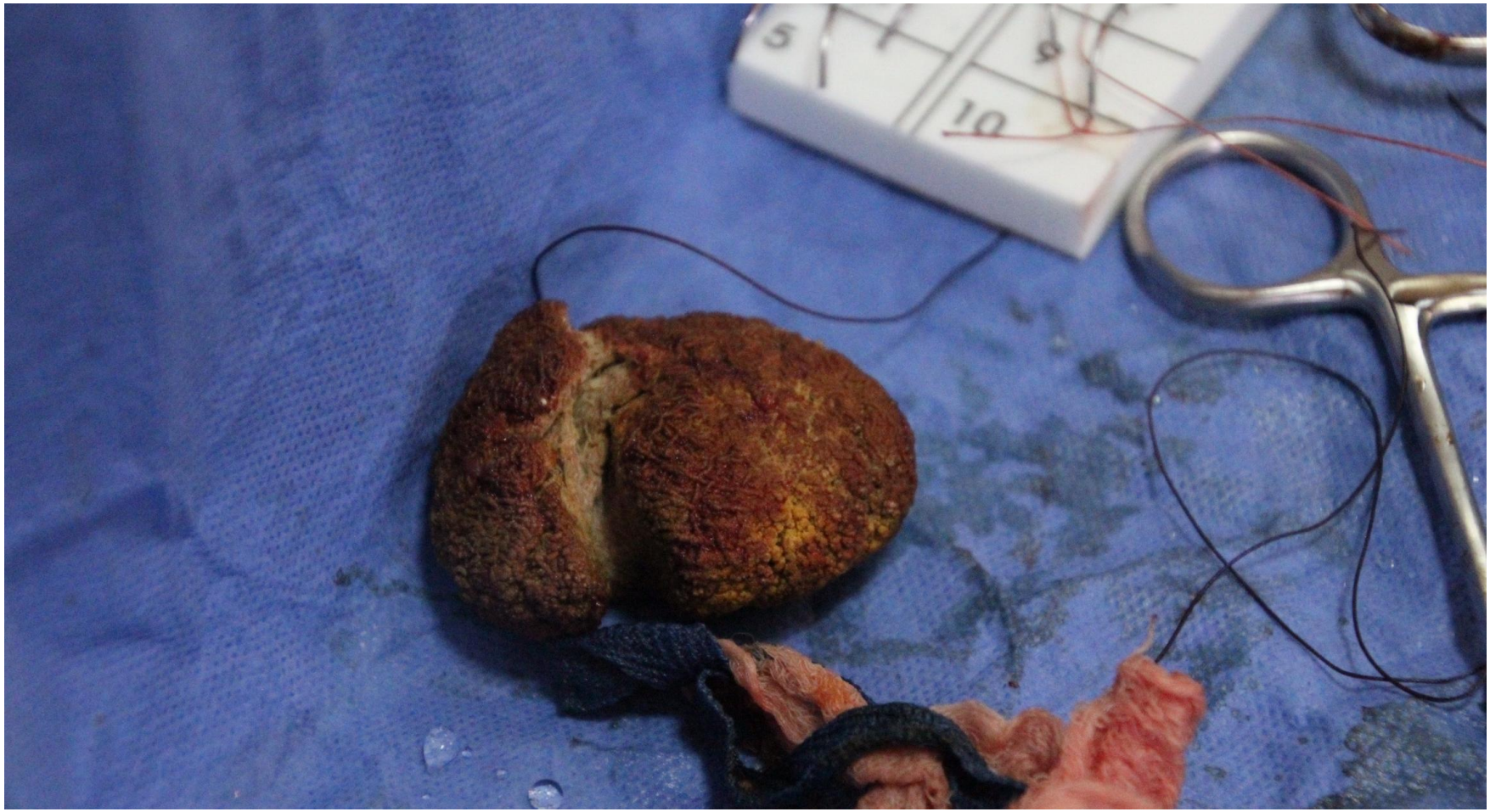
Failure to use existing safety know-how

- **High rates of preventable surgical site infection result from inconsistent timing of antibiotic prophylaxis and skin prep/shaving.**

- **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**

Where did we get this?



The Safe Surgery Saves Lives Strategy

1. Promotion of surgical safety as primary care and a public health issue
2. Creation of a checklist to improve the standards of surgical safety WHO project
3. Collection of "Surgical Vital Statistics"; collect data

   pulse oximetry project *LIFEBOX*

   low cost item

   learn from errors

   with pulse oximetry hypoxia and pulse rate problems are discovered early and can be corrected.

Monitoring is Critical to Safety



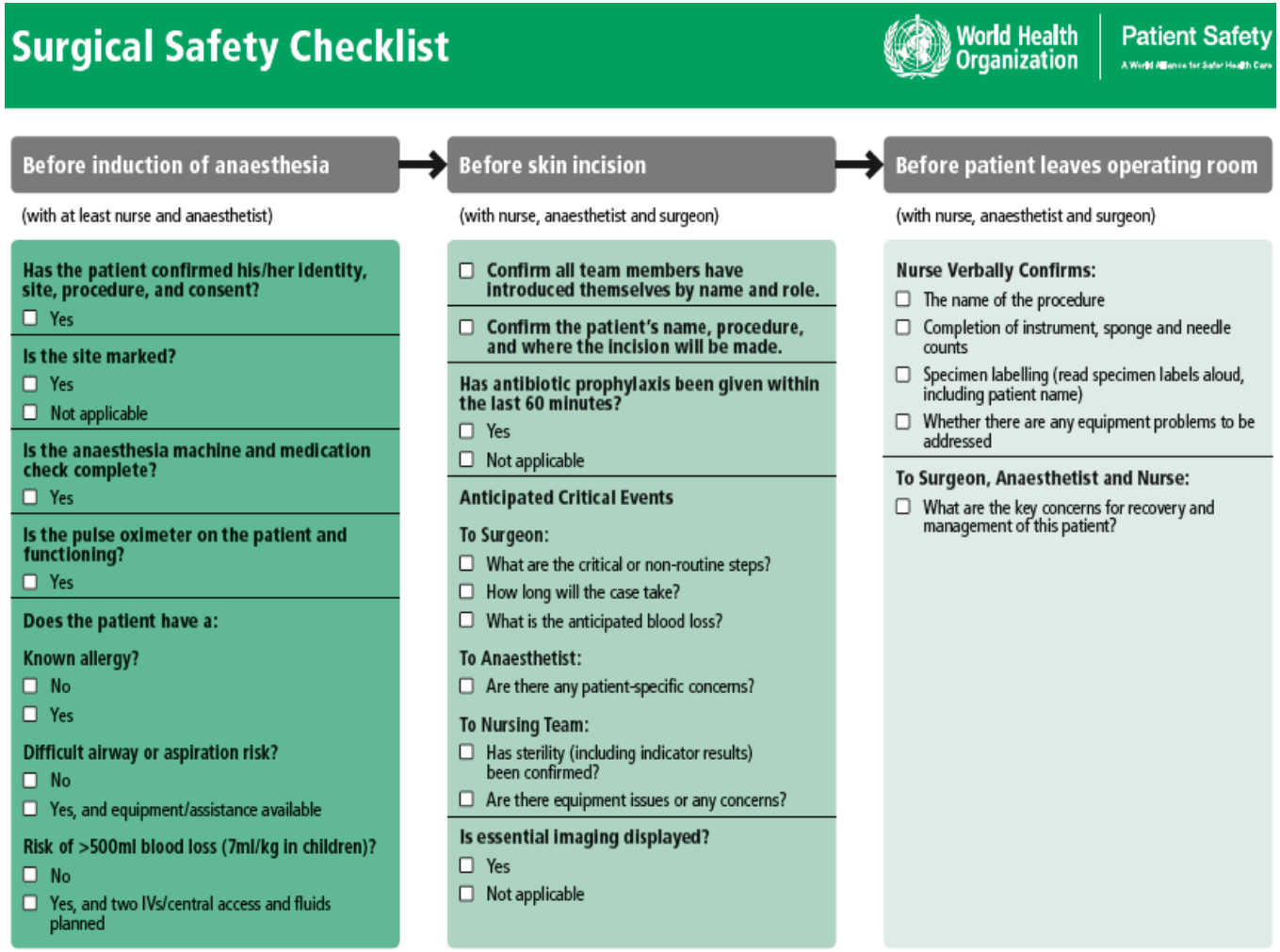
Checklists improve safety in other complex industries?

Aviation

Power

Construction

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?

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.

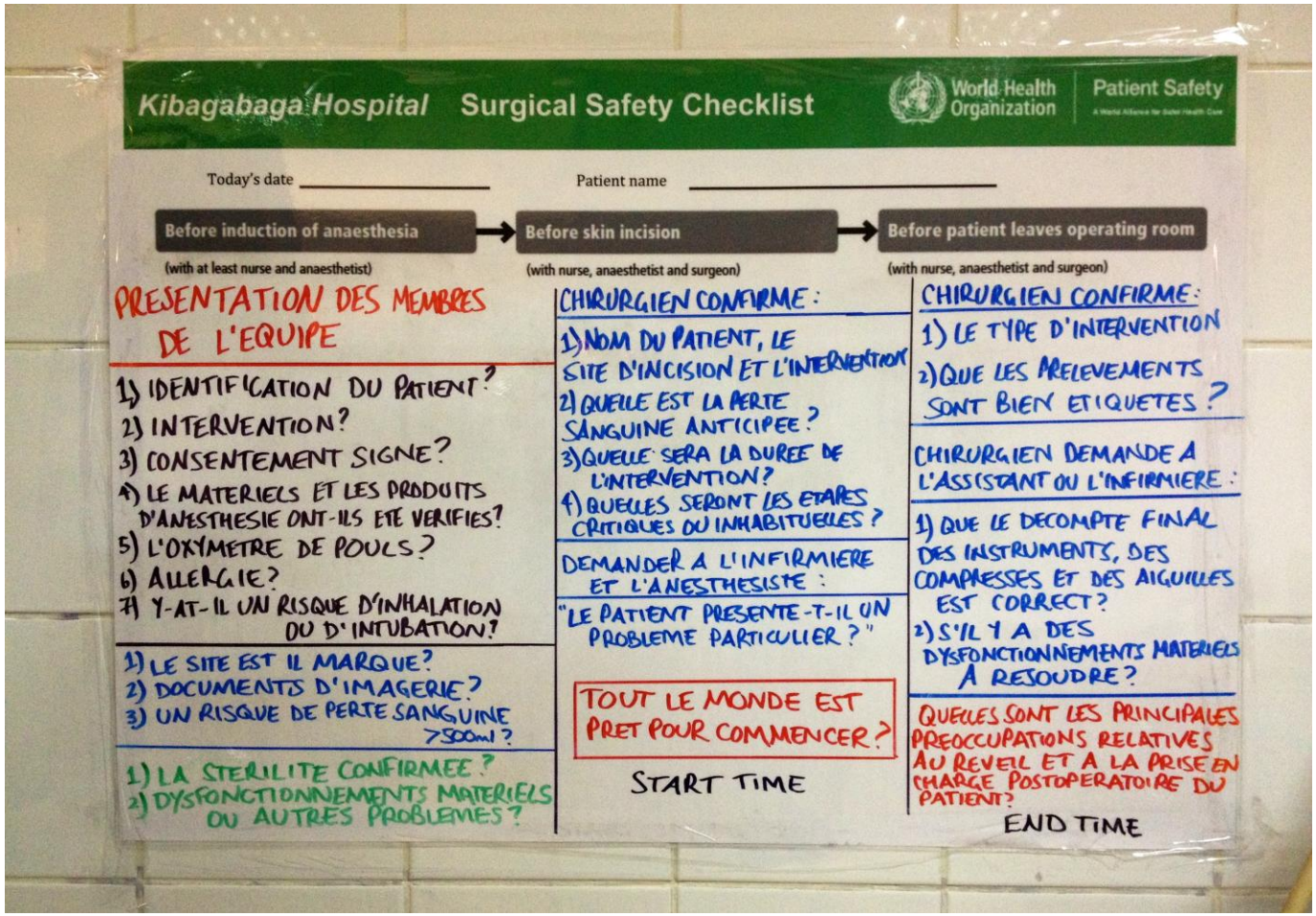
WHO's 10 objectives for Safe Surgery (cont.)

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.

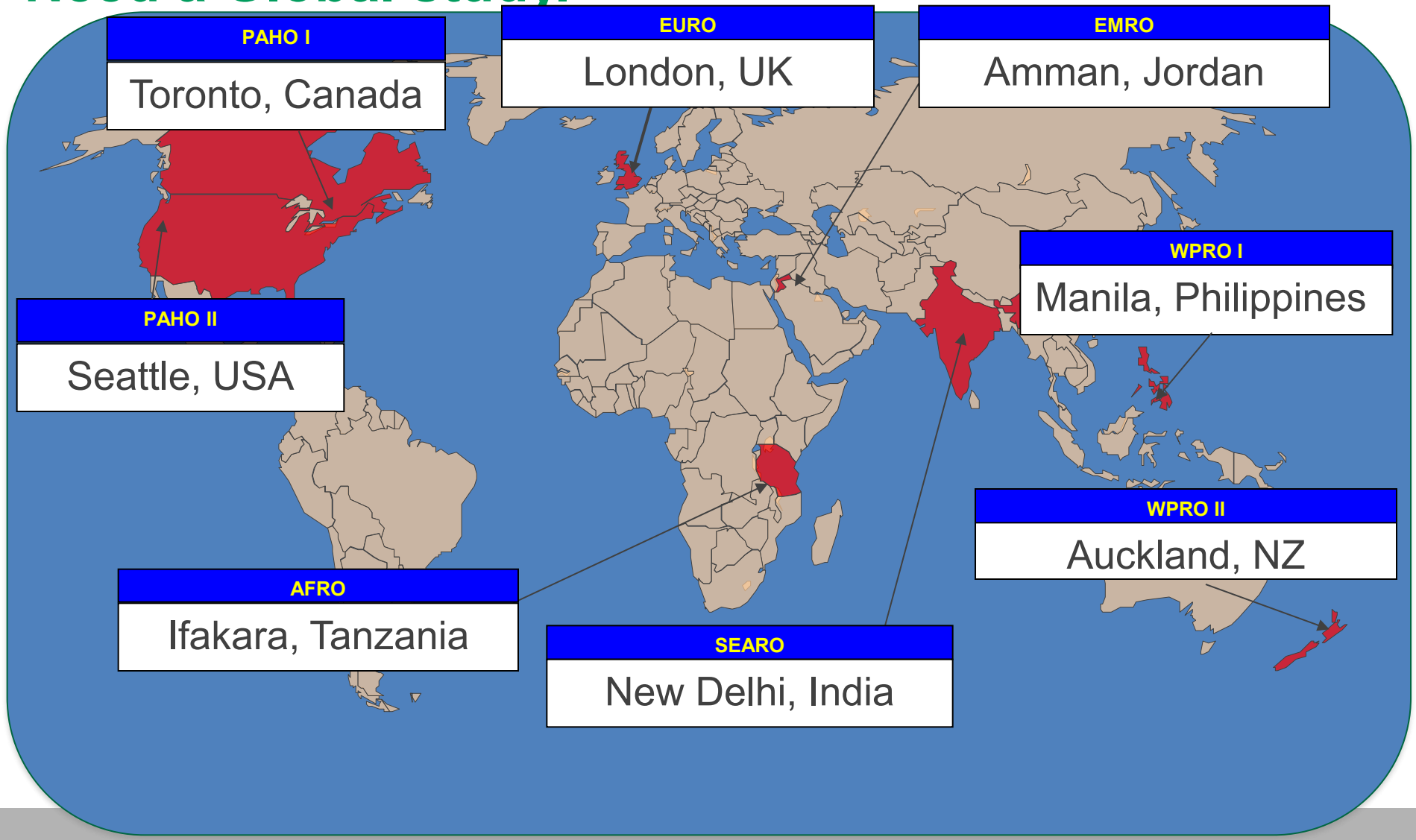
Advantages of using a Checklist

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

Kibagabaga Custom Checkliste



The Checklist was piloted in 8 cities…will it work? Need a Global study.



...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 infection	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%*

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)

*** p<0.05**

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.[1]
- In a survey of 1050 hand surgeons, 21% reported having performed wrong-site surgery at least once in their career.[2]

[1] Seiden, Archives of Surgery, 2006.
[2] 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

Before skin incision:

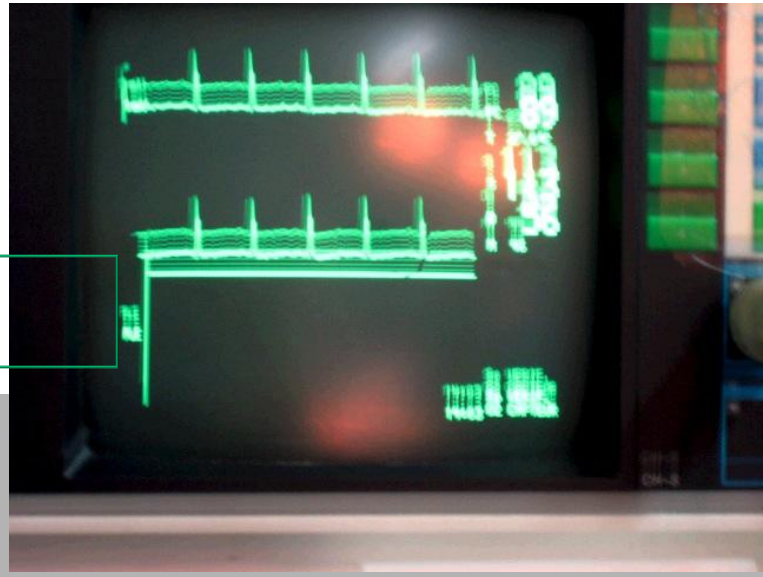
To Anaesthetist:

☐ 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.[1]

[1] Webb, Anaesthesia and Intensive Care, 1993.



Monitor on:
no pulse oximetry

What problems does this Checklist address? (cont.)

Before skin incision:

Has antibiotic prophylaxis been given within the last 60 minutes?

- ☐ Yes
- ☐ Not applicable



Minimize risk of infection

- Giving antibiotics within one hour before incision can cut the risk of surgical site infection by 50%[1, 2]
- 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.

[1] Bratzler, The American Journal of Surgery, 2005.
[2] Classen, New England Journal of Medicine,1992.

What problems does this Checklist address? (cont.)

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?

Effective teamwork

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

[1] Joint Commission, Sentinel Event Statistics, 2006.
[2] Makary, Joint Commission Journal on Quality and Patient Safety, 2006.
[3] Altpeter, Journal of the American College of Surgeons, 2007.

Planning and care with equipment



Anesthesia check

Failing to plan is like planning to fail

Counting sponges BEFORE closure



Counting instruments



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/anesthesia providers per 100,000 population
- Number of anesthesia professionals per 100,000 population
- Day-of-surgery mortality rate
- Postoperative in-hospital mortality rate ****

Easy Math. Baseline calculations

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

\+ At least ½ are avoidable with the Checklist

500,000 lives on the line each year

What can we do?

Briefing rounds. Be sure everyone knows what is being done . Speak to surgeon , nurse before case.

Checklist before anesthesia, before incision, after surgery

Record complications, even if there has been no adverse outcome and analyze them. Make sure mistakes are not repeated by devising systems to avoid them.

Root Cause Analysis





Surgery is a complex activity that involves team coordination
Avoidable errors can be diminished by using a checklist to assure important steps are not missed and teamwork is established
The checklist is being used world wide.

Summary

EBP | Improvement science

- Addresses a knowledge gap: research (knowledge generation)
- Addresses a practice gap: quality improvement (knowledge translation)

The goal of all improvement science is to inform practice – to identify and accelerate the uptake of evidence-based practice (best practices) in order to improve access, quality and safety of patient care.

- Effectiveness, efficiency

Key Take Aways

- Improvement/Implementation science includes
  - Research | Quality Improvement | Evidence Based Practice
- This course will focus on QI and EBP and accelerating (or translating) evidence to practice.
- It takes approximately 17 years for medical and scientific evidence to be translated into routine clinical practice
  - Delays are due to clinician variation, complex institutional barriers, the time to build consensus across medical disciplines, updated clinical guidelines and change in habits within hospitals and clinics.
  - Implementation/Improvement science aims to narrow/eliminate this lag
- Identify a problem → search the evidence → determine if the gap is in knowledge, practice behavior or knowledge of the evidence → create a plan (research | QI | EBP) to address the gap