
Essential Surgery Key Messages

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Outline

- Introduction:
 - Goals of DCP3 surgery volume.
 - Definition of “essential surgery.”
- Structure of volume
- Key messages

Introduction

- Large health burden from conditions that can be treated by surgery.
 - Injury: 5 million deaths per year
 - Pregnancy related: 270,000 deaths per year
- Surgical care not available to many who need it most.
 - 2 billion without even basic care.
- Barriers:
 - Resources: human, physical
 - Quality of care

Goals of Surgery Volume

- (1) Better define the health burden of conditions requiring surgery;
- (2) Identify those surgical procedures that are the most cost-effective and cost-beneficial;
- (3) Understand health care delivery methods and platforms that can most efficiently be used to deliver these procedures.

Focus of Surgery Volume

Define and study a set of “essential” surgical procedures that would effect the biggest improvements in health if they were more uniformly delivered.

Highest priority surgical conditions to address:

- Large public health burden.
- Surgical procedure that is highly successful.
- The surgical procedure (and related ancillary services and treatments) is cost-effective and feasible to promote globally.

Focus of Surgery Volume

Many of these procedures can be done at **first level** facilities

50-200 beds

Serve 50-200,000 people

Basic surgical care

(e.g. district hospitals in Africa).



Some (less time-sensitive) will require specialized facilities.



Focus of Surgery Volume

Established by consensus at 2007 Bellagio Essential
Surgery Meeting



Definitions and concepts laid out in further detail:

World J Surg (2010) 34:381–385
DOI 10.1007/s00268-009-0263-4

*World Journal
of Surgery*

Developing Priorities for Addressing Surgical Conditions Globally: Furthering the Link Between Surgery and Public Health Policy

Charles Mock · Meena Cherian · Catherine Juillard ·
Peter Donkor · Stephen Bickler · Dean Jamison ·
Kelly McQueen

Focus of Surgery Volume

Major categories:

Basic: Injuries, obstetric complications, abdominal emergencies (e.g. appendicitis).

Specialized: Cataracts, obstetric fistula, congenital anomalies (e.g. cleft lip and palate).



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Surgery Volume Contents

- Part 1: Global Burden of Surgical Disease
- Part 2: Surgical Interventions
- Part 3: Surgical Platforms and Policies
- Part 4: Economics of Surgery

Volume Outline

PART 2: Surgical Interventions

Section 1: Emergency Surgery

- Trauma Care
- General Surgical Emergencies

Section 2: Reproductive Surgery

- Obstetric Surgery
- Obstetric Fistula
- Surgery for Family Planning, Abortion and Post-Abortion Care

Volume Outline

PART 2: Surgical Interventions

Section 3: Non-emergent Surgery

- Congenital Anomalies
- Hernia and Hydrocele
- Dentistry
- Cataract Surgery

Volume Outline

PART 3: Surgical Platforms and Policies

Organization of Essential Services and The Role of the First-Level Hospital

Specialized Surgical Platforms

Prehospital and Emergency Care

Anesthesia and Perioperative Care

Excess Surgical Mortality: Strategies for Improving Quality of Care

Workforce Innovations to Expand the Capacity for Surgical Services

Volume Outline

PART 4: The Economics of Surgery

Costs, Effectiveness, and Cost-Effectiveness of Selected Surgical Procedures and Platforms:
A Summary from Across the Volume

Task-Shifting and Universal Public Finance for Expanding Surgical Access in Rural Ethiopia:
An Extended Cost-Effectiveness Analysis

Global Surgery and Poverty

Benefit-Cost Analysis for Selected Surgical Interventions in Low and Middle Income
Countries

Cleft lip

Cesarean section

Outline

- Introduction:
 - Goals of DCP3 surgery volume.
 - Definition of “essential surgery.”
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- Key messages

Key messages

- (1) There is a significant burden of death and disability from conditions that require surgical care.
- (2) Many essential surgical services are among the most cost-effective of all health interventions.
- (3) Human and physical resources to provide surgical care are at very low levels, especially in low-income countries and in rural areas.
- (4) Critical indicators of quality, such as perioperative mortality rates and anesthesia-related deaths, continue to show huge disparities between LMICs and high-income countries and even among countries at same economic levels.

Key message 1

- (1) There is a significant burden of death and disability from conditions that require surgical care. (Chapter 2)

Surgical procedure—the suturing, incision, excision, or manipulation of tissue; or other invasive procedure that usually, but not always, requires local, regional, or general anesthesia

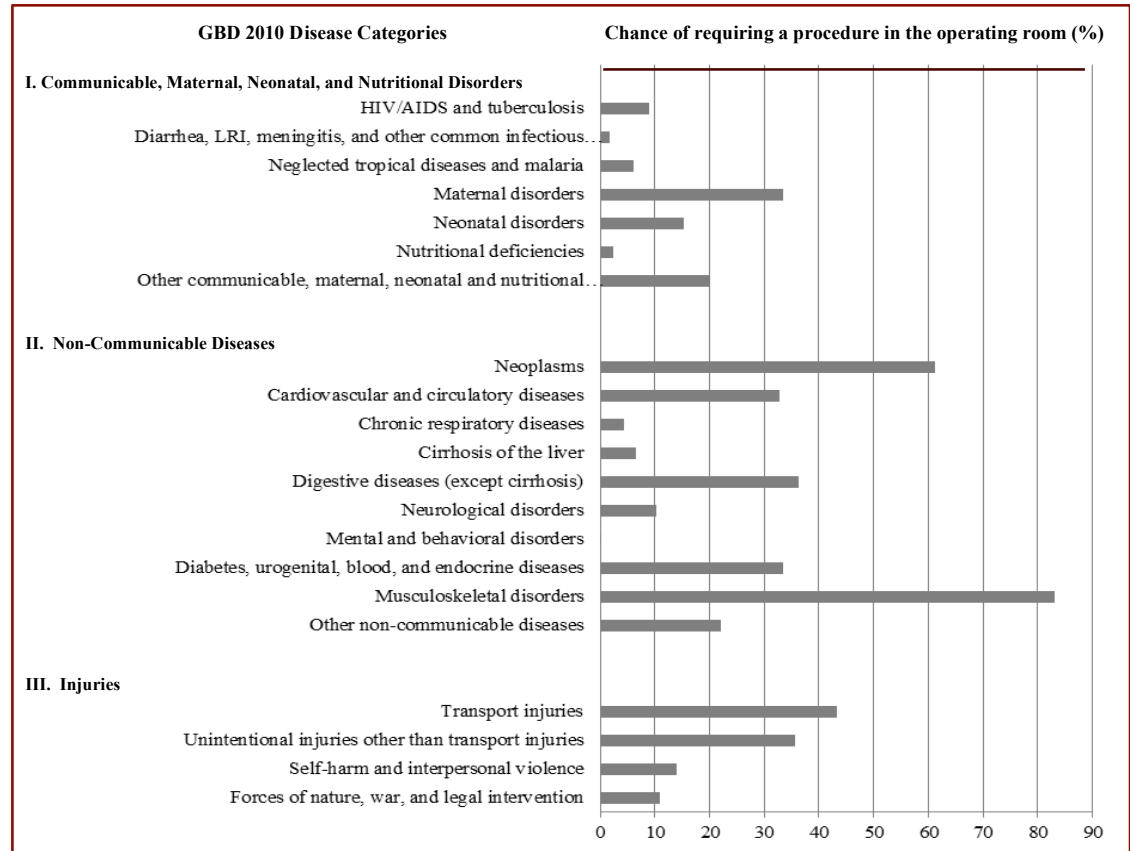
Surgical care—operative and non-operative interventions directed at reducing the disability or premature death associated with a surgically treatable condition. Surgical care includes the pre-operative assessment of patients, intra-operative care including anesthesia and post-operative care.

Surgically treatable condition—any condition in which surgical care can potentially improve outcome

- Not dichotomous

Key message 1

Chance of a patient admitted to hospital in the US requiring a surgical procedure in the operating room. Procedures were performed in every category illustrating the integrative nature of surgical care. Analysis based on 38.4 million admissions.



Key message 1

Set of conditions often treated by:

Basic surgical procedures:

- Injury
- Maternal- neonatal
 - (e.g. maternal hemorrhage, obstructed labor)
- Abdominal emergencies:
 - (e.g. appendicitis, gallbladder disease)

Specialized: Cataracts, obstetric fistula, congenital anomalies (e.g. cleft lip and palate).

Key message 1

What is the ***avertable burden*** of these conditions?

Difference between current burden in each of 21 regions in the world and the burden in the best performing country of that region.

This represents potential benefits from scaling up “essential surgical care.”

Key message 1

Type of surgical care	Preventable deaths (millions)	Burden			
		Avertable		Non-avertable	
		DALYs per year (millions)	Fraction of LMIC total GBD	DALYs per year (millions)	Fraction of LMIC total GBD
Basic surgical care ¹	1.4	77.2	3.5%	238.5	10.7%
Subspecialty surgical care ²	0.4	38.9	1.7%	46.5	2.1%
TOTALS	1.8	116.1	5.2%	285.0	12.8%

= 18% of total burden

Table 2. (Table 2.7 from Chapter 2). Public health impact of scaling-up surgical care in LMICs.

¹Designed to treat four gastrointestinal diseases, four maternal-fetal conditions, and injuries.

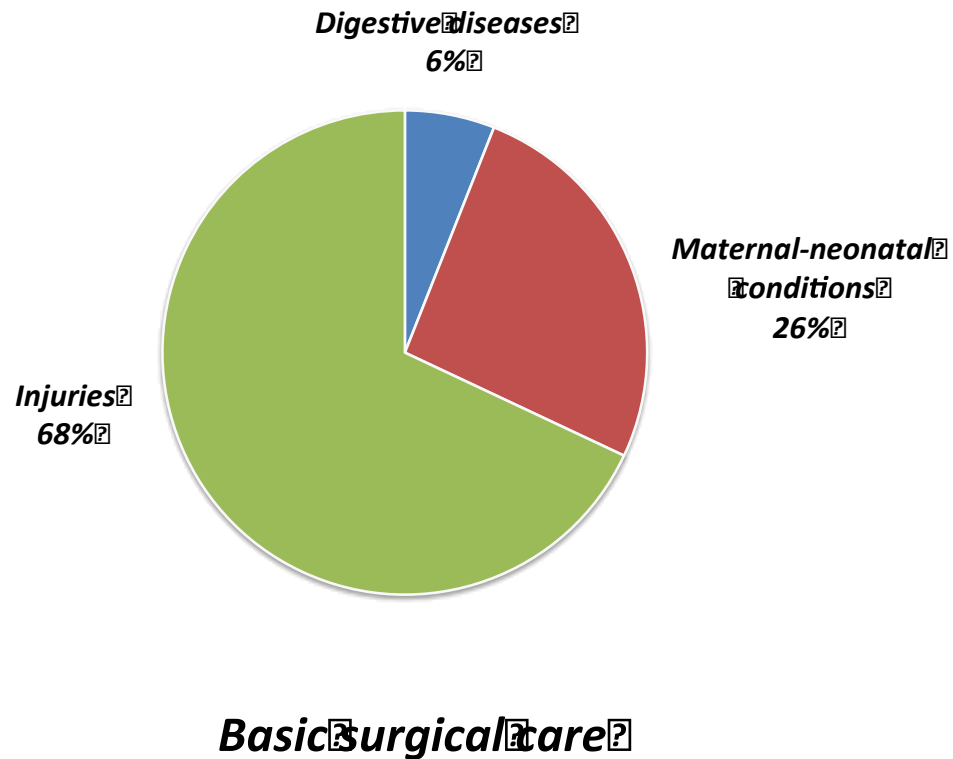
Basic surgical care refers to emergency and essential surgical care, much of which is deliverable at first-level hospitals.

²Surgical care for cataracts, obstetrical fistula, and congenital anomalies (e.g. cleft lip and palate).

Vs. 11% estimate from DCP2, from consensus, for all of surgery.

DCP3 estimates do NOT include cancer, vascular disease, degenerative disease.

Key message 1



Key message 1

- Limitations:
 - Injury:
 - Part of avertable burden might be due to prevention (e.g. road safety).
 - Part of avertable burden likely due to more complex procedures (e.g. vascular injury, ICU care).
- Congenital:
 - Large component due to cardiac disease.

Key message 1

- 18% of total disease burden due to conditions for which surgical care is a major component.
- 5.2% of total disease burden is avertable through improvements in surgical capabilities.

1. Opportunities

- National governments
 - Add key essential surgical conditions to health and demographic monitoring systems.
- International community
 - Research to better define and measure the concept of “surgical burden.”
 - Better estimates of this burden (with ongoing monitoring).

Key message 2

- Many essential surgical services are among the most cost-effective of all health interventions.

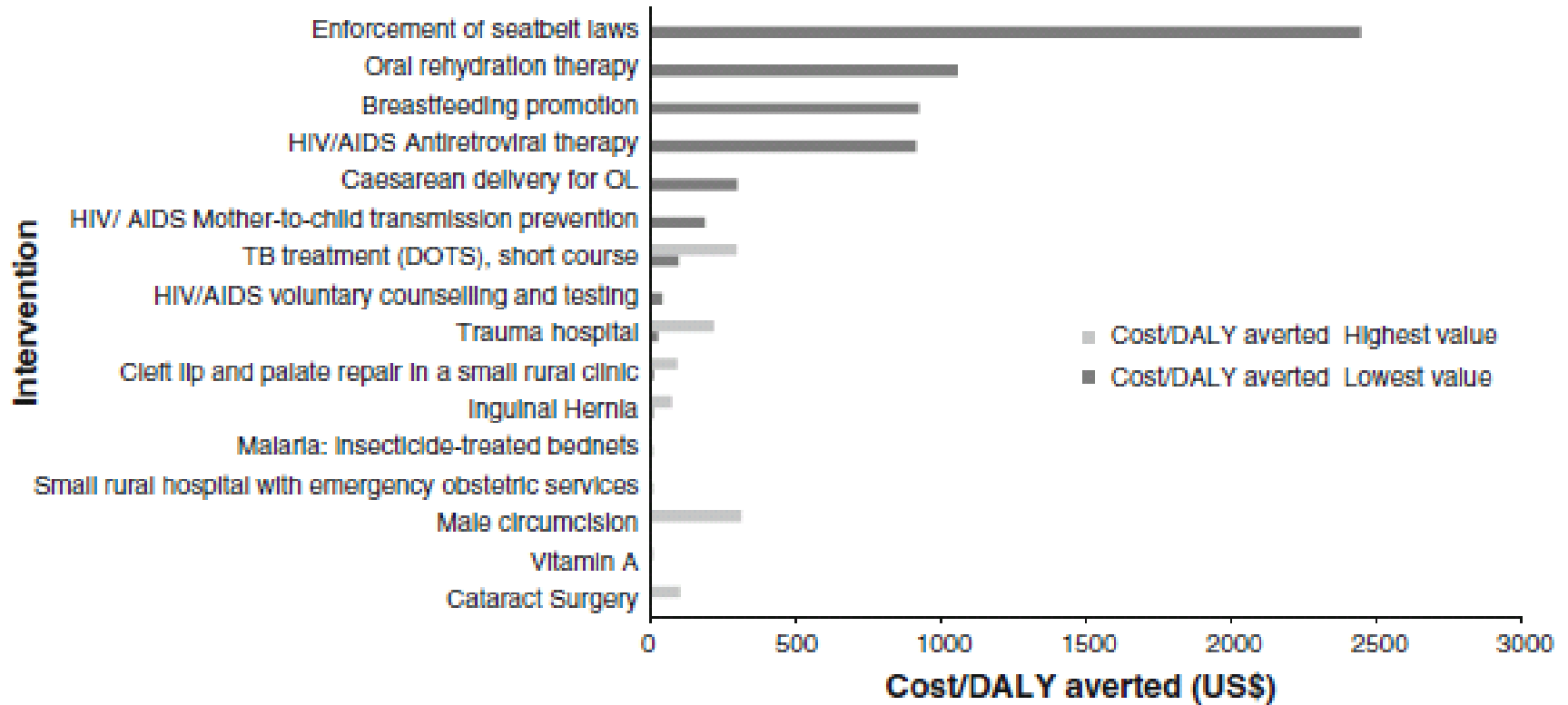


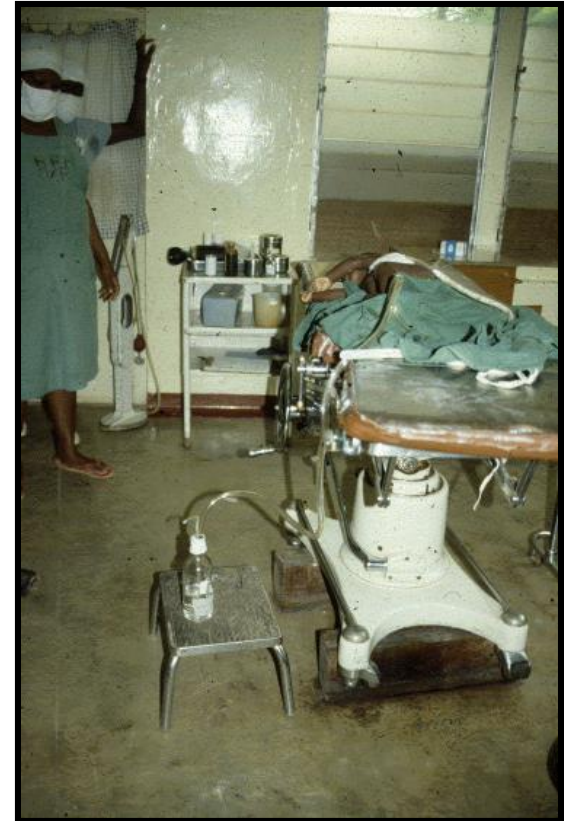
Fig. 2 Cost-effectiveness of surgical interventions compared with other public health interventions

Source: *Grimes et al, World J Surgery 2014*

Key message 2

PLATFORMS

- First level hospital.
 - \$11 - \$233 / DALY
 - Similar findings across wide range of LMICs
 - Primarily caring for Ob, trauma, abd. Emergencies



Key message 2

PLATFORMS

- Specialty:
 - Short term mission:
 - Lack of cost-effectiveness and sustainability
 - Self-contained mobile platforms (e.g. ship)
 - Good outcomes (likely)
 - Limited data on CE
 - Specialized hospitals (e.g. fistula, cataract)
 - Most CE of these options.
 - Sustainable

Key message 2

PLATFORMS

- Prehospital
 - Many prehospital deaths, esp. trauma.
 - Improve first aid skills of lay first responders:
 - \$7 per year of life gained!
 - Basic ambulance
 - \$94-\$284 per year of life gained.



2. Opportunities

- National governments
 - Increasing capacity for essential surgery can decrease high burden from many major health problems (e.g. injury, obstetric complications)
 - Many of most needed procedures are very affordable and feasible to delivery.
 - Need for public health and systems strengthening approach.

2. Opportunities

- National governments
 - Sequencing: efforts to assure greater access to the more basic services (relative to more complex conditions) will have greater public health impact.
 - Improved access to essential surgery should be implemented early in the path to UHC.

2. Opportunities

- International community
 - Build evidence base for system-wide methods to expand surgical capacity and increase access.
 - Implementation research.
 - Policy research.
 - Intervention packages.

Key message 3

- Human and physical resources to provide surgical care are at very low levels, especially in low-income countries and in rural areas.
- High-income countries:
 - 15% population
 - 60% of operations
- Low-income countries:
 - 35% population
 - 3.5% of operations.

Key message 3

- Capacity very low
- Human:
 - 23 LMICs: General surgeons: 0.13 – 1.57 / 100,000
 - USA: 9 / 100,000

Key message 3

- Capacity very low
- Physical:
 - GIEESC, EsTC projects by WHO
 - Deficiencies of low-cost items.
 - Physical presence, but components missing.
 - Awaiting repairs.
 - Available, but only to those who can pay.



Examples of improvements: Physical resources.

International Journal of Injury Control and Safety Promotion, Vol. 13, No. 2, June 2006, 125–127



Improvements in trauma care capabilities in Vietnam through use of the WHO-IATSIC *Guidelines for Essential Trauma Care*

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Key message 3

Examples of improvements: Human resources.

- Ghana College of Physicians and Surgeons:
- 284 specialists trained since 2003
- Greater availability in provincial hospitals.

Key message 3

- Examples of improvements: Human resources.
- Task sharing
 - Demonstrated effectiveness and CE
- General practitioners
- Mid-level operators / NPCs
 - Tecnicos de cirurgia (Mozambique)
 - Assistant Medical Officers (AMOs): Tanzania

Key message 3

Task sharing

- Outcomes (maternal, neonatal mortality):
 - Similar for AMOs vs MDs in Tanzania.
- Training and deploying TCs:
 - Three times most CE than for MDs for ob surgery in Mozambique.
- Higher retention rate
- Challenges: MD acceptance, training and regulatory mechanisms, supervision.

Key message 3

SEQUENCING

Long range goal: adequate numbers of fully trained surgeons.

Mechanisms such as task sharing allow better access along the way to this goal; and improve quality of care compared to status quo, which is no care for much of the population.

3. Opportunities

National governments

- Increase surgical workforce through expanded training of fully credentialed surgeons.
- Until full coverage by specialists achieved, improved access and quality of essential surgical care can be provided by appropriately trained and supervised non-surgeons clinicians:
 - GPs and NPCs.
 - Especially for more remote and under-served areas.
- Need for support of professional surgery associations.

3. Opportunities

International community

- Research on product development for essential supplies and equipment:
 - Durability, lower cost, improved availability (local manufacture, where relevant).
- Implementation science: Improved delivery methods.
- Document case studies of successes.
- Country specific assistance for provision of basic essential equipment and supplies for poorest countries for near future.

3. Opportunities

National and international

- Training to prepare surgeons to address the barriers to equitable access to safe and effective essential surgery.
- Redefining surgeons' role for small, but critical, number of surgeons.
 - Additional skills in management, QI, public health viewpoint.

Key message 4

Critical indicators of quality, such as perioperative mortality rates and anesthesia-related deaths, continue to show huge disparities between LMICs and high-income countries and even among countries at same economic levels.

Example: Death from C-section:

0.04 / 1000 in Sweden

10-15 x higher in Latin America

40-80 x higher in Asia

20 – 1000 x higher in Africa.

Key message 4

- Example - Anesthesia related deaths:
- High income countries:
 - 357 deaths / million anesthetics: Before 1970
 - 34 deaths / million: 2000's
- Better monitoring and protocols.
- Better technology (much simple)
 - Pulse oximetry.
 - Simple changes in anesthesia machines.

Key message 4

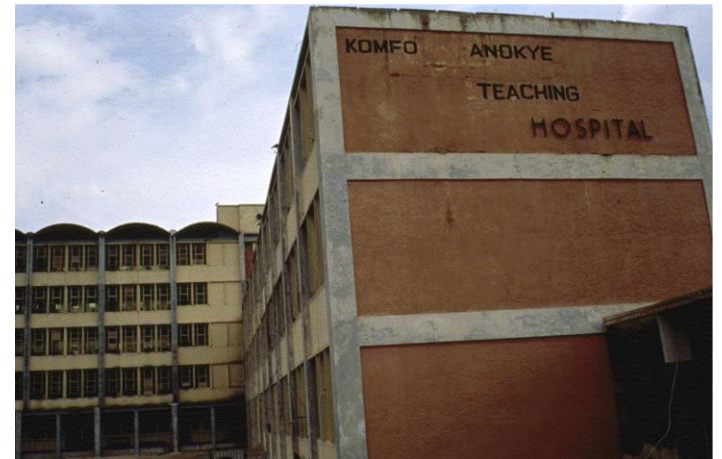
- Why?
- Human and physical resources
- Administration and management

Main hospital in Kumasi, Ghana:
2022 trauma admissions

Prolonged time to emergency surgery:
average 12 hours

Low utilization of:
airway equipment
chest tubes

Source: London et al, J Trauma 2001



Key message 4

- Improvements: WHO Safe Surgery Checklist:
- Decreased peri-operative deaths by 47% and complications by 35% in countries at all economic levels.

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)

Before skin incision
(with nurse, anaesthetist and surgeon)

Before patient leaves operating room
(with nurse, anaesthetist and surgeon)

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

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

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?

Trauma QI program Khon Kaen, Thailand

- High rate of preventable deaths
 - Correctable problems identified
 - Inadequate resuscitation for shock
 - Delayed surgery for head injuries
- Corrective action
 - Improve communication
 - Senior staffing in ED
 - Improved record keeping

Results

- Mortality decreased:
 - **6.1% to 4.4%**

Sources: Chadbunchachai et al, J Med Assoc Thai, 2003
Strengthening Care for the Injured, WHO, 2010.



4. Opportunities

National governments

Based on current evidence and practicality of being able to be implemented large scale with modest funding, the following measures would result in significant improvements in surgical safety in countries at all economic levels:

- Training and deployment of the WHO Safe Surgery Checklist.
- Improved availability of safety-related technology, especially for anesthesia and especially as regards pulse oximetry availability.
- Improved outcome feedback, such as in the form of quality improvement programs and in terms of better monitoring of outcomes and complications.

4. Opportunities

- International community
- Implementation research
 - Specific methods and good practice for improving quality of care.
- Better definition and tracking of a variety of quality indicators globally, such as the perioperative mortality rate.

Conclusions

- High rate of avertable death and disability from conditions that can be treated by surgery.
- Many of the needed procedures are among the most cost-effective of all health interventions and are feasible to deliver.

Conclusions

- Need for public health and health systems strengthening approach.
- Surgical and global health communities have not done this.
- Assuring these essential surgical services.
 - In part about improving training.
 - In part about improving functioning and equity of health systems:
 - Monitoring and evaluation
 - Financing mechanisms
 - Promoting social justice and human rights.

Conclusions

- Modest investments in improving capacity for delivering these essential surgical services on the part of both national governments and the international community would significantly lower the sizable burden of the global health problems that are treatable with surgery.