3M℠ Health Care Academy

Surgical safety Solution

Caroline Bilen BS- NYIC
CEEMEA Scientific Affair and Education Manager
Infection prevention Division.
Health care Academy Lead -CEEMEA

3M Science. Applied to Life.™

Caroline Bilen BS- NYIC
CEEMEA Scientific Affair and Education Manager Infection prevention Division.
Health care Academy Lead -CEEMEA

Caroline holds BS in nursing since 1988, certified in Infection Control (NYIC) as well as educator for NYIC certification. She is JCI certified educator for JCI education program "*Safety in Surgical Services*".

She has more than 30 years' experience in Nursing Management, Infection control and Health Care Quality, Accreditation Management and Elderly Care. She held the position of Director of Nursing Services at "Home Care Lebanon", where she was leading the Health Care Team and responsible for Patient Safety
Caroline held the position of Operating Room Nursing Manager in Lebanon.
She is an active public speaker at international and national congresses for Patient Safety, Surgical forum, Hand Hygiene Campaigns and Infection Preventions summits in CEEMEA region.

Since she joined 3M in 2004, she has been working closely with Hospitals Management team, Infection Control and Patient Safety Committees all over the CEEMEA region to improve patient safety, Expectations and outcomes. Her contribution in creating awareness of the best practices and driving surgical safety solution, surgical pathway, clinical evidences and standards of care to prevent Hospital Acquired Infection as well as educating Health Care Staff in CEEMEA region is broadly recognized and appreciated.

She has publication on the Reduction of Surgical Site Infections in Cesarean Section Deliveries by Implementation of a Surgical Care Pathway

Patient safety

Mission

Leader in Quality of Care

- To achieve patient, health care workers and families safety

Vision

Deliver the Best Health Care Services

- Meet needs /values of patients and health care workers
- Patient satisfaction by exceeding patient expectations

Getting to Zero Harm

Focus: Inpatient Hospital KPI Examples

Inpatient Utilization	•Length of Stay •"Excess bed days" •"Cold bed time" •Average daily census
OR Utilization	•Block time utilization •Case delays •Case cancellation rate •OR turnaround time
Patient Access	•# of patients referred vs. accepted •# of patients turned away due to hospital census
Patient Safety/Quality	• Mortality rates Hand Hygiene • 30-day unplanned readmissions • Infection (CAUTI, CLABSI, SSI, etc.)
Clinic Flow	•Waiting room times •Patient wait times in exam rooms •Outpatient pharmacy wait times
Schedule Utilization	•No-show appointment rates •Cancellation rates •MD schedule utilization •Turnaround times- machines, labs, rooms

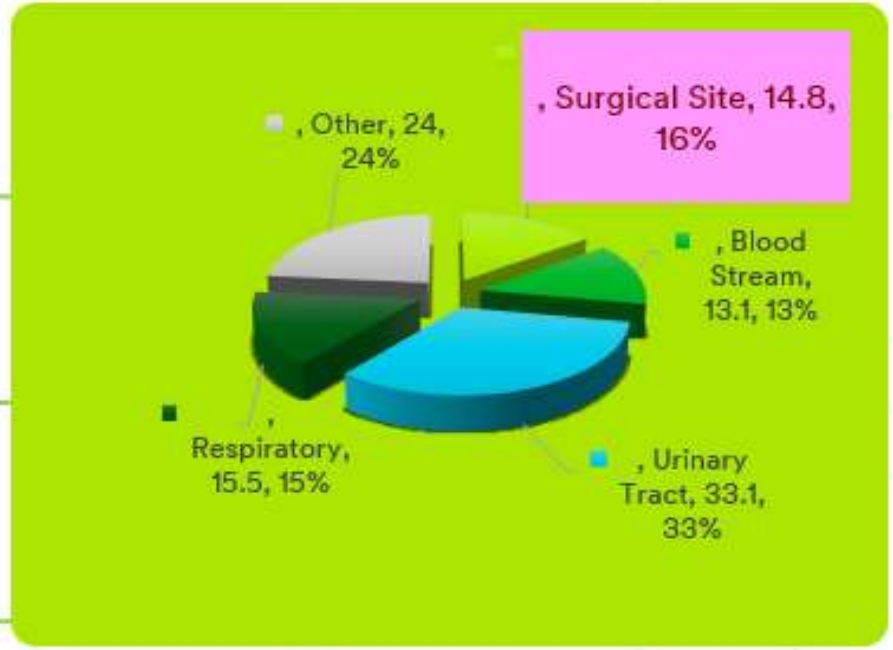
Health care Associated Infection threatens patient safety

Health-care-associated infection (HAI) is a major global safety concern for both

Every year , Hundreds of millions of patients are affected by health care-associated infections worldwide,

Burden of HAI increase :

- ✓Mortality and Morbidity Estimated 2 M Infection/year
- ✓Increase Hospital length of stay 1 to 30 days
- ✓Increase Cost Year



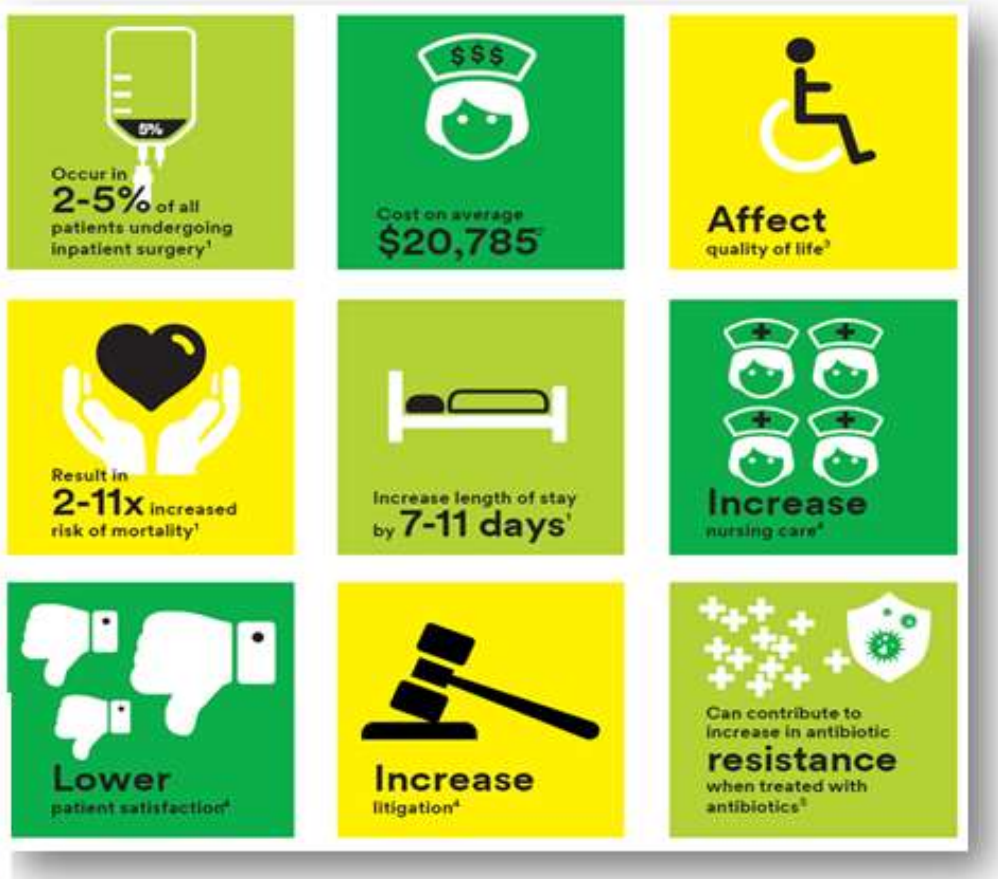
Up to 50% of HAI could have prevented

1-WHO Information Sheet 1 "Clean care is Safer Care Challenge".
2.Patient Safety and Hand Hygiène Matter ! – CPSW Week 2006 brochure
3.Yalcin 2003

Burden of SSIs

- SSI is one of the most frequent type of HAI with a huge burden on healthcare systems, providers, patients and community

60 % of SSIs are **preventable**



1. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for prevention of surgical site infection. *Infect Control Hosp Epidemiology*. 1999;20:247-78.
Anderson, D., et al. Strategies to Prevent Surgical Site Infections in Acute Care Hospitals: 2014 Update. Infection Control and Hospital Epidemiology. 2014; 35(6), 605-627. doi:1. Retrieved from http://www.jstor.org/stable/10.1086/676022 doi:1
2. Zimlichman E, Henderson D, Tamir O, et al. Health Care-Associated Infections: A Meta-analysis of Costs and Financial Impact on the U.S. Health Care System. *JAMA Internal Medicine*, Dec. 9/23, 2013. 173(22), 2042-2044.
3. Whitehouse et al. The impact of surgical-site infections following orthopedic surgery at a community hospital and a university hospital: adverse quality of life, excess length of stay, and extra cost. Infect Control Hosp Epidemiology. 2002; 23(4):183–189.
4. Prevention and treatment of surgical site infection. NICE Clinical Guidelines https://www.nice.org.uk/guidance/cg74/evidence/full-guideline-242005933 Published October 22, 2008. Accessed December 13, 2016.
5. Cars O, Nordberg P. Antibiotic resistance - the faceless threat. International Journal of Risk and Safety in Medicine. 2005; 17:103-110

Source of Microorganism

Where Micro Organism comes from?	
Operating Room (OR) Environment and ventilation	Whyte et al., J. Hosp. Infect. (1991) 18:93-107 Brown,A.R., et al., J.Hosp.Infect.(2001) 48:117-131 Edminston, CE et al., Surgery (2005) 138:573-582
OR Staff	Huebner,J. Annu.Rev.Med. (1999) 50:223-236
Patient flora	vonEiff, et al., Eur.J.Clin.Microbiol.Infect.Dis. (1999) 18:843-846 Brown,A.R., et al., J.Hosp.Infect.(2001) 48:117-131 (ultraclean air systems present) Garvin,K.L. and Urban, J.A., Total hip infections in Musculoskeletal Infections (2003) pp. 241-293

Risk Of Surgical Site Infection (SSI)

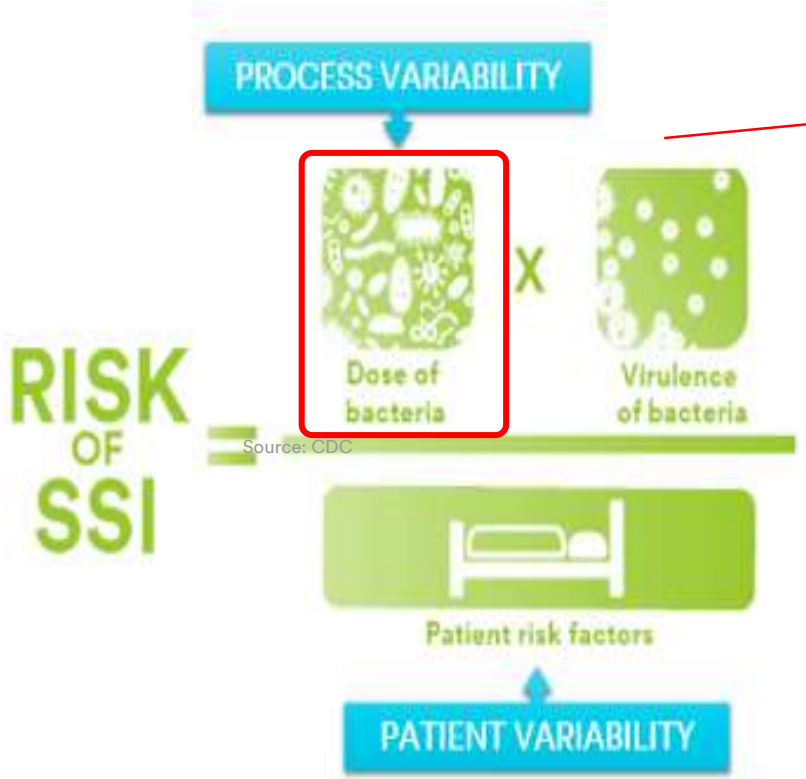
Patient Risk factors
Patient Variability

- Age
- Co-morbidity, e.g., Diabetes
- Compromised Immune System
- Obesity
- Nutritional Status
- Nicotine Use
- Prolonged Preoperative Stay
- Steroid Use
- Duration of Surgery
- Remote Site Infection (Not treated prior to surgery)

1 Mangram AJ, Horan TC, Pearson ML, Silver LC, and Jarvis WR. Guideline for prevention of surgical site infection. *Infect Control Hosp Epidemiol.* 1999/-2017 ;4:247-278. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/24799638.

Risk Of Surgical Site Infection (SSI)

According to the CDC's conceptual formula for SSI Risk, **SSIs are impacted by the number of microbes that contaminate an incision during surgery**[1]



3 Primary Vectors of Contamination

Environment

- Air
- Surfaces
- Equipment
- Instruments

Surgical Team

- Hands
- Hair
- Clothes / bodies
- Breath

#1 Cause

Patient's Own Skin

- Skin
- Nares
- Oral / mucosal cavities

Most surgical site infections are caused by contamination of an incision with microbes from the patient's own skin

1 Mangram AJ, Horan TC, Pearson ML, Silver LC, and Jarvis WR. Guideline for prevention of surgical site infection. *Infect Control Hosp Epidemiol.* 1999/-2017 ;4:247-278. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/24799638.

The first factor is contamination from patient's own skin

Patient's Own Skin

- Skin
- Nares
- Oral / mucosal cavities

The skin can contain over 1,000,000 bacteria per sq cm [1]

It can take as few as 10 microbes per sq cm* to cause a surgical site infection[2]

By reducing the number of microorganisms, we can reduce the risk of infection

* When implant present

1. Percival SL, Emanuel C, Cutting KF, Williams DW. Microbiology of the skin and the role of biofilms in infection. *Int Wound J*. 2012;9:14-32.
2. Feldman G, et al. Recent advances in the basic sciences: osteoarthritis, infection, degenerative disc disease, tendon repair and inherited skeletal diseases. In: Austin MS, Klein GR, ed. *Recent Advances in Orthopedics.* Philadelphia, PA Jaypee Medical Inc; 2014: 256.

How Do We Get to Zero SSI?

Don’t operate

Surgical patient safety

Operating room is one of the most complex work environments in health care setup.

Complexity manifests on :

1. Patient
2. Type of surgery
3. Structure of Operating room
4. Hospitals protocols and policies
5. Technology and Equipment's
6. Instrument cleaning/sterilization process
7. Coordination among the surgical team.

Global Initiatives and Programs to Prevent SSIs

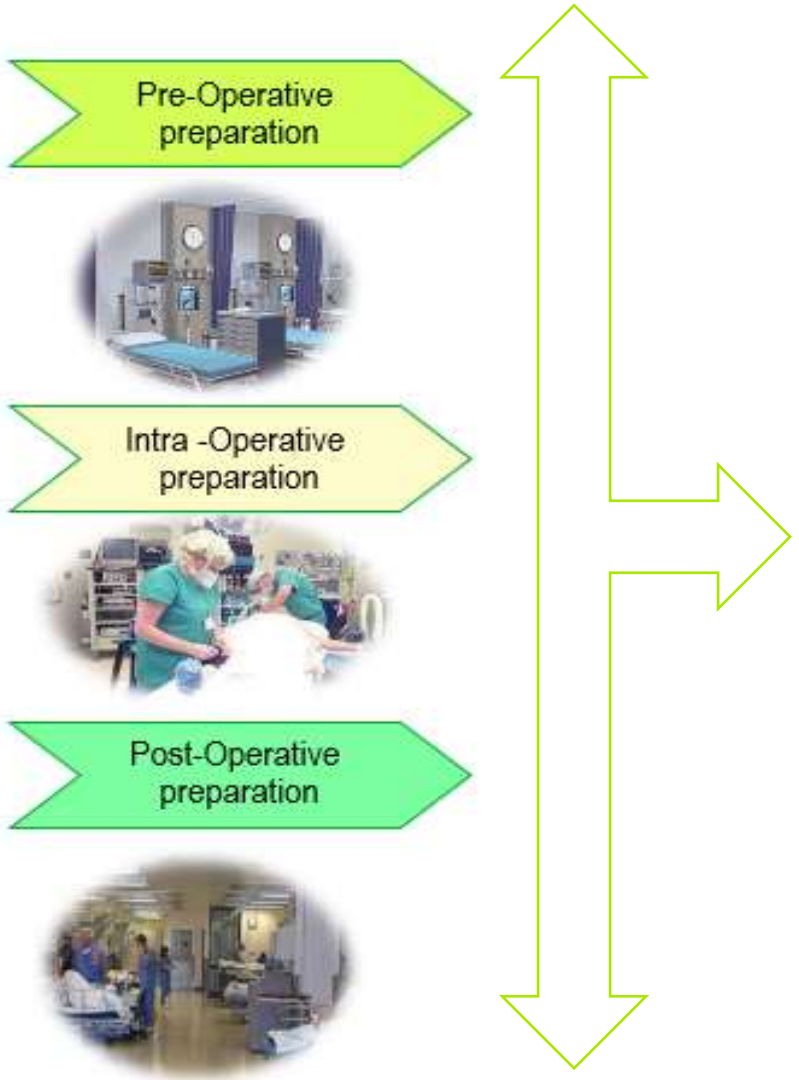
To provide comprehensive strong evidence- and expert consensus-based recommendations to :

1. Increase awareness of the global burden of SSI and how to prevent it.
2. Provide programs focus on surgical safety,
3. Improve Patient safety, satisfactions and outcomes
4. Protect Health care team and community

Global strategies and programs to achieve safe surgery

1. Patient Education
2. Hand Hygiene
3. Prophylaxis Antibiotics
4. Patient perioperative Preparation
5. Promote Safe surgery in Operating Room
6. Surgical Safety Program
    - Safe Surgery Saves Lives Programs
    - Surgical Pathway
        - Bundle of Care

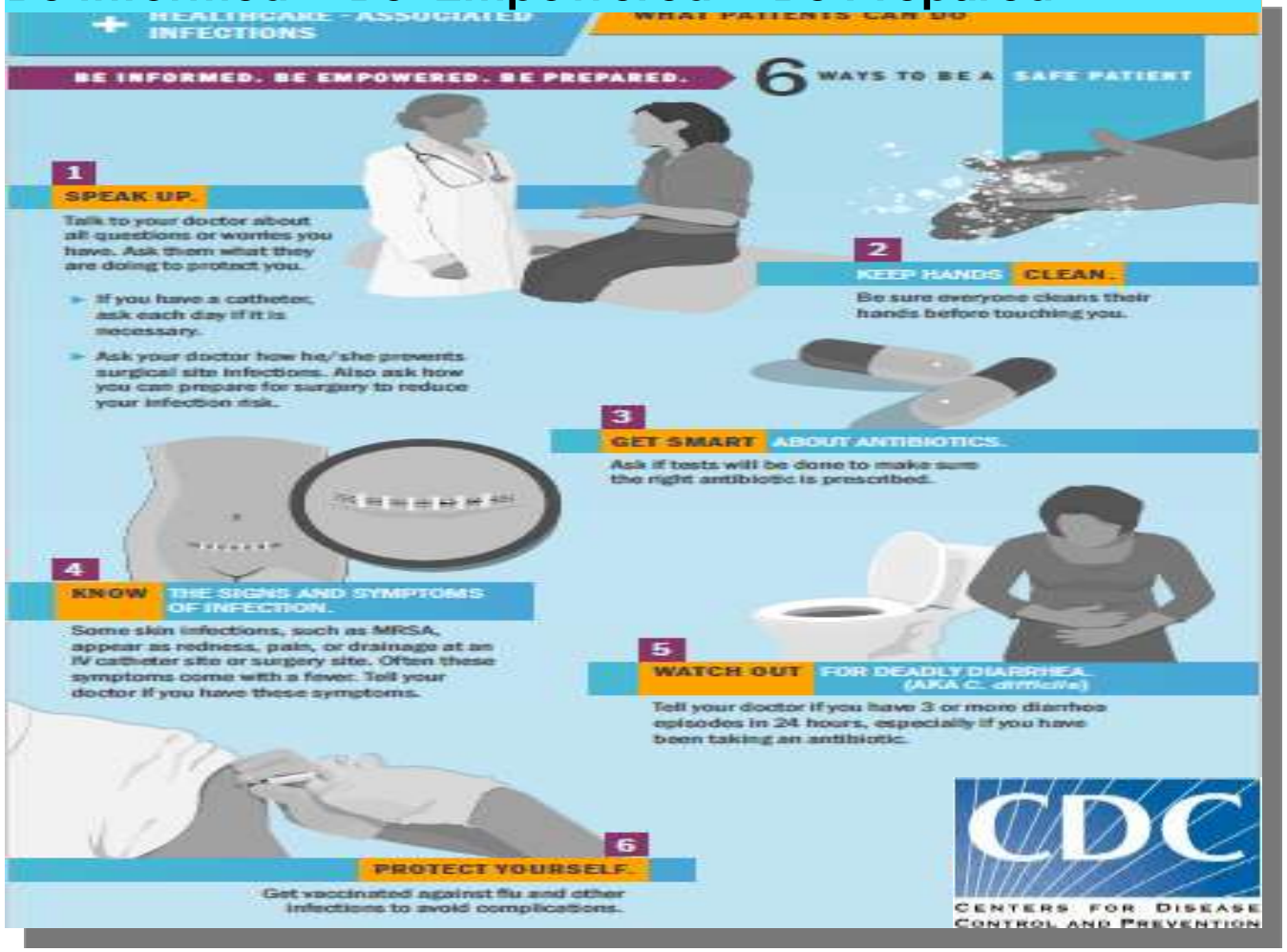
Global strategies and programs to achieve safe surgery



1. Patient Education
2. Hand Hygiene
3. Prophylaxis Antibiotics
4. Patient perioperative Preparation
5. Promote Safe surgery in Operating Room
6. Surgical Safety Program
    - Safe Surgery Saves Lives Programs
    - Surgical Pathway
        - Bundle of Care

Patient Education is Part of Safe Surgery

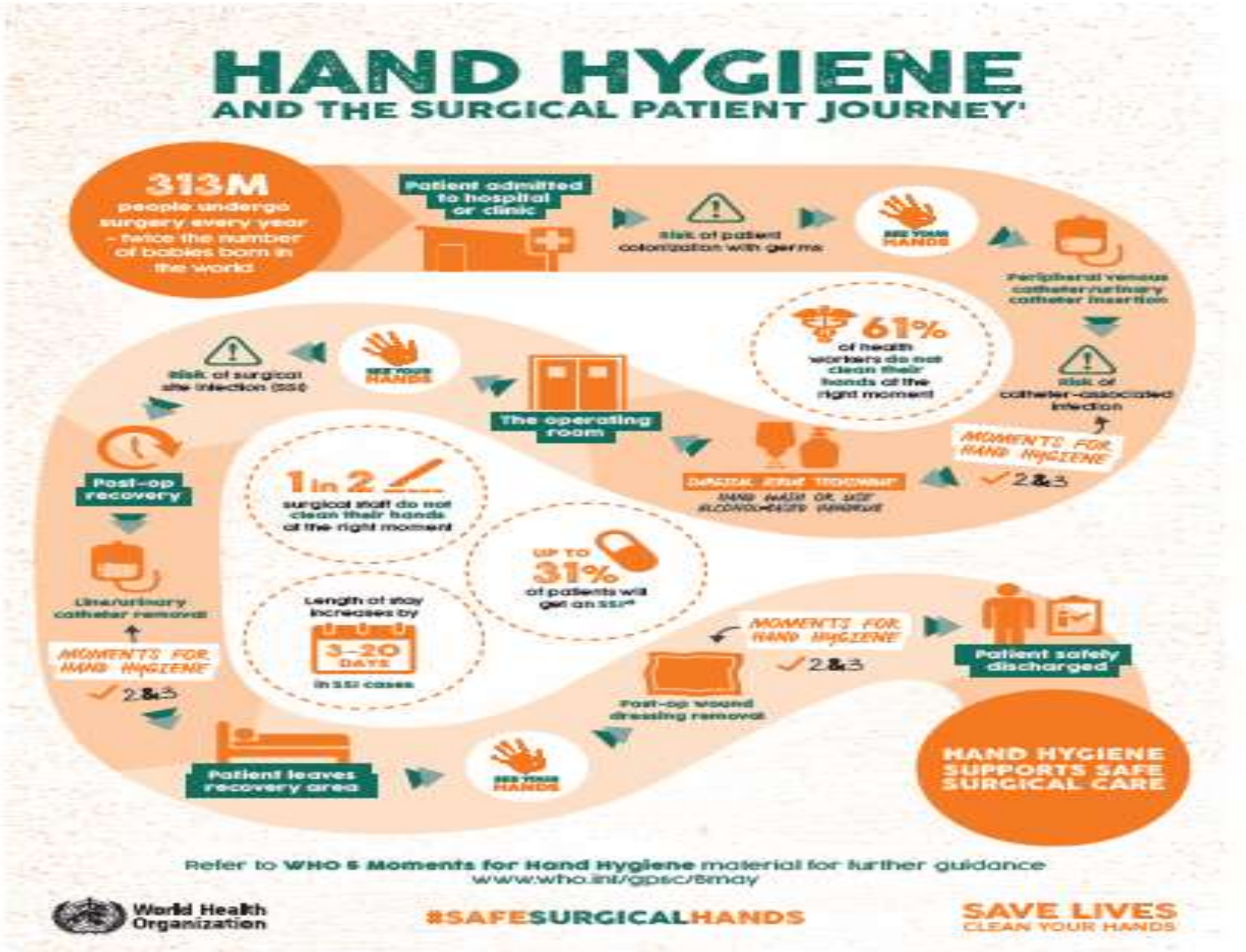
Be Informed – Be Empowered - Be Prepared



Patient Surgical Journey preparation start from home

Global strategies and programs to achieve safe surgery

1. Patient Education
2. Hand Hygiene
3. Prophylaxis Antibiotics
4. Patient perioperative Preparation
5. Promote Safe surgery in Operating Room
6. Surgical Safety Program
    - Safe Surgery Saves Lives Programs
    - Surgical Pathway
        - Bundle of Care



Hand Hygiene is the gold standard to prevent HAI

Surgical Team Preparation

Surgical Hand Scrub: Alcohol-based Antiseptic Hand Rub

1. No artificial nails in the OT
2. Keep natural nails tips less than ¼ inch long (not extend beyond fingertips)
3. Remove all rings, watches, bracelets
4. Don a surgical mask
5. If visible soil is present on hands, wash with soap and water
6. Remove all debris under fingernails with a nail cleaner while under running water
7. Use Antiseptic solution with alcohol base and persisting activities
8. Don't use the Brushes –Use Water less brushless scrub less solution to preserve skin integrity
9. **Apply manufacturer's recommendation ONLY .**

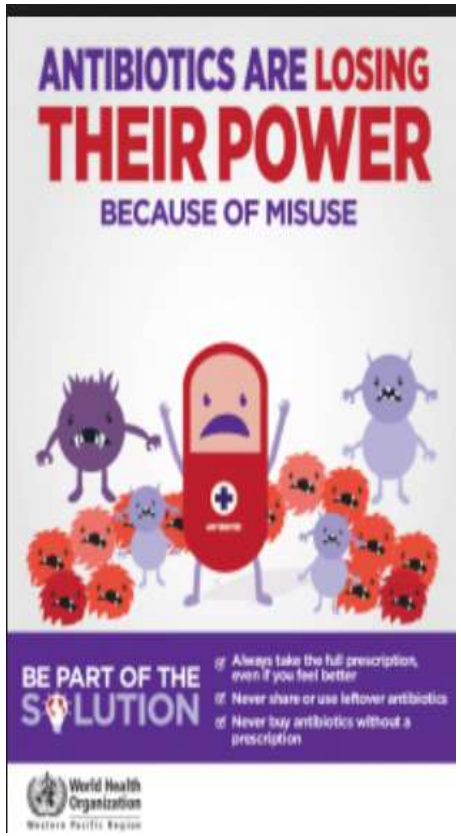
Global strategies and programs to achieve safe surgery

1. Patient Education
2. Hand Hygiene
3. Prophylaxis Antibiotics
4. Patient perioperative Preparation
5. Promote Safe surgery in Operating Room
6. Surgical Safety Program
    - Safe Surgery Saves Lives Programs
    - Surgical Pathway
        - Bundle of Care

Antibiotics are Losings Their power because of MISUSE

Select appropriate Antibiotic prophylaxis agents based on:

1. Surgical procedure
2. Most common SSI pathogens for the procedure
3. Published recommendations



The appropriate **Time** :

Administer within **1 hour** prior to incision

2hr for vancomycin and fluoroquinolones

Appropriate **Dosage** :

weight based. Repeat dose if surgery extends past the ½ life of the drug

Appropriate Agent for gram negative and gram positive organisms and surgical procedure

Discontinue antibiotic within 24 hours of the end of surgery except for cardiac surgeries ,Antibiotics should be stopped within 48 hours

Fry DE. Surgical Site Infections and the Surgical Care Improvement Project (SCIP): Evolution of National Quality Measures. Surg Infect 2008;9(6):579-84.

Global strategies and programs to achieve safe surgery

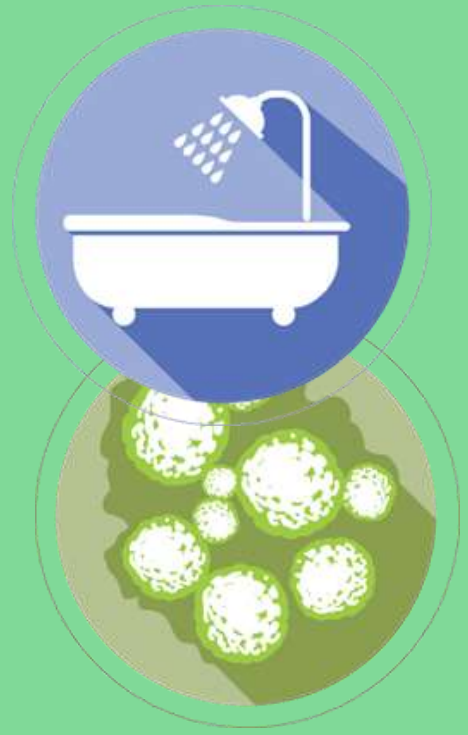
1. Patient Education
2. Hand Hygiene
3. Prophylaxis Antibiotics
4. Patient perioperative Preparation
5. Promote Safe surgery in Operating Room
6. Surgical Safety Program
    - Safe Surgery Saves Lives Programs
    - Surgical Pathway
        - Bundle of Care

Holistic Approach for Patient Preparation

Surgical patient preparation to optimize outcomes and reduce risks

Prior to admission

Preoperative



Surgery

Post Surgery

Discharge

Patient Preparation

Patient Preparation Following a consistent approach for preparing patients for surgery, aligned to guidelines and best practices, it the most effective way to manage contamination from the patient's skin

Consistent Standardized Practice
- Assessments
- Protocol Development
- Education

Nasal Decolonization

Patient Bathing

Hair Removal (w. clippers)

Surgical Prepping

Antimicrobial Incise Drapes

Wound care

Preoperative

Intraoperative

Postoperative surgery

Hair Removal

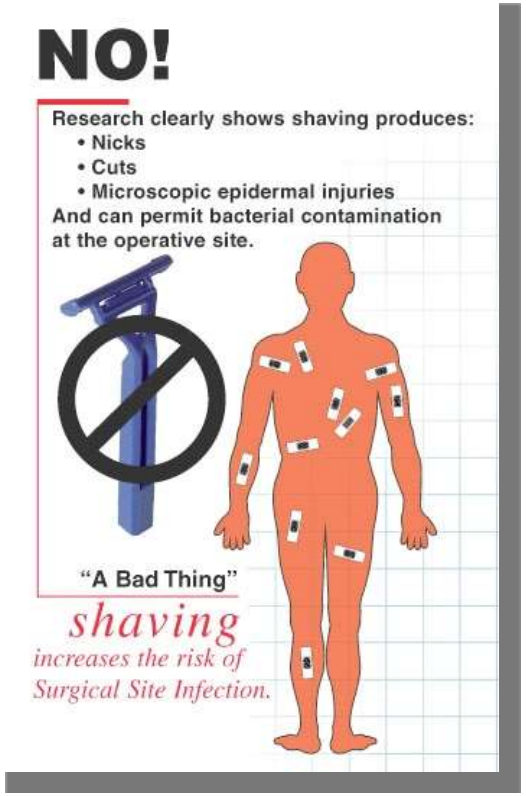
Hair Removal Guidelines and recommendations

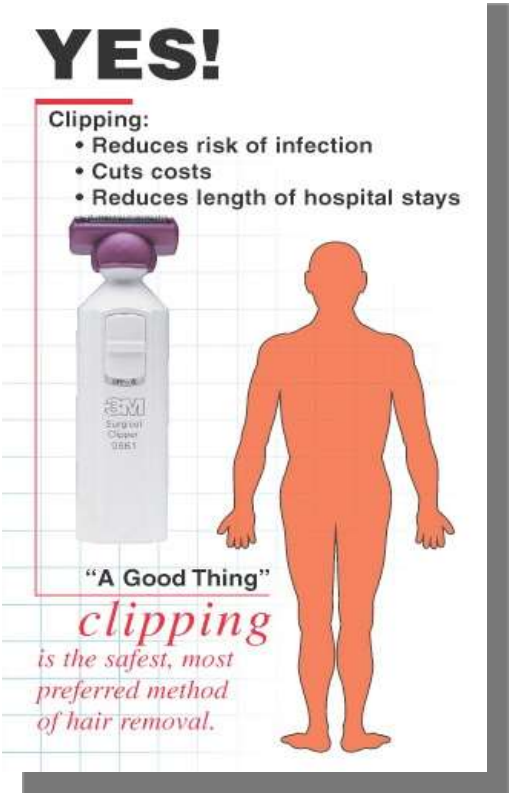
CDC Published 2017	WHO Published 2016	NICE Published 2008	AORN Published 2014
• Do not remove hair	• For all surgery types, hair	• Do not use hair removal routinely to	• Hair removal at the surgical site should be performed only in select clinical situations.
• If hair removal is necessary, remove immediately before the operation, with clippers.	strongly discouraged.	of surgery. • Do not use razors for hair removal, because they increase the risk of surgical site infection.	Patients should be instructed not to shave at home. • **Hair should be removed in a location <u>outside</u> the operating room or procedure room.**

- **Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the operation** (Category IA)
  - **If hair is removed, remove immediately before the operation preferably with <u>electric clippers</u>** (Category IA)
    - **Hair should be removed in a location <u>outside</u> the operating room or procedure room**

Hair Removal Campaign

Clipping vs. Shaving is Changing Behavior





Education is the key driver to increase Bundle of care compliance and cut the risk of SSI

Recommended Practices to improve Preoperative Hair Removal Process

1. Have a policy in place indicate the use of clipper for hair removal and **NO Hair removal is done in the operating theater.**

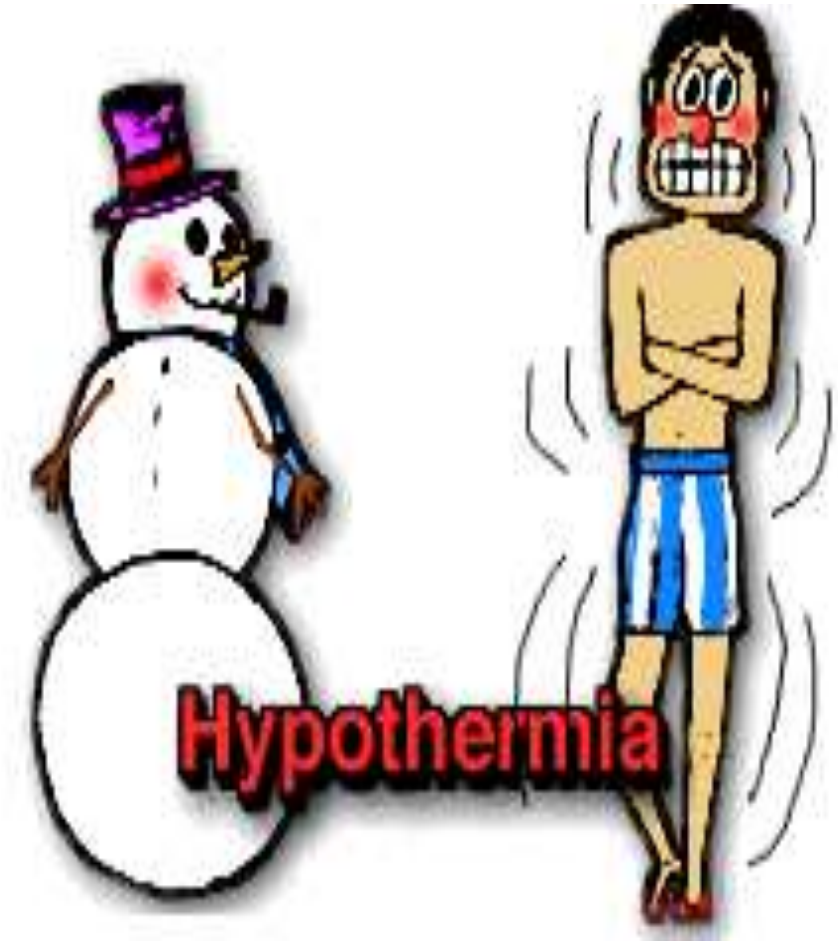
2 . Remove all razors from preoperative areas , the operating theater, and supply areas

3. Perform hair removal when necessary with clippers right before surgery

4 .Provide patient education and materials on appropriate hair-removal techniques to prevent shaving at home

Prevent Hypothermia

Prevent Hypothermia –Part of Safe surgery



Inadvertent hypothermia occurs in 50% to 90% of patients, unless treated*

*Aesthetic Surg J 2006;26:551-571.

Skin Prepping

Patient Skin preparation

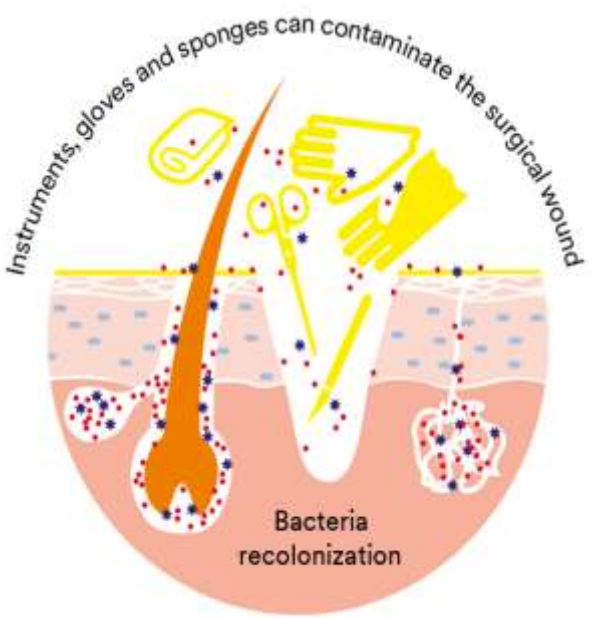
- Reducing bacteria at the surgical site may help reduce surgical site infection.
- Effective skin antiseptics rapidly and persistently remove transient microorganisms and reduce resident microorganisms to subpathogenic levels
- **Use single use applicator and avoid Multi-Dose Antiseptics**
- **Use the right antiseptics for the right procedures**
- **There is no one antiseptics for all type of surgeries : Depends on patient history and surgery**
- **Follow up manufactory instruction**

1. AORN. Guideline for Preoperative Patient Skin Antisepsis. *Guidelines for Perioperative Practices*. Denver, Colorado: AORN, Inc. 2017.

Prepping Alone is Not enough

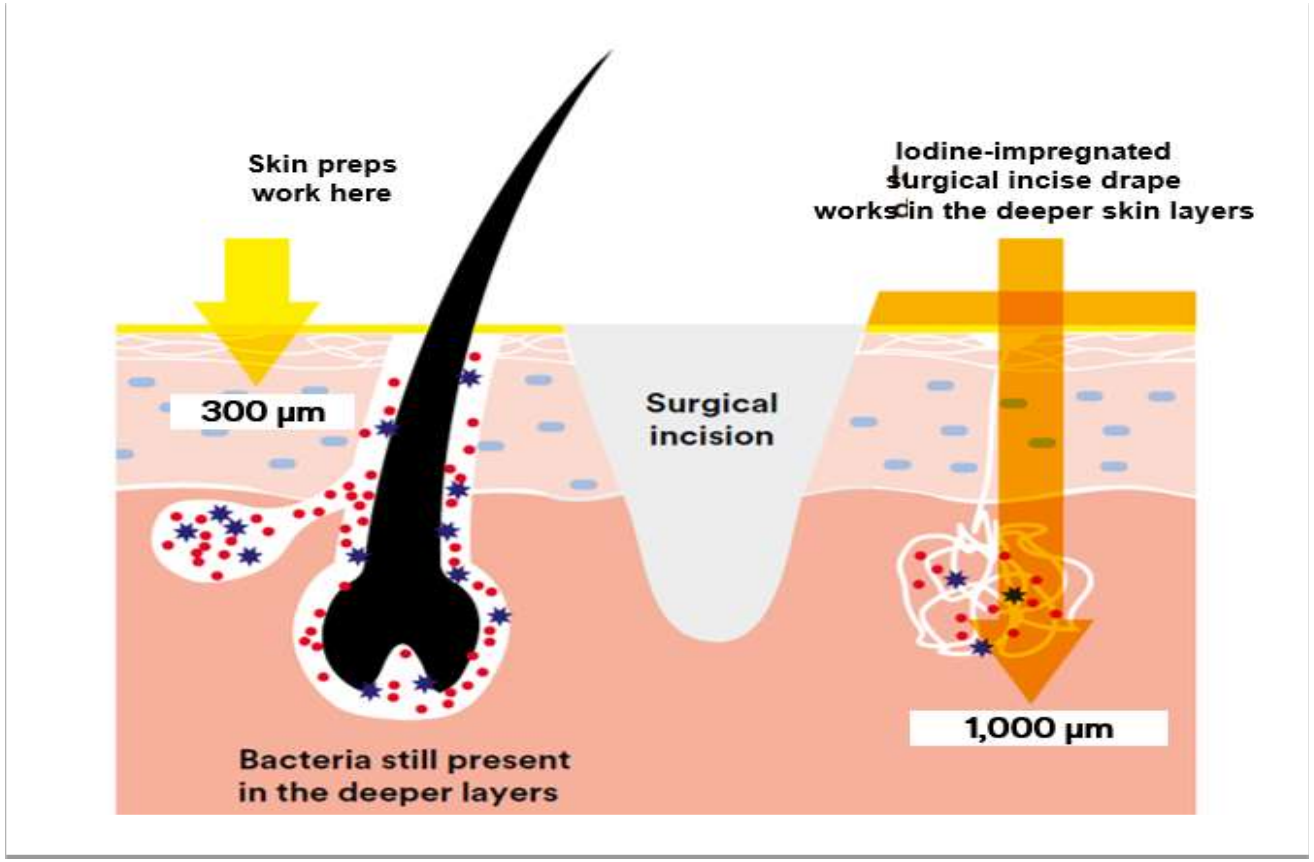
Preps work primarily on the skin surface, not in the deeper skin layers. The skin is never sterile

Why do we where gloves during surgery?



New Evidence in the Fight Against SSI

Skin penetration of skin Antiseptics .CHG vs Iodine

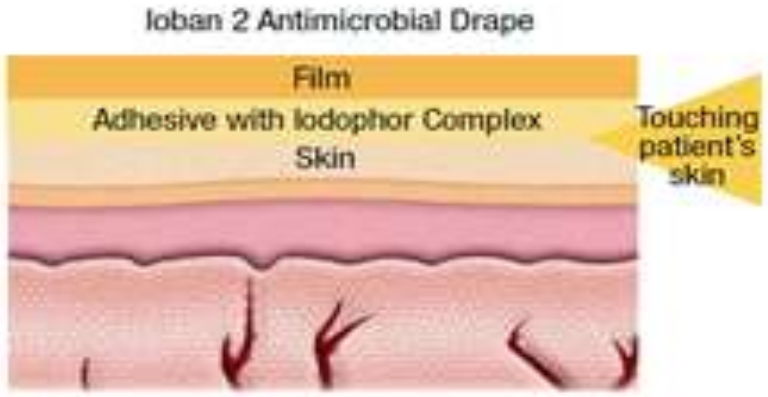


In a recent ex vivo study on human skin, the iodine in an iodine-impregnated surgical incise drape was shown to be present at concentrations effective against methicillin-resistant Staphylococcus aureus (MRSA) at a depth of 1000 microns, in the deeper layers of the skin where hair follicles are present [1]

1. Casey AL, Karpanen TJ, Nightingale P, Conway BR, Elliott TSJ. Antimicrobial activity and skin permeation of iodine present in an iodine-impregnated surgical incise drape. J Antimicrobial Chemotherapy. 2015.

Incise Drape with Antimicrobial activity :

1. Provides a sterile surface
2. Prevents bacterial migration
3. Prevents strikethrough
4. Keeps other drapes in place



Incise Drape Guidelines

CDC Published 2017, WHO Published 2016	(UK) NICE[1] Published 2008	(Canadian) Agency for Drugs and Technologies in Health Published 2011	(Australian) NHMRC[2] National Health and Medical Research Council Published 2013
• <u>CDC:</u> The use of plastic adhesive drapes with or without antimicrobial properties is not necessary for the prevention of SSI. • <u>WHO:</u> Plastic adhesive incise drapes, with or without antimicrobial properties, should not be used	• Do not use non-iodophor-impregnated incise drapes routinely for surgery as they may increase the risk of surgical site infection. • **If an incise drape is required, use an iodophor-impregnated drape unless the patient has an iodine allergy.**	• Do not use non-iodophor-impregnated incise drapes routinely for surgery as they may increase the risk of surgical site infection • **If an incise drape is required, use an iodophor-impregnated drape unless the patient has an iodine allergy**	• **If an incise drape is required, use an iodophor-impregnated drape unless the patient has an iodine allergy.** • Do not use non-iodophor-impregnated incise drapes routinely for surgery as they may increase the risk of surgical-site infection. • Ensure skin preparation is dry before draping the patient.

Incise Drape Guidelines 2018

Commission for Hospital Hygiene and Infection Prevention (KRINKO) guidelines for Germany

The use of antimicrobial coated incise drapes reduces wound contamination and eliminates the SSI rate associated with the use of non-antimicrobial coated incision drapes.

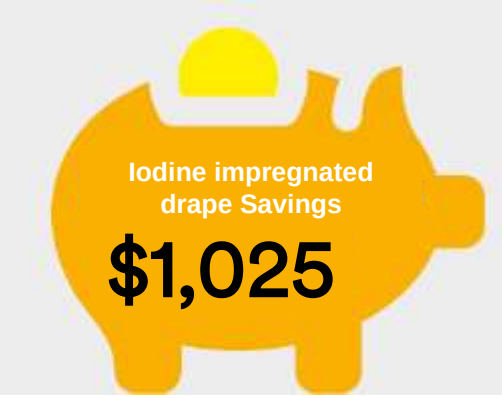
New clinical study shows that an iodine impregnated drape can help reduce the risk of infection as well as reduce overall cost

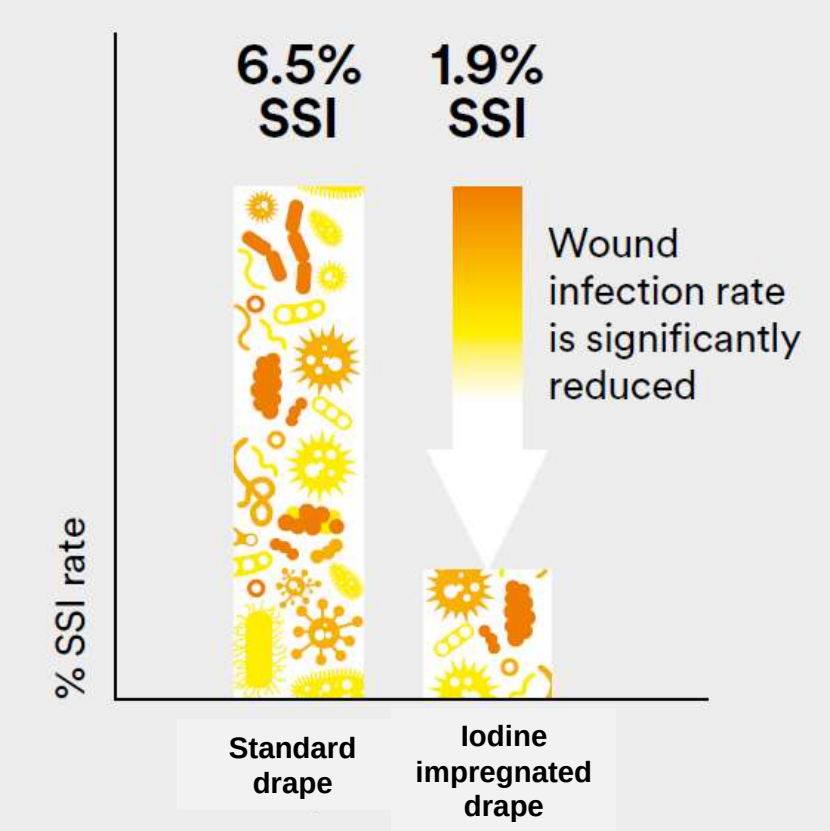
Bejko et al.

Comparison of efficacy and cost of iodine impregnated drape vs. standard drape in cardiac surgery

In a new prospective randomized study of 5,100 patients undergoing cardiac surgery, 3M Ioban was associated with:

- A significant reduction **(71%)** in the overall incidence of SSIs when compared with the use of a non-antimicrobial incise drape [1]
- Cost-effective direct patient-related care, delivering overall cost savings of **$828,000 (or about $1,025 per patient)** [1]



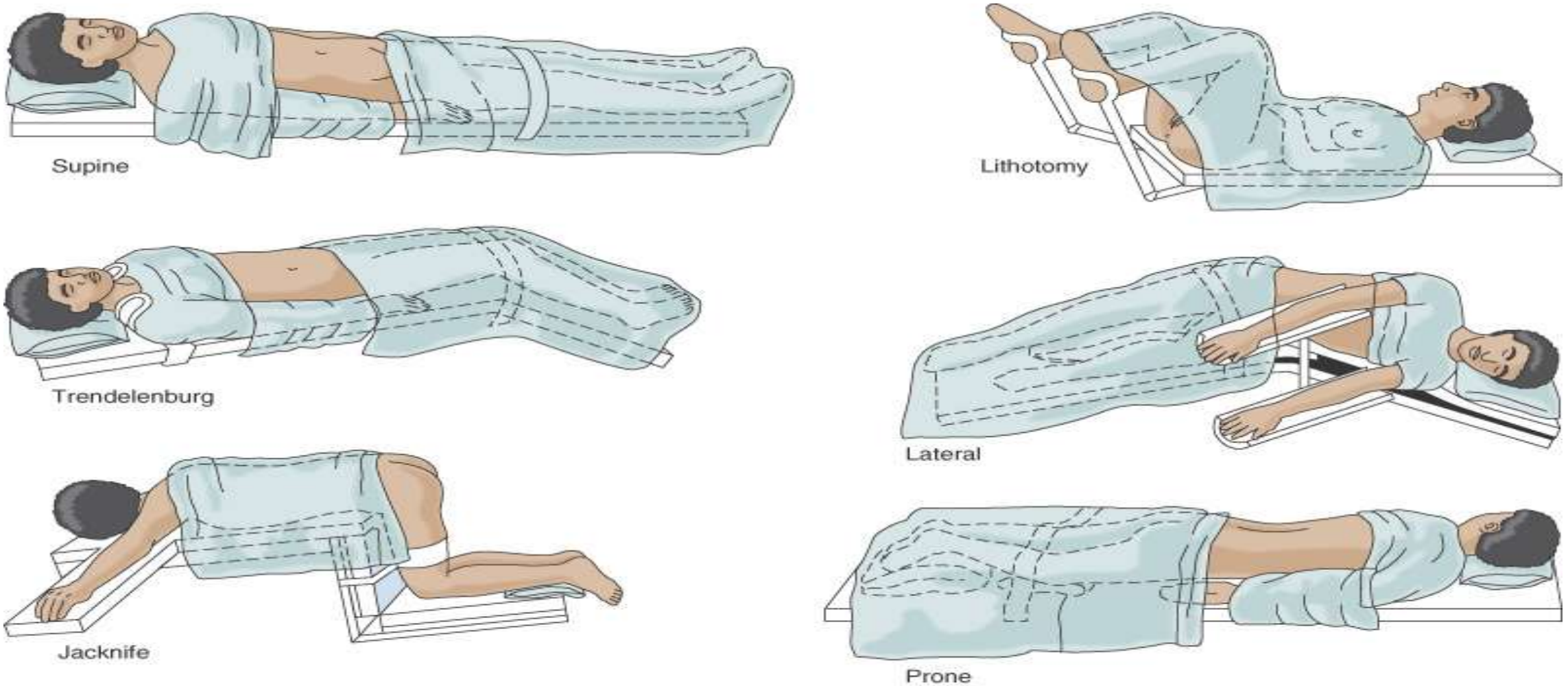


1 Bejko et al. Comparison of efficacy and cost of iodine impregnated drape vs. standard drape in cardiac surgery: Study in 5100 patients. J Cardiovasc Trans. Res. 2015; 8:431-437

Global strategies and programs to achieve safe surgery

1. Patient Education
2. Hand Hygiene
3. Prophylaxis Antibiotics
4. Patient perioperative Preparation
5. Promote Safe surgery in Operating Room
6. Surgical Safety Program
    - Safe Surgery Saves Lives Programs
    - Surgical Pathway
        - Bundle of Care

Patient Positioning



Operating Room Traffic Patterns

The surgical area is composed of three areas

Unrestricted Area

- Central control point (front desk) monitor the entrance of patients, personnel, and materials
- Street clothes are permitted in this area
- Traffic is not limited

Semi-restricted Area includes

- Scrub sink areas
- Storage areas for clean and sterile supplies
- Work areas for processing surgical instruments
- Corridors leading to the surgical suite
- Traffic is only for authorized team members and patients

Restricted Area includes

- Operating Room
- Traffic is only allowed for authorized team members and patients
- Surgical team wear scrub attire,
- Head and facial hair is covered
- Masks are worn if open sterile supplies and during the surgery

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major article

Traffic flow in the operating room: An explorative and descriptive study on air quality during orthopedic trauma implant surgery

Annette Erichsen Andersson RN [a,b,*], Ingrid Bergh RN, PhD [c], Jón Karlsson MD, PhD [d,e], Bengt I. Eriksson MD, PhD [d,e], Kerstin Nilsson RN, PhD [a]

[a] Institute of Health and Care Sciences, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden
[b] Department of Anesthesia, Surgery and Intensive Care, Sahlgrenska University Hospital, Gothenburg, Sweden
[c] School of Life Sciences, University of Skövde, Skövde, Sweden
[d] Department of Orthopedics, Sahlgrenska University Hospital, Gothenburg, Sweden
[e] Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

Key Words:
Surgical site infection
Door opening
Air sampling
Colony-forming units

Background: Understanding the protective potential of operating room (OR) ventilation under different conditions is crucial to optimizing the surgical environment. This study investigated the air quality, expressed as colony-forming units (CFU)/m^3, during orthopedic trauma surgery in a displacement-ventilated OR; explored how traffic flow and the number of persons present in the OR affects the air contamination rate in the vicinity of surgical wounds; and identified reasons for door openings in the OR.
Methods: Data collection, consisting of active air sampling and observations, was performed during 30 orthopedic procedures.
Results: In 52 of the 91 air samples collected (57%), the CFU/m^3 values exceeded the recommended level of <10 CFU/m^3. In addition, the data showed a strongly positive correlation between the total CFU/m^3 per operation and total traffic flow per operation ($r = 0.74$; $P = .001$; $n = 24$), after controlling for duration of surgery. A weaker, yet still positive correlation between CFU/m^3 and the number of persons present in the OR ($r = 0.22$; $P = .04$; $n = 82$) was also found. Traffic flow, number of persons present, and duration of surgery explained 68% of the variance in total CFU/m^3 ($P = .001$).
Conclusions: Traffic flow has a strong negative impact on the OR environment. The results of this study support interventions aimed at preventing surgical site infections by reducing traffic flow in the OR.

Surgical Team Role and collaborations in surgical safety

Surgeons/Surgical Assistant

1. Surgical technique
2. Handling of tissues
3. Aseptic Technique
4. Maintain sterile field

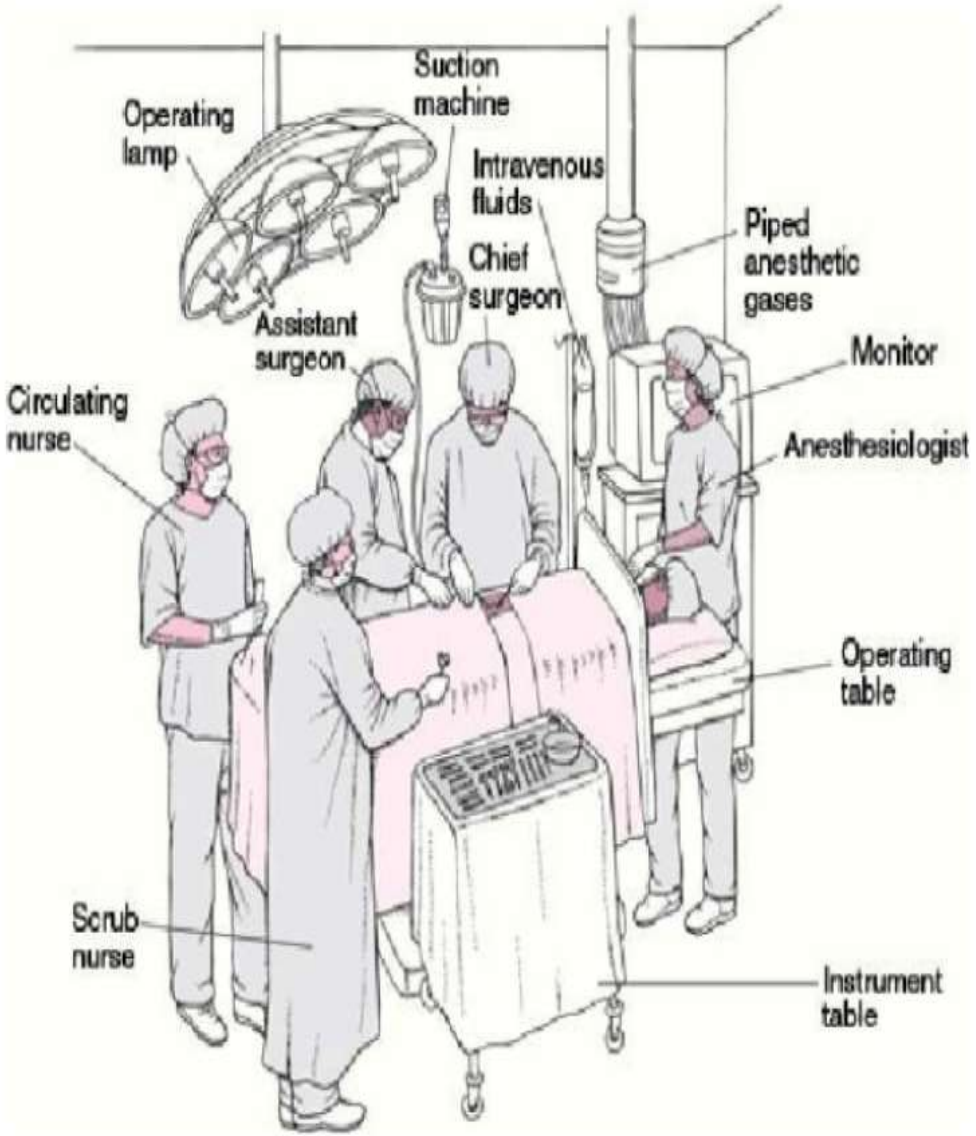
Holding Area Nurse
OR Technician
Peri operative nurses

- Circulating Nurse :
  1. Planning for optimal care during surgery
  2. Coordinating all personnel with the OR
  3. Monitoring compliance/PPE and traffic flow
  4. Patient documentation
  5. Handling Specimens

- Scrub Nurse
  1. Prepare supplies and Instruments
  2. Maintain Sterile field
  3. Safe handling of Instruments
  4. Maintain Accurate counts of sponges ,needles ,instruments before and after surgery
  5. Wound cleaning and dressing

Anesthesiologist
Anesthesia technician

1. Prepare medication
2. Prepare Anesthesia machine
3. Estimated Blood and fluids
4. Maintain Hemodynamic stability
5. Alert surgeons immediately to any complications



Surgical Team Preparation

Surgical Attires

Every One entering Semi-Restricted and Restricted Areas MUST wear Surgical Attire to prevent transmission of MO from Staff to patient and verse versa.

- **Normal individuals shed more than 10 million particles from their skin every day.**
- **Approximately 10% of skin squames carry viable microorganisms**

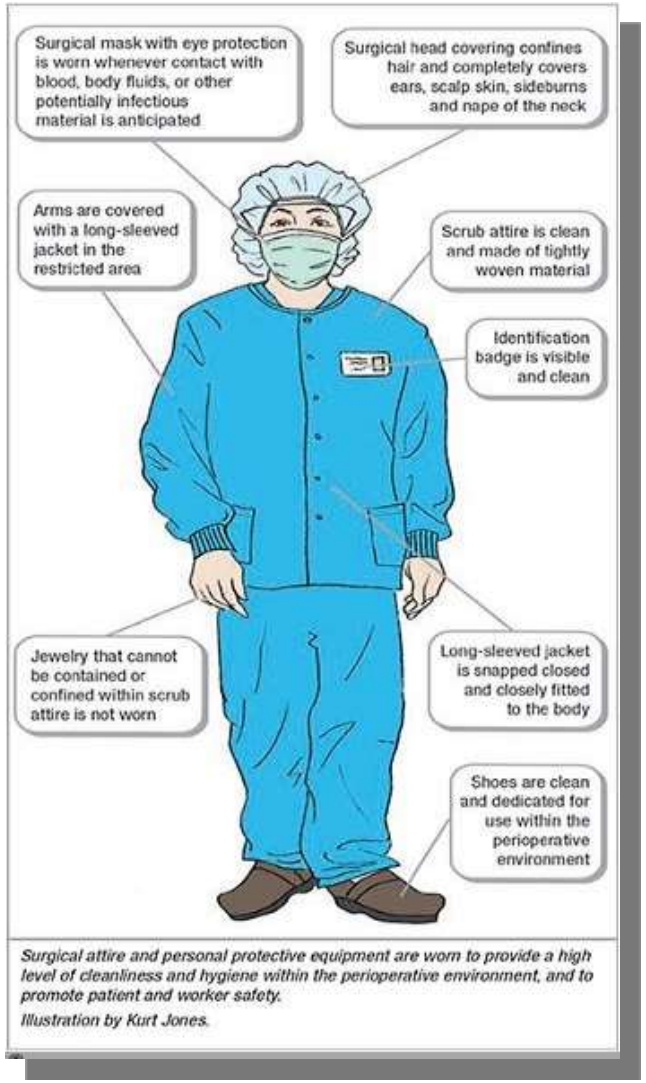
1. Scrub Gowns
2. Hair covers
3. Cover jacket.
4. Gloves (Double gloving)
5. Eye protection
6. Dedicated Shoes for OR
7. **Mask**

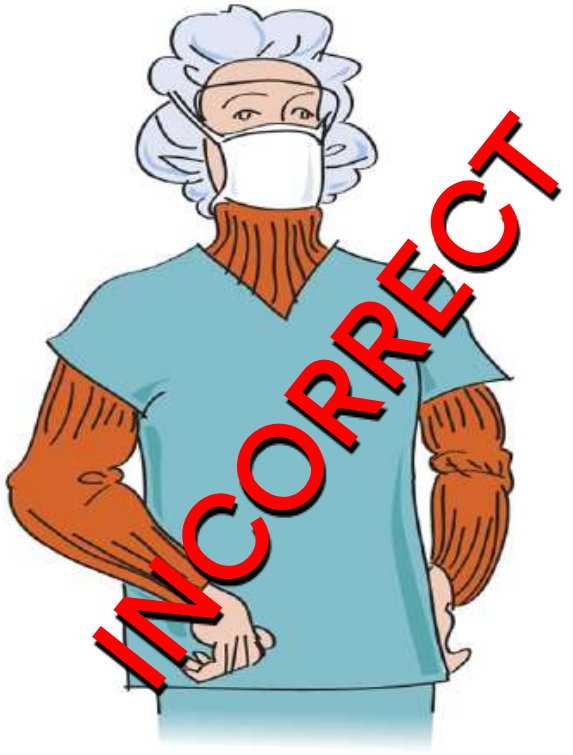
Surgical masks should be changed between procedures

AORN

Association of perioperative Registered Nurses

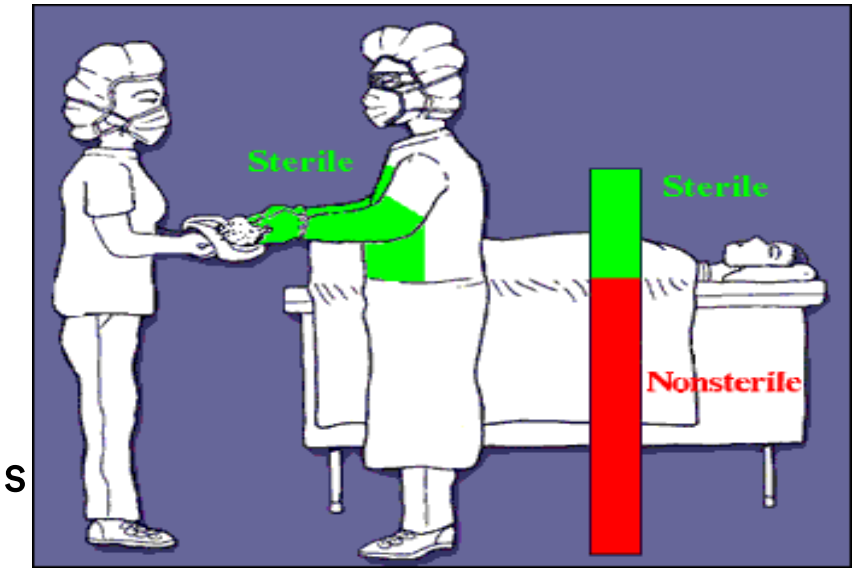
Dress code in Operating ROOM

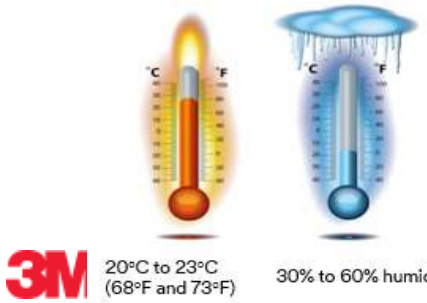




Aseptic Practices Enhance Patient Safety

1. Wear Sterile Gowns and gloves
2. Use sterile Instruments /Check sterility
3. Create sterile field by using a barrier drapes
4. Sterile fields protected and monitored
5. Monitor Movement of surgical team in OR (Back to back)
6. Adhere to principles of sterile technique during surgery
7. Unscrubbed personnel MUST not pass between two sterile fields
8. Avoid Foley catheter on the floor
9. Instrument cleaning and control sterilization process
10. Double gloving /Change gloves before closing
11. Control Temperature and Humidity in OR
12. Have a policy in place to cover all the topics above





AORN
Association of periOperative Registered Nurses

3M Health Care Academy

Operating Room Door **Must be Closed**

Closing doors stops deadly surgical site infections in Uganda
May 2016

World Health Organization

In Uganda, At Kisiizi Hospital in Uganda's southwest taking a bath before surgery, closing the door to the operating theatre and ensuring surgeons clean their hands properly can be the difference between life and death.

A study involving more than 650 surgical patients, showed the rate of infections halved after new measures were introduced.

As a result, patients are spending less time in hospital, resulting in cost-savings for both the patient and the hospital.

Effects of the Introduction of the WHO "Surgical Safety Checklist" on In-Hospital Mortality: A Cohort Study

van Klei, W. A. MD, PhD*; Hoff, R. G. MD, PhD*; van Aarnhem, E. E. H. L. MD†; Simmermacher, R. K. J. MD, PhD‡; Regli, L. P. E. MD, PhD§; Kappen, T. H. MD*; van Wolfswinkel, L. MD, PhD*; Kalkman, C. J. MD, PhD*; Buhre, W. F. MD, PhD*; Peelen, L. M. PhD*,¶

Annals of Surgery: January 2012 - Volume 255 - Issue 1 - p 44–49

Objective: To evaluate the effect of implementation of the WHO's Surgical Safety Checklist on mortality and to determine to what extent the potential effect was related to checklist compliance.

Background: Marked reductions in postoperative complications after implementation of a surgical checklist have been reported. As compliance to the checklists was reported to be incomplete, it remains unclear whether the benefits obtained were through actual completion of a checklist or from an increase in overall awareness of patient safety issues.

Methods: This retrospective cohort study included 25,513 adult patients undergoing non-day case surgery in a tertiary university hospital. Hospital administrative data and electronic patient records were used to obtain data. In-hospital mortality within 30 days after surgery was the main outcome and effect estimates were adjusted for patient characteristics, surgical specialty and comorbidity.

Results: After checklist implementation, crude mortality decreased from 3.13% to 2.85% ($P = 0.19$). After adjustment for baseline differences, mortality was significantly decreased after checklist implementation (odds ratio [OR] 0.85; 95% CI, 0.73–0.98). This effect was strongly related to checklist compliance: the OR for the association between full checklist completion and outcome was

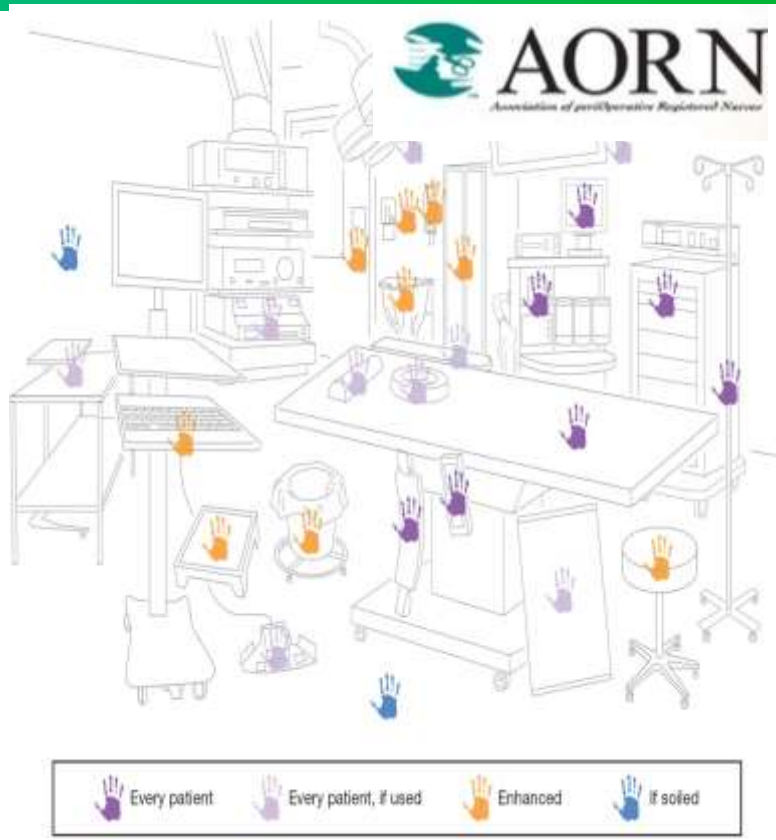
THE COCHRANE COLLABORATION®

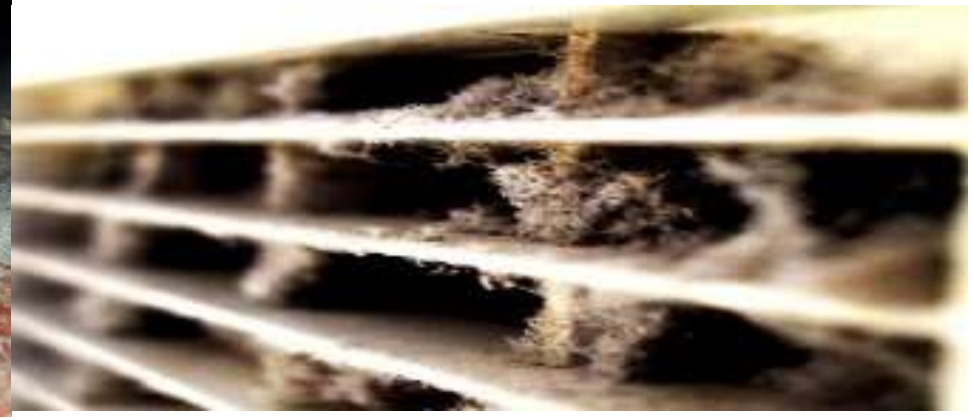
Environmental Cleaning

Daily when the OR is being used :

- Disinfection of all floors, **moving from clean to dirty**, perimeter to center, **with all mobile equipment moved**

- Cleaning and disinfection **of all exposed surfaces**, including wheels and casters, anesthesia equipment, OR equipment, storage cabinets, light switches, Filters …..
- Trash removed
- **Air handling systems: filtration**





Global strategies and programs to achieve safe surgery

1. Patient Education
2. Hand Hygiene
3. Prophylaxis Antibiotics
4. Patient perioperative Preparation
5. Surgical Safety Programs
    - Safe Surgery Saves Lives Program
    - Surgical Pathway
        - Bundle of Care

Safe Surgery Saves Lives Program

to improve surgical Safety Globally

(WHO-2007)

Safe Surgery Checklist: Lessons from the Aviation Industry

Surgical Safety Checklist

World Health Organization | Patient Safety

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 intravenal 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?

COMPREHENSIVE SURGICAL CHECKLIST

Blue = World Health Organization (WHO) Green = the Joint Commission - Universal Protocol 2016 National Patient Safety Goals Teal = Joint Commission and WHO

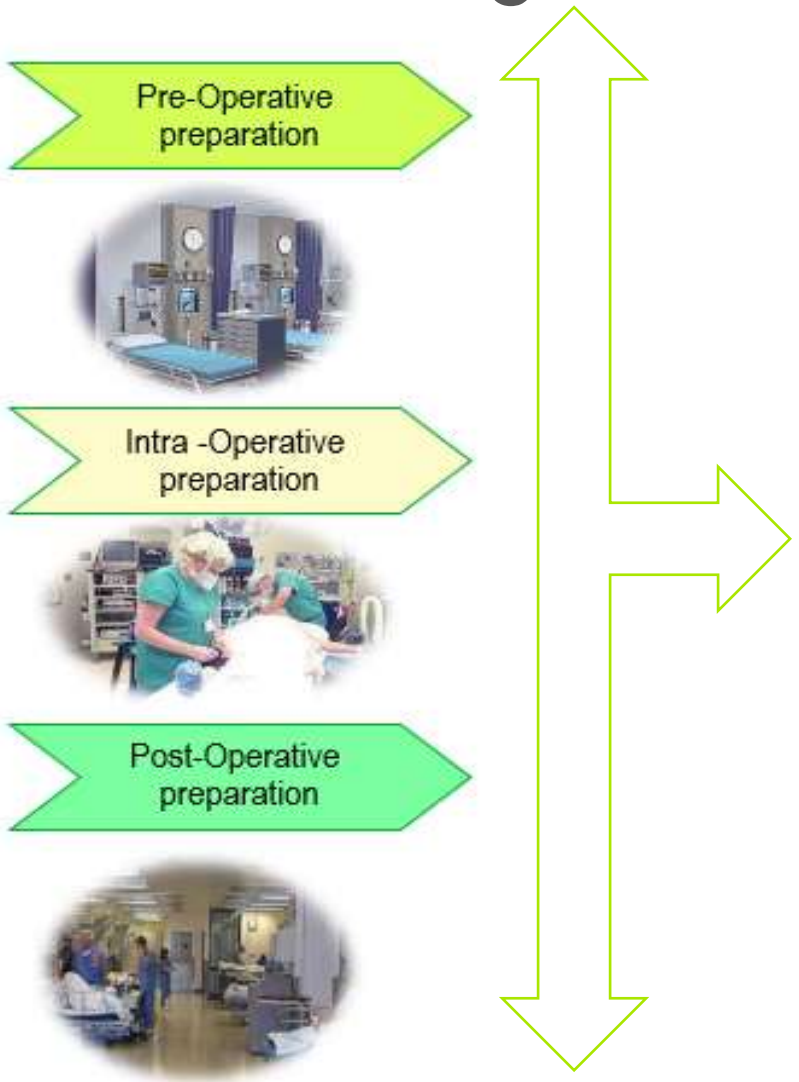
PREPROCEDURE CHECK-IN	SIGN-IN	TIME-OUT	SIGN-OUT
In Preoperative Ready Area	**Before Induction of Anesthesia**	**Before Skin Incision**	**Before the Patient Leaves the Operating Room**
Patient or patient representative actively confirms with registered nurse (RN): Identity ☐ Yes Procedure and procedure site ☐ Yes Consent(s) ☐ Yes Site marked ☐ Yes ☐ N/A by the person performing the procedure **RN confirms presence of:** History and physical ☐ Yes Preanesthesia assessment ☐ Yes Nursing assessment ☐ Yes Diagnostic and radiologic test results ☐ Yes ☐ N/A Blood products ☐ Yes ☐ N/A Any special equipment, devices, implants ☐ Yes ☐ N/A Include in Preprocedure check-in as per institutional custom: Beta blocker medication given ☐ Yes ☐ N/A Venous thromboembolism prophylaxis ordered ☐ Yes ☐ N/A Normothermia measures ☐ Yes ☐ N/A	**RN and anesthesia professional confirm:** Confirmation of the following: identity, procedure, procedure site, and consent(s) ☐ Yes Site marked ☐ Yes ☐ N/A by person performing the procedure Patient allergies ☐ Yes ☐ N/A Pulse oximeter on patient ☐ Yes Difficult airway or aspiration risk ☐ No ☐ Yes (preparation confirmed) Risk of blood loss (> 500 mL) ☐ Yes ☐ N/A # of units available _____ Anesthesia safety check completed ☐ Yes **Briefing:** All members of the team have discussed care plan and addressed concerns ☐ Yes	**Initiated by designated team member:** All other activities to be suspended (except in case of life-threatening emergency) Introduction of team members ☐ Yes **All:** Confirmation of the following: identity, procedure, incision site, consent(s) ☐ Yes Site is marked and visible ☐ Yes ☐ N/A Fire Risk Assessment and Discussion ☐ Yes (prevention methods implemented) ☐ N/A Relevant images properly labeled and displayed ☐ Yes ☐ N/A Any equipment concerns ☐ Yes ☐ N/A **Anticipated Critical Events** **Surgeon:** States the following: ☐ Critical or no routine steps ☐ Case duration ☐ Anticipated blood loss **Anesthesia professional:** Antibiotic prophylaxis within 1 hour before incision ☐ Yes ☐ N/A Additional concerns ☐ Yes ☐ N/A **Scrub person and RN circulator:** Sterilization indicators confirmed ☐ Yes Additional concerns ☐ Yes ☐ N/A **RN:** Documented completion of time out ☐ Yes	**RN confirms:** Name of operative procedure Completion of sponge, sharp, and instrument counts ☐ Yes ☐ N/A Specimens identified and labeled ☐ Yes ☐ N/A Equipment problems to be addressed ☐ Yes ☐ N/A Discussion of Wound Classification ☐ Yes **To all team members:** What are the key concerns for recovery and management of this patient? **Debriefing with all team members:** Opportunity for discussion of – team performance – key events – any permanent changes in the preference card June 2016

The Joint Commission does not stipulate which team member initiates any section of the checklist except for site marking. The Joint Commission also does not stipulate where these activities occur. See the Universal Protocol for details on the Joint Commission requirements.

AORN

3M

Global strategies and programs to achieve safe surgery



1. Patient Education
2. Hand Hygiene
3. Prophylaxis Antibiotics
4. Patient perioperative Preparation
5. Surgical Safety Programs
   - Safe Surgery Saves Lives Program
   - Surgical Pathway
     - Bundle of Care

How to achieve Safe Surgery ?

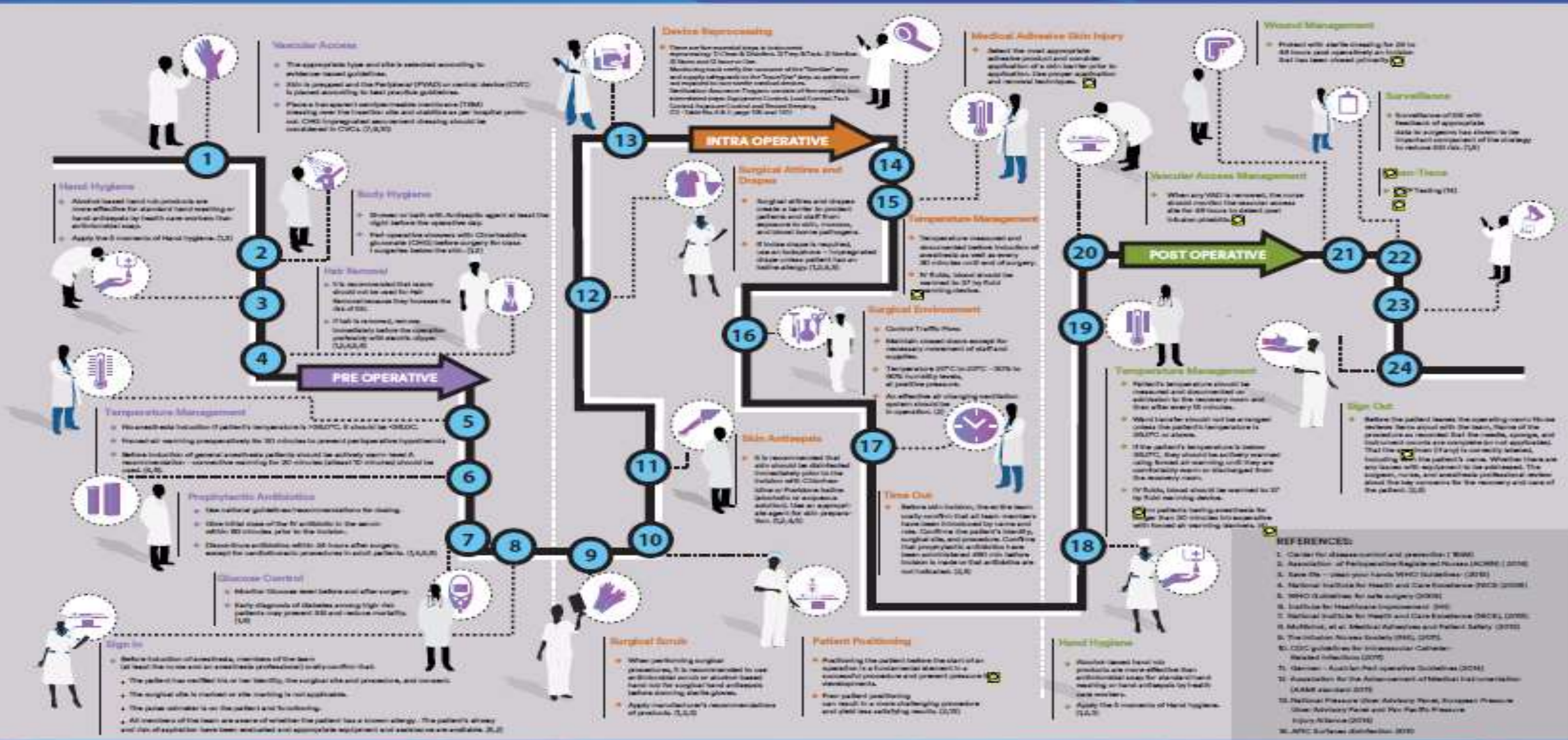
Implementation of Guidelines, protocols policies and Recommendations BUT knowledge not always transferred into practice and Compliance

Implementing *Clinical pathway improve surgical care*

Help to **Standardization practices and processes and Measure and monitor performance**

3M Science. Applied to Life.™

Infection Prevention Surgical Patient Care Pathway



Appropriate patient centered education will accompany each step of the patient care pathway

Surgical Patient Care Pathway

Pre Operative

- Hand Hygiene
- Vascular Access
- Body Hygiene
- Hair removal
- Temperature Management
- Prophylactic Antibiotics
- Glucose Control
- Sign In

Intra Operative

- Hand Hygiene
- Patient positioning
- Skin Antisepsis
- Surgical Attires and Drapes
- Instrument Management
- Medical Adhesive Skin Injury
- Temperature Management
- Surgical Environment
- Time Out

Post Operative

- Hand Hygiene
- Temperature management
- Vascular access Management
- Wound management
- Surveillance
- Environment cleaning
- Sign Out

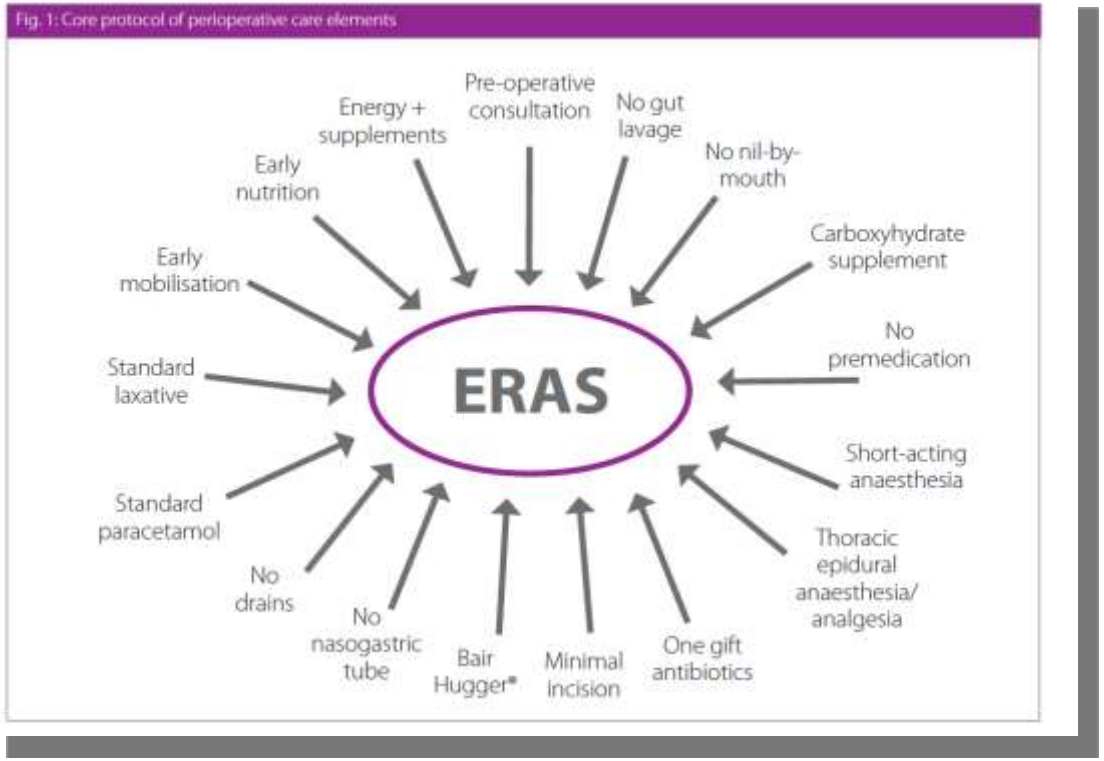
Enhanced Recovery After Surgery (ERAS) program

ERAS® Society

Multi-modal Peri-opererative care pathways designed to achieve early recovery after surgical procedures by maintaining pre-op organ function and reducing profound stress response following surgery.

Key Principles of the ERA

- Pre-operative counselling
- Pre-operative nutrition
- Avoidance of peri-operative fasting and carbohydrate loading up to 2 hrs pre-operatively
- Standardized anesthetic and analgesic regimens
- Early mobilization.
- Management of post-operative ileus
- Use of mechanical bowel preparation.



Benefits

- Reduction in complications and hospital stay
- Improvements in cardiopulmonary function.
- Earlier return of bowel function
- Earlier return of normal activities

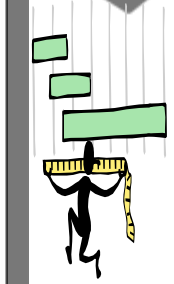
The introduction of an ERAS program results in cost reduction and surgical Site infection rates within major abdominal surgery.

Bundle Of care to prevent SSI

1. Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the operation (Category IA
2. If hair is removed, remove immediately before the operation, preferably with electric clippers (Category IA)

1. Select the appropriate prophylactic antibiotic for a specific surgical procedure based on current clinical guidelines.
2. Ensure the antibiotic is administered at the proper time, in the correct dose and for the recommended duration (Category IB–strong recommendation

Maintain perioperative Normothermia. (Category IA–strong recommendation.



Implement perioperative glycemic control and use blood glucose target levels less than 200 mg/dL in patients with and without diabetes. (Category IA–strong recommendation)

Best care Always!

Institute for Healthcare Improvement

Health Protection Scotland

CDC

Best Practice

Fact About Caesarean section deliveries

Caesarean section deliveries are an important surgical procedure that is used to **improve both maternal and fetal outcomes in complicated pregnancies**.

Caesarean section (CS) deliveries are on the rise not only in high income countries (HIC) but low and middle income countries (LMIC) too.

Elective CS deliveries are based on convenience rather than medical necessity in many countries across the world .

Besides the huge cost implications, CS rates are also associated with significant perinatal and maternal morbidity and mortality

World Health Organization (2010) World health statistics 2010. WHO Library Cataloguing-in-Publication Data.

Statistic about South Africa (SA)

1. For every 1 million births in South Africa, 800k are by means of caesarean sections (SASOG, 2016).

2. In Africa statistics show that 38% of all O&G procedures are complicated by infections (WHO, 2013).

Massyn N, Peer N, Padarath A, Barron P, Day C (2015) District Health Barometer 2014/15. Durban: Health Systems Trust.

MEDWIN PUBLISHERS
Committed to create value for Researchers

Open Access Journal of Gynecology
ISSN: 2474-9230

The Reduction of Surgical Site Infections in Cesarean Section Deliveries by Implementation of a Surgical Care Pathway

Jan 2015 – August 2016

1069 Patients

Ramesar SV[1]*, Hugo H[1], Bouwer B[1], Bilen C[2] and Mailula T[3]

[1]Infection Prevention Division, 3M South Africa Pty Ltd. Gauteng, Johannesburg

[2]Infection Prevention Division, 3M (Central Eastern Europe, Middle East & Africa), Dubai

[3]Department of Infection Control, Louis Pasteur Private Hospital, Pretoria

Research Article

Volume 2 Issue 3

Received Date: November 23, 2017

Published Date: November 27, 2017

Study Scope

The purpose of this study was to reduce the burden of SSI at a private hospital in South Africa by implementing a performance improvement project

Sample Population All women undergoing both **emergency and elective CS deliveries**, between 1 September 2015and 31 August 2016 were considered for this study **1069 Patients**

Ethical Considerations **Ethical approval was obtained from the hospital's clinical education department. All patient information remained anonymous throughout the duration of the study.**

Force Task team :

1. Infection control manager
2. Clinical facilitator
3. Operating room manager
4. Central services and sterilization department supervisor
5. Maternity ward manager

Surgical Checklist audit : 20 Indicators were measured

Pre-operatively

- Hand hygiene practices
- Preoperative antiseptic showering
- Preoperative hair removal
- Blood glucose control
- Antimicrobial prophylaxis.

Intraoperative phase

- Patient skin preparation in the operating room,
- Control of the operating room environment
- Surgical attire and drapes used
- Verification on the sterility of the surgical instruments and supplies
- Aseptic techniques
- Surgical technique.

Post-operative phrase

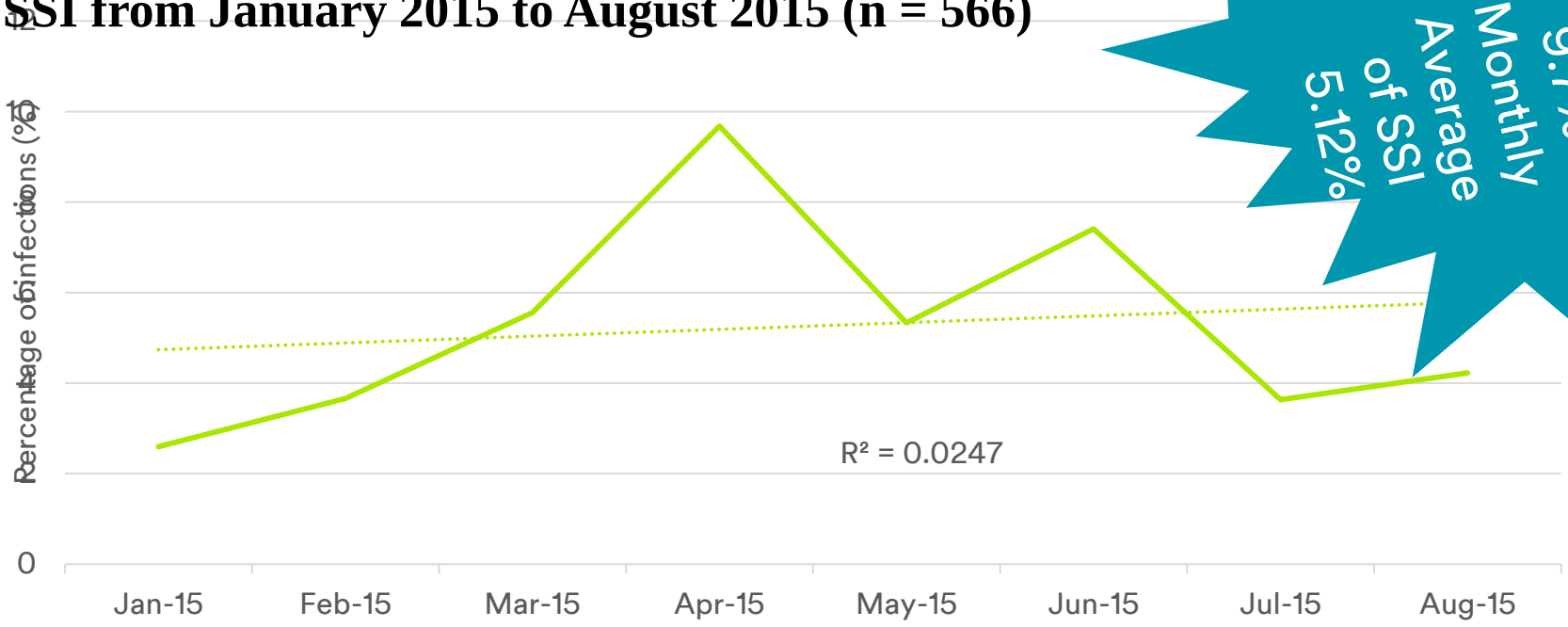
- Maintenance of Normothermia
- Wound management .

Adherence to the recommended practices were scored between

- 0 indicated non-compliance
- 1 indicated slight compliance,
- 2 indicated average compliance
- 3 indicated almost compliant
- 4 indicated compliant. The compliance percentage was calculated as the (Hospital Score / Maximum Score) x 100.

Rate of SSI during C-Section deliveries

The rate of SSI from January 2015 to August 2015 (n = 566)



SSI rate : 2.6% to 9.7%
Monthly Average of SSI 5.12%

Patient Developing SSI:

3.6 Patient per Month

Figure 1 : The rate of SSI was calculated as (number of SSI per month / number of CS deliveries per month) X 100 and is expressed as a percentage of the total number of CS Deliveries.

Audit of the existing surgical process

All processes with a percentage of 50 % and below were chosen as areas for improvement.

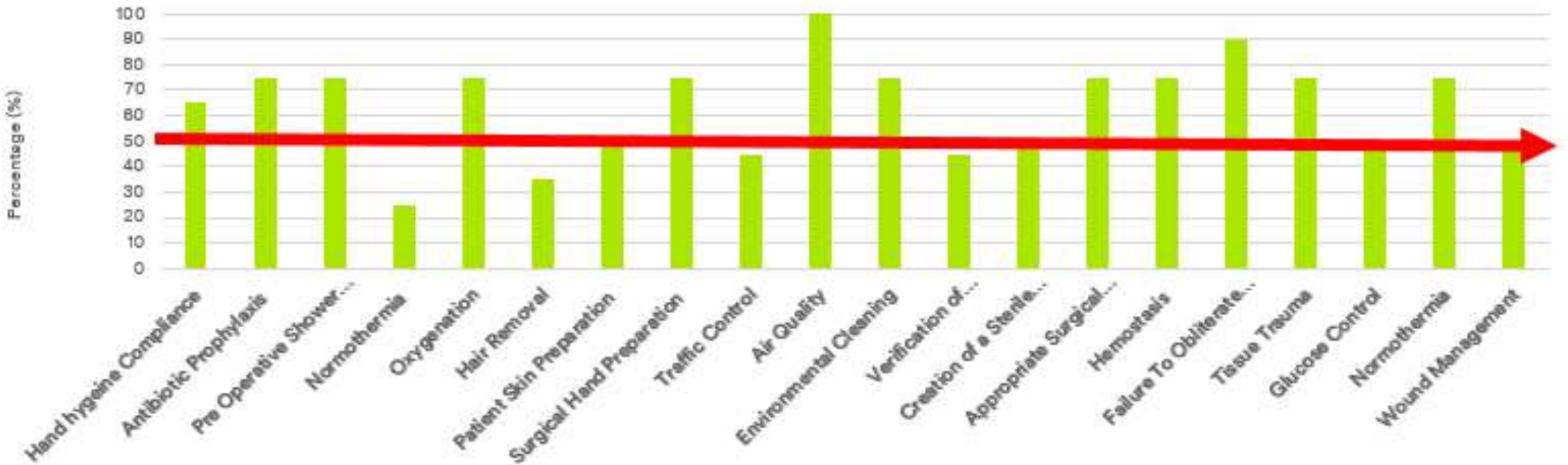


Figure 3 : The Percentage of compliance to the 20 key processes indicators in the perioperative pathway (n = 30). The percentage of compliance was calculated as the (Hospital Score / Maximum Score) x 100.

Outcomes of Gap Assessment of surgical process

Out of 20 process indicators 6 areas scored below 50% were as follows:

1. Hair removal (35%),
2. verification of instrument sterility (45%),
3. traffic control (45%),
4. patient skin preparation (50%),
5. postoperative glucose control (50%)
6. post-operative wound management (50%).

Implementing Surgical Safety Solutions improve patient outcomes in C/S

1. Preoperative Hair Removal: All women were advised not to remove their own pubic hair at home. Hair removal was performed **3M Surgical Clippers on the** day of surgery,

2. Patient Skin Preparation: The surgical skin preparation regime was changed from prepping with a CHG-alcohol combination (HIBISCRUB® cutaneous solution, BCM Ltd, UK - chlorhexidine gluconate 4% w/v (40mg/ml) as chlorhexidine digluconate solution; isopropyl alcohol) to an iodine povacrylex-alcohol solution **(DuraPrepTM,** Iodine povacrylex [0.7% available Iodine]; 74% isopropyl alcohol w/w).

3. Verification of Instrument Sterility: The CSSD staffs were educated on the necessity to include a chemical indicator (**ComplyTM Chemical Integrator, 3M** in every pack that was to be used for the CS delivery

4. Postoperative wound Management: The postoperative wound dressing regimen was improved by the introduction of a unique all-in-one sterile dressing **(3M™ Tegaderm plus pad**)

5. Operating Room Traffic Control: minimize number of individuals allowed into the operating room No disturbances were entertained by the surgical team for the duration of the procedure.

6. Postoperative Glucose Control: A postoperative blood glucose level was routinely monitored for 24 hours with blood glucose strips and a glucometer (Accucheck Active, Roche Diagnostics, Indiana, USA)

Results

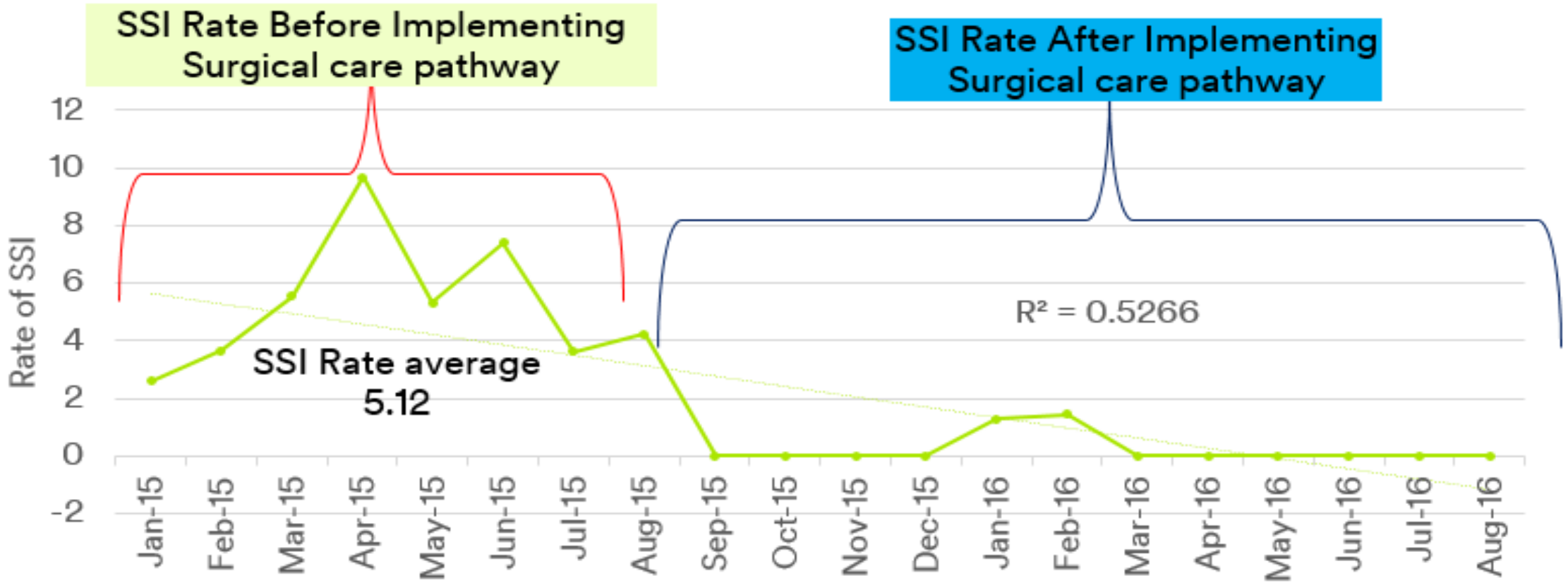


Figure 3 : The rate of SSI from January 2015 to August 2016. The rate of SSI was calculated as (number of SSI per month / number of CS deliveries per month) X 100 and is expressed as a percentage of the total number of CS deliveries.

Outcomes of Implementing Surgical Pathway

1. Introductions of evidence – Based medicine and clinical guidelines
2. Support clinical effectiveness ,Risk management and clinical audit
3. Improve communication and team work
4. Provides well defined standards for care
5. Help reduce errors /mistakes variations

1. Human reaction to change behavior
2. Increase work flood for new documentations, checklist /audit
   And action plan
3. Problems of introducing new concept it may take time to be accepted .
4. Requires “Buy in “ and Endorsement from management

Summary

1. Surgical site infections (SSIs) are a huge burden on healthcare systems and providers

2. **Surgical site infection is a complicated process that begins before the patient arrives at the hospital and continuous throughout their stay and well after discharge.**
3. The clinical team needs to understand the risks related to SSIs and what can be done to reduce the risks for best patient outcomes
4. **The best prevention is standardization of policies and procedures. Divided in 4 Key phases:**
   - **Patient education**
   - **Have a policy in place to drive practices**
   - **Patient preparation is critical clipping – skin prepping – Antimicrobial – prevent hypothermia**
   - **Implement Surgical Pathways and safety solutions to standardize practices and improve patients outcomes and enhance team collaboration.**
   - **Implement Peri-operative Safety Checklist/ Time out to improve patient safety and reduce errors and adverse events**
   - Patient safety is everyone responsibility

THANK YOU