The World Health Organization
Safe Surgery Checklist

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Harvard School of Public Health
• Surgery is a public health issue
• 234 million surgical procedures per year
  ▪ Outnumbers childbirth and HIV
• Surgery is associated with considerable risk of complications and death
  ■ At least 7 million disabling complications worldwide each year
  ■ At least 1 million deaths worldwide each year
Preventable complications:

- There are between 1500 and 2500 wrong site surgery incidents every year in the US.¹
- An analysis of 1256 incidents involving general anaesthesia in Australia showed that pulse oximetry on its own would have detected 82% of them.²
- Giving antibiotics within one hour before incision can cut the risk of surgical site infection by 50%.³,⁴

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.
Outline

• Surgical Safety Checklist Pilot Study (NEJM 2009)

• Surgical Safety Checklist and Pulse Oximetry Pilot Study
The Checklist was piloted in 8 cities…

Seattle, USA

Toronto, Canada

Lodon, UK

New Delhi, India

Amman, Jordan

Ifakara, Tanzania

Manila, Philippines

Auckland, NZ
A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population

...and was found to reduce the rate of postoperative complications and death by more than one-third!
## Results: All sites

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Checklist</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cases</strong></td>
<td>3733</td>
<td>3955</td>
<td>-</td>
</tr>
<tr>
<td><strong>Death</strong></td>
<td>1.5%</td>
<td>0.8%</td>
<td>0.003</td>
</tr>
<tr>
<td><strong>Any Complication</strong></td>
<td>11.0%</td>
<td>7.0%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Surgical Site Infection</strong></td>
<td>6.2%</td>
<td>3.4%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Unplanned Reoperation</strong></td>
<td>2.4%</td>
<td>1.8%</td>
<td>0.047</td>
</tr>
</tbody>
</table>

## Change in Death and Complications by Income Classification

<table>
<thead>
<tr>
<th></th>
<th>Change in Complications</th>
<th>Change in Death</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Income</strong></td>
<td>10.3% -&gt; 7.1%*</td>
<td>0.9% -&gt; 0.6%</td>
</tr>
<tr>
<td><strong>Low and Middle Income</strong></td>
<td>11.7% -&gt; 6.8%*</td>
<td>2.1% -&gt; 1.0%*</td>
</tr>
</tbody>
</table>

* p<0.05

Haynes et al.  
A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population.  
Surgical Safety Checklist Worldwide

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# Surgical Safety Checklist

## Before induction of anaesthesia
(With at least nurse and anaesthetist)

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has the patient confirmed his/her identity, site, procedure, and consent?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the site marked?</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is the anaesthesia machine and medication check complete?</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a pulse oximeter on the patient and functioning?</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the patient have a...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Known allergy?</td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Difficult airway or aspiration risk?</td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Risk of &gt;500ml blood loss (7ml/kg in children)?</td>
<td></td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

## 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 theatre
(With nurse, anaesthetist and surgeon)

- Nurse Verbally Confirms:
  - The name of the procedure
  - Completion of instrument, sponge, and needle counts
  - Specimen labeling (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?
Image courtesy of The Neenan Company on Flickr.
Pulse Oximetry

- Standard of safe anaesthesia and surgery
- High-income countries
  - Present in virtually all operating rooms
- Low-income countries
  - Absent from >50% of operating rooms
Surgical Safety Checklist and Pulse Oximetry Pilot Study

• **Aim #1**: To pilot study the effect of checklist and pulse oximetry implementation on mortality

• **Aim #2**: To measure the effects of pulse oximetry training by monitoring hypoxemia rates during surgery
Three pilot sites…

- Toronto, Canada
- Lusaka, Zambia
- Chisinau, Moldova
- London, UK
- New Delhi, India
- Amman, Jordan
- Manila, Philippines
- Auckland, NZ
- Seattle, USA
- San Pedro Sula, Honduras
- Ifakara, Tanzania
- Lusaka, Zambia

Image by MIT OpenCourseWare.
Implementation/Intervention Plan

Principles:
1. Implementation Team
2. Lecture
3. Demonstration
4. Role-Play
5. Coaching with Feedback

WHO, HSPH, WFSA
(oversight)

Local Implementation Team
(Anesthesiologist, Surgeon, Nurse)

Local Hospital Administration

• Lecture
• Demonstration
• Role-Play
• Coaching with Feedback

Operating Room Staff

CHANGE
- Using the Checklist we can save lives and prevent complications
- Pulse oximetry is an essential part of safe surgery

- Implementation of the Checklist and Pulse Oximetry can improve surgical outcomes

- Implementation of the Checklist and Pulse Oximetry can improve surgical outcomes around the world
The World Health Organization
Safe Childbirth Checklist Program

Priya Agrawal, MD MPH
World Health Organization
Harvard School of Public Health
Assemble evidence on possible areas of improvement and critical omissions

Identify pause points & Draft Checklist Items

Experts/field users review draft checklist

Redraft checklist

Problems

1\textsuperscript{st} validation stage – Can it change improve quality/safety of care?

RCT

2\textsuperscript{nd} validation stage – Does it reduce mortality and morbidity?

Dissemination
### Surgical Safety Checklist

#### Before induction of anaesthesia

- **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

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#### Before skin incision

- **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

- **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?

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*This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.*

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Safer Childbirth

130 Million Births worldwide each year

350,000 Maternal Deaths

4 Million Neonatal Deaths
(3 million Early Neonatal Deaths)

3.3 Million Stillbirths
(1 million intrapartum-related)

Avoidable

Infection
Hemorrhage
Hypertensive disorders
Prolonged/obstructed labor

Infection
Asphyxia
Prematurity

Poor intrapartum fetal monitoring
Poor neonatal resuscitation
Different challenge, similar solution

- 99% of burden is in resource-poor settings
- Extremely variable level of training of caregiver
- High-risk period could cover days, rooms, caregivers, facilities
- No obvious team structure
- Woman is awake and ‘well’
- Rich evidence-base available and proven interventions are inexpensive
Sources Informing Checklist Content

- WHO published guidelines
- Evidence-based literature
- Expert consensus
- Collaborator feedback
- Mortality and near-miss audits
Pause Points

- **Pause point #1** On admission
- **Pause point #2** Just before pushing (or before Cesarean)
- **Pause point #3** Soon after birth (within 1 hour)
- **Pause point #4** Before Discharge

Timeline:
- Labor onset
- Antenatal period
- Conception
- Pre-conception
- Admission to birth facility
- Labor progression
- Delivery
- Postpartum
- Discharge from birth facility

Duration:
- 28 days
- 42 days
Program Progress

Review evidence – Starting Oct 2008

International Consultation – July 2009

Development of Safe Childbirth Checklist draft content

Expert Panel Meeting #1 – Nov 2009

“Usability Feedback Cycle” Field Development & Checklist Modification

Expert Panel Meeting #2 – May 2010
WHO Partners

Patient Safety: Gerald Dziekan, Angela Lashoher, Claire Lemer
Child & Adolescent Health: Rajiv Bahl, Wilson Were
Making Pregnancy Safer: Matthews Mathai, Severin Ritter von Xylander, Jelka Zupan
Reproductive Health & Research: Mario Merialdi

Expert Collaborators

Pilot Study - Objectives

1. Measure healthcare worker performance: effective delivery of essential standards of care proven to result in improved maternal, fetal, and neonatal health outcomes.

2. Obtain qualitative feedback describing contextual factors that facilitate or block successful checklist implementation.

Pilot Study - Design

Pre-Intervention
~3 months
300 Patients

Intervention
1 week
Checklist Training and Implementation

Post-Intervention
~3 months
300 Patients

Childbirth Improvement Coordinator meets with childbirth staff
1. Stories shared
2. Some baseline data shared
3. Checklist content modified to fit local practice
4. Instructional video and simulation practice
5. Supervised practice, feedback, ongoing support
Results

• ALL of the 29 essential standards of care were delivered more reliably
• Overall effective delivery of a core set of standards improved by over 50%
• System changes catalyzed by introduction of checklist
• Job satisfaction and patient satisfaction increased
• Better teamwork and communication
Next steps

- RCT
- Implementation
- Use of technology?
Thank-you!

Questions?