SURGICAL SITE INFECTION (SSI) NATIONAL TRAINING MODULE

National SSI Committee
Ministry of Health Malaysia
August 2023

OVERVIEW OF THE SSI TRAINING MODULE

OUTLINE

Part A

- Introduction and background
- Why SSI?
- Objectives
- Definition of Terms
- Risk Factors of SSI
- Classifications
- Implementation

Part B

- Definitions
- Prevention Strategies
  - Pre-operative
  - Intra-operative
  - Post-operative
- Discharge

SSI TRAINING MODULE

What is SSI Training Module?

Aimed to train healthcare workers to perform their duties in the prevention and surveillance of SSI.

Why is SSI Training Module required?

To train HCW on the SSI guideline for the prevention of SSI in all healthcare facilities

To teach HCW on the current measures and strategies in SSI prevention

To educate on filling up form, data collection and surveillance

Who is the SSI Training Module for?

National SSI Committee

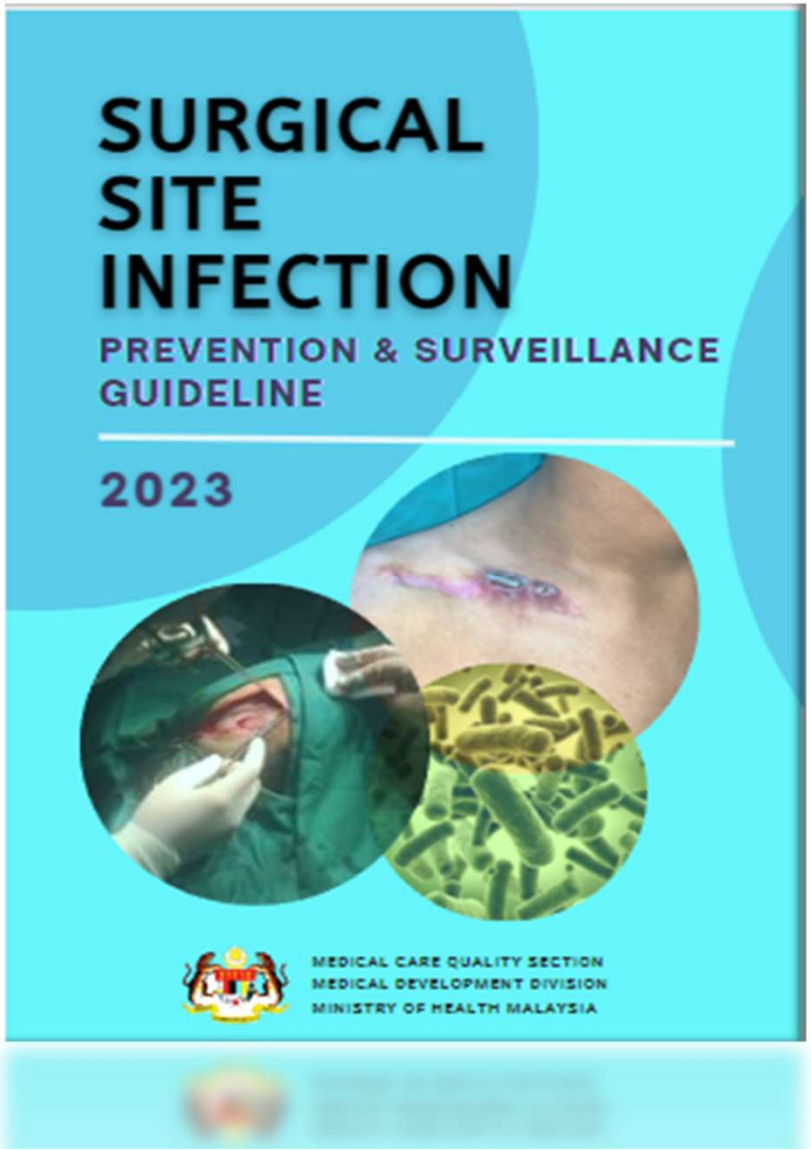
Hospital

State Health Department

HCW of all MOH hospitals
Surgeons
Medical Officers
Quality Officers
Infection Control Officers
Nurses
(preferably OT/ surgical-based ward nurses)
Assistant Medical Officer

SURGICAL SITE INFECTION (SSI) TRAINING MODULE PART A

INTRODUCTION & BACKGROUND



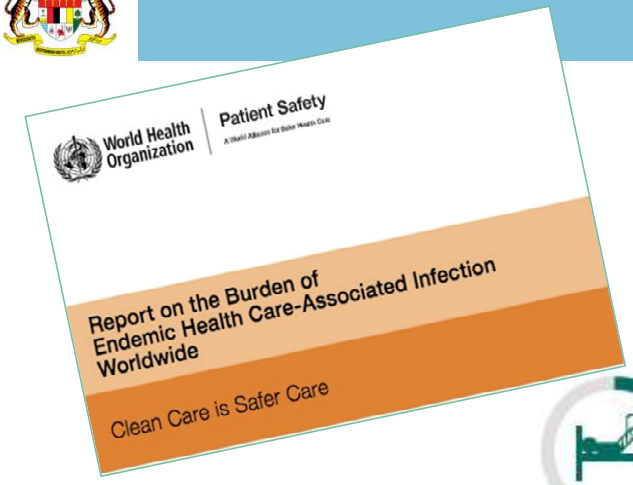
National Surgical Site Infection Committee 2023, MOH

Introduction

SSI is one of the most common types of healthcare-associated infection (HAI).

Ranges from trivial to life-threatening conditions which may require intensive care or re-operations.

SSI – The Global Impact



LOW- AND MIDDLE-INCOME COUNTRIES

More than 1 in 10 people who have surgery in low- and middle-income countries (LMICs) **get surgical site infections (SSIs)**

People's risk of SSI in LMICs is **3 TO 5 TIMES HIGHER** than in high-income countries

Up to **1 in 5 women in Africa** who deliver their baby by caesarean section get a **wound infection**

HIGH-INCOME COUNTRIES

In Europe, SSIs affect more than **500 000 PEOPLE** per year costing up to **€ 19 BILLION**

Around 1% of people who have surgery **in the USA get an SSI**

In the USA, SSIs contribute to patients spending more than **400 000 extra days** in hospital, costing **US$ 10 BILLION** per year

http://www.who.int/infection-prevention/publications/ssiguidelines/en/

SSI - The Global Impact

- Associated with 3% mortality rate[2].
  - Prevalence is underestimated due to poor recognition and underreporting.

Surgical Site Infection event (National Healthcare Safety Network, Centre for Disease Control (CDC), January 2022

- Most frequent type of Healthcare Associated Infection in Low Middle-Income countries
- Incidence : 1.2 - 23.6 per 100 procedures
  - Cumulative incidence LMIC 11.8% (HIC: 1.2-5.2%)
  - SSI pooled incidence in South-east Asia : 7.7%

https://www.who.int/teams/integrated-health-services/infection-prevention-control/surgical-site-infection (2018)

Economic Impact of SSI - Global

Costs approximately

USD 3.3 billion*

(~RM 15 billion)

and

almost **1 million**

additional inpatient-days annually

Direct costs

re-operations, nursing and wound care as well as drug treatments.

Indirect costs

loss of productivity, patient dissatisfaction and litigation, and reduced quality of life for the patient.

Squeri R, Genovese C, Palamara MA, Trimarchi G, La Fauci V. "Clean care is safer care": correct handwashing in the prevention of healthcare associated infections. Ann Ig. 2016 Nov-Dec;28(6):409-415.

Economic Impact of SSI - Malaysia

In 2021, the total number of surgeries performed in Malaysia was 891,558 (HIMS).

If our numbers were to be extrapolated based on the statistic by WHO and CDC:

The total number of SSI could be as high as

105,203 cases

(estimated incidence of SSI in Malaysia)

&

the number of deaths associated with SSI could be as high as

3,156

(estimated mortality from SSI).

According to the study by Tan L.T et. al. (2019), patients with SSI requires additional hospitalization of

7-10 days.

As the cost of additional inpatient stay is RM 100/ day (based on Malaysian fee schedule)*, which would entail an expenditure of at least

RM 20 million

EXCLUDING the costs of treatment in a year (2021)

Ref: Malaysia Fee Schedule 2012

Why MUST we monitor SSI?

No.	Organization	Initiative
1.	SUSTAINABLE DEVELOPMENT GOALS	SDG 3.8.1 Post operative sepsis rate • Proxy indicator: Surgical site infection rate
2.	G4 alliance surgical, obstetric, trauma & anaesthesia care	Establishing an Antibiotic Stewardship Program • Target 33% reduction of SSI
3.	STRATEGIC FRAMEWORK OF THE MEDICAL PROGRAMME Ministry of Health Malaysia 2021 – 2025	Establishment of SSI Surveillance in hospitals • Development of Protocol • Implementation of training program at state and specialist hospitals

Why MUST we monitor SSI? (1)

SDG 2030

In 2015, the UN gathered world leaders and adopted 17 Sustainable Development Goals (SDGs) to **end poverty, promote prosperity, ensure well-being for all, and protect the planet.** Within the 17 global goals there are 169 targets and indicators to guide action. UN member states are expected to align their agendas and political policies with the SDGs. The SDGs came into force 1 January 2016 and the deadline for achieving them is 2030.

SDG 3:

Ensure healthy lives and promote wellbeing for all at all ages

3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.

3.8.1 Post operative sepsis rate

- Proxy indicator: Surgical site infection rate
- At the moment, we refer to wound infection rate

Reference: https://sdgs.un.org/goals

Why MUST we monitor SSI? (2)

Who We Are

A coalition of associations and organizations around the world working to increase awareness, foster political will, shape policy, and mobilize resources to make access to quality, safe, timely, and affordable emergency and essential surgical, obstetric, trauma and anaesthesia (SOTA) care a global health priority and a reality for all.

Mission

To advocate for the neglected surgical patient.

Vision

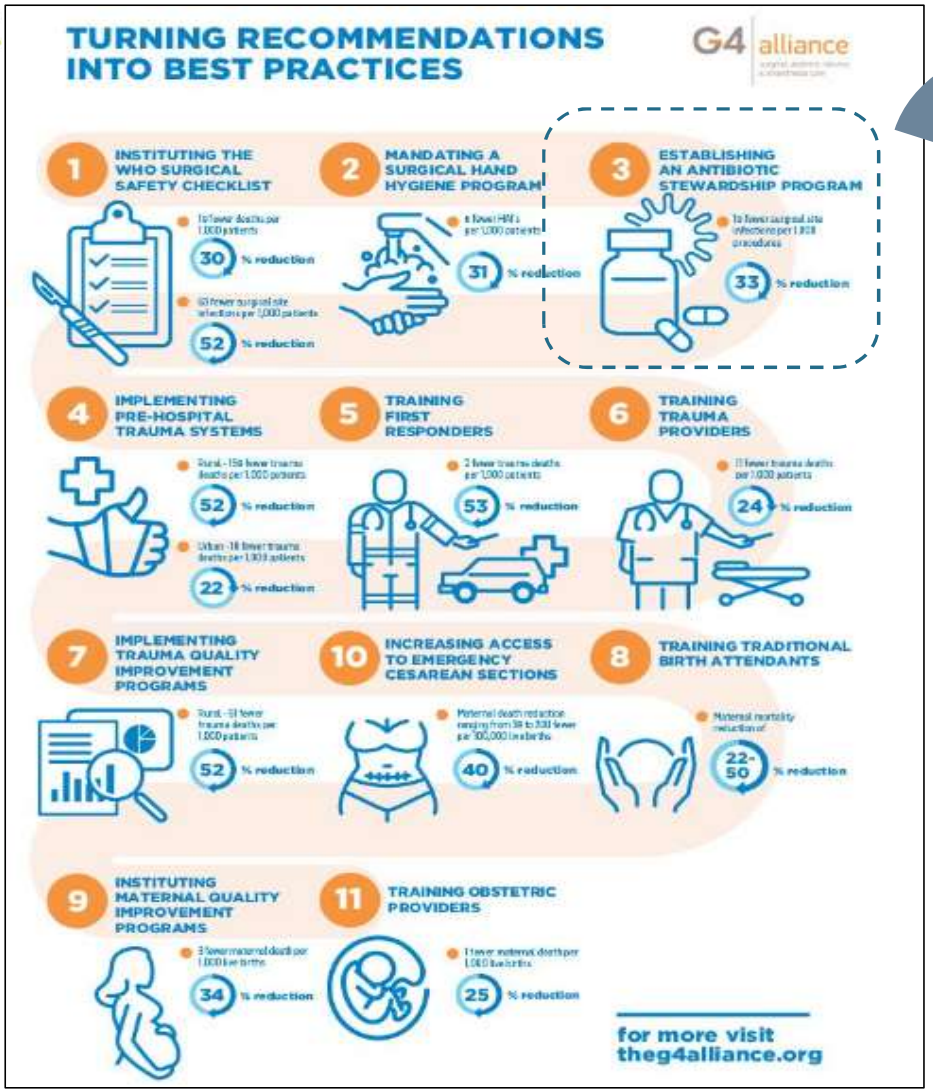
Universally available, accessible, acceptable and quality emergency and essential surgical, obstetric, trauma, and anaesthesia care.

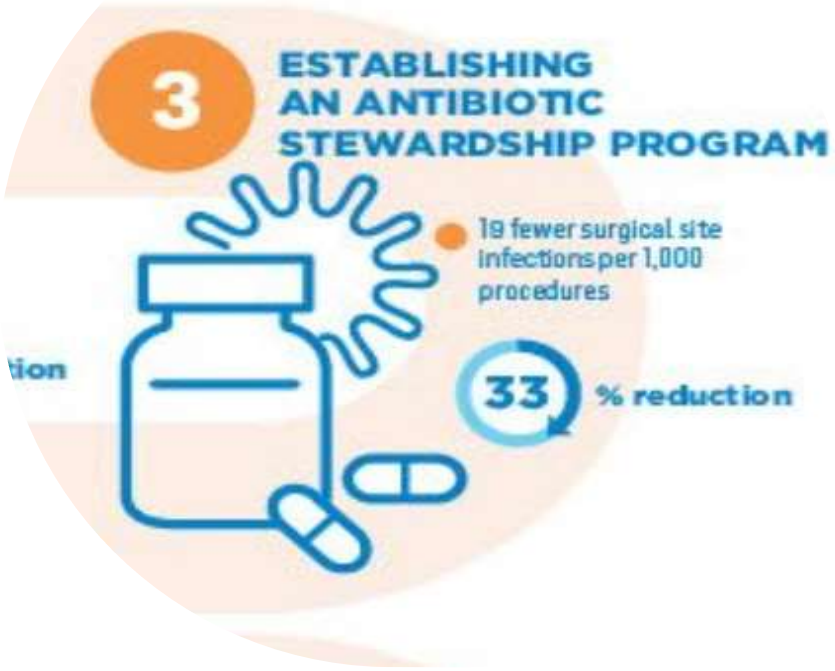
https://www.theg4alliance.org/

G4 alliance
surgical, obstetric, trauma & anaesthesia care

Our network of member organizations is aligned in support of a global unifying target:

Safe, timely, and affordable emergency and essential surgical, obstetric, trauma, and anaesthesia care for 80% of the world's people by 2030





https://www.theg4alliance.org/

National Surgical Site Infection Committee 2023, MOH

Why MUST we monitor SSI? (3)

Strategy No.5:
Strengthen safety and quality in the delivery of the healthcare system

Implementation Plan	Activity / Initiative	Target / Indicator	Division
46 To strengthen the infection prevention and control programmes	To enhance the existing surveillance programme on effective sanitation, hygiene and infection prevention measures	Reduction of Incidence of Healthcare Associated Infection	Medical Development Division
	Establishment of surgical site infection (SSI) surveillance in hospitals	Development of protocol	
		Implementation of training programme at state and specialist hospitals	

Reference: https://www.moh.gov.my/moh/resources/Pelan_Strategik_KKM.pdf

Objectives of SSI Guideline

General

To provide a reference for healthcare workers in Malaysia for the prevention, and surveillance of SSI.

Specific

- To promote awareness of SSI & its prevention
- To decrease variations in clinical practice
- To improve the effectiveness of the quality of care
- To minimize costly preventable complications
- To serve as an instrument for training

Definition of Perioperative Period

Three phases of any surgery which includes the **preoperative phase**, **intraoperative phase** and the **postoperative phase**.

PRE-OPERATIVE PERIOD*

From the time when patient agrees for operation to arrival of patient at Operating Room.

INTRA-OPERATIVE PERIOD*

From arrival of patient at Operating Room until the arrival of patient at the Recovery Area.

POST-OPERATIVE PERIOD*

From arrival of patient at the Recovery Area until completion of surgical care.

*These definitions of terms were based on the consensus of the TWG for the purpose of standardization of practice within Malaysian healthcare facilities.

Definition of Elective Surgery

Planned surgery that can be booked in advance of routine admission to hospital as a result of a specialist clinical assessment.

It occurs within a planned time that suits patient, hospital and staff. It is performed in an elective theatre list for conditions not classified as immediate, urgent or expedited.

Definition

SURGICAL SITE INFECTION (SSI)

Infection related to an operative procedure that occurs at the surgical incision **within 30 days** of the procedure or **within 1 year** if prosthetic material is implanted at surgery.

Global Guidelines for The Prevention of Surgical Site Infection, World Health Organisation (WHO) 2018.
Surgical Site Infection, European Centre for Disease Prevention and Control (ECDC), https://www.ecdc.europa.eu/en/surgical-site-infections

Definition

Surgical Wound	A wound created when an incision is made during surgery.
Medical Implant*	Devices or tissues that are placed inside or on the surface of the body.
Healthcare Worker	Any person who is working in a health care facility.

*Ref: https://www.fda.gov/medical-devices/products-and-medical-procedures/implants-and-prosthetics

Definition of Terms

Surgery

- Procedure performed for the purpose of structurally altering the human body by incision or destruction of tissues and is part of the practice of medicine for the diagnostic or therapeutic treatment of conditions or diseases.

Surgical Site

- The site on the human body where the surgery was performed.

Healthcare Worker (HCW)

- Any person who is temporarily or permanently employed by or at, or who serves as a volunteer in, or has an employment contract with, a health care facility.

Surgical Wound

- A wound created when an incision is made with a scalpel or other sharp cutting device and then closed in the operating room by suture, staple, adhesive tape, or glue and resulting in close approximation to the skin edges.

Medical Implant

- Devices or tissues that are placed inside or on the surface of the body. Many implants are prosthetic intended to replace missing body part. Other implants deliver medication, monitor body functions or provide support to organ and tissues[5].

Risk Factor for SSI

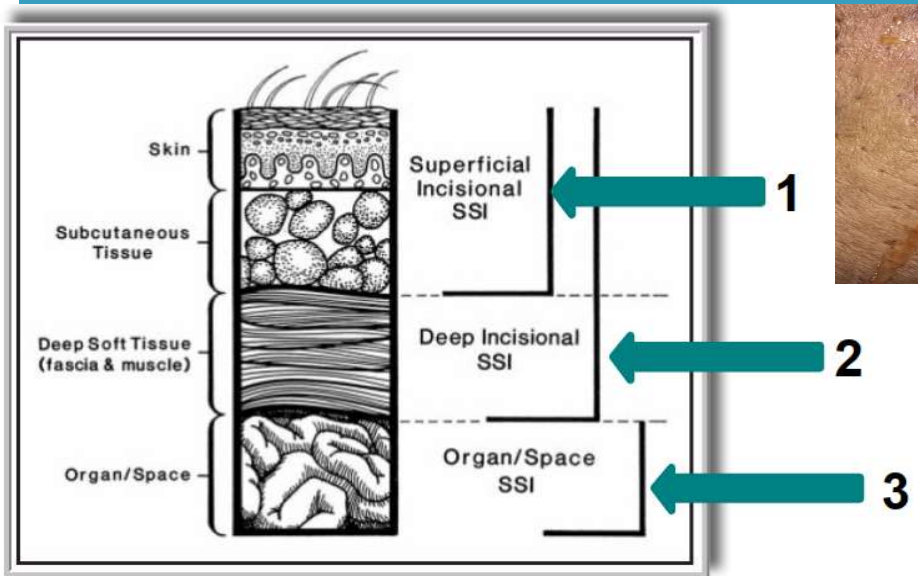
Multifactorial

- **Patient**
  - Modifiable
    - (e.g., Diabetes Mellitus, BMI, Smoking, Alcohol)
  - Non-modifiable
    - (e.g., Age, Gender, Race, Genetic)
- **Surgery Related Factor**
  - Preoperative
  - Intraoperative
  - Postoperative
- **Environmental Factors**
  - Humidity
  - Temperature
  - Ventilation

Classification of SSI

Can be superficial, deep, or organ space includes one or all of the following:

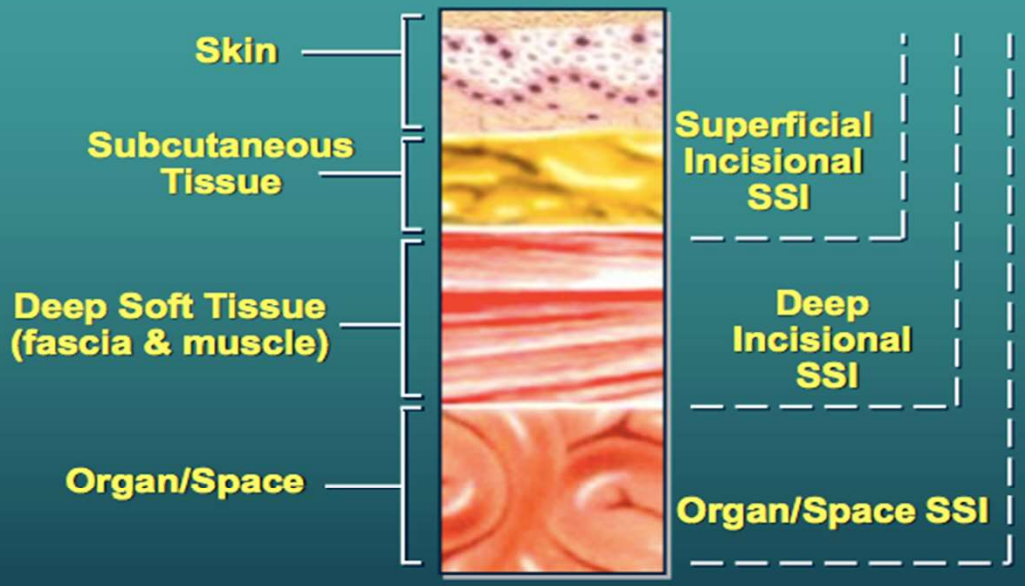
Purulent drainage from incision site +/-laboratory confirmation	Organism isolated via aseptically obtained culture/ fluid/ tissue from incision.	At least one of the following signs/ symptoms of infection; pain or tenderness, localized swelling, redness, or heat and incision is deliberately opened by surgeon.	Diagnosis of SSI by attending physician or surgeon.



Stryja J, et al. *J Wound Care*. 2020;29(Sup2b):S1-S72.

National Surgical Site Infection Committee 2023, MOH

Classification of Surgical Site Infections (SSI)



Recognition of the surgical locus of infection influences the development of specific interventional strategies

Mangram AJ, et al. Am J Infect Control 1999;27:97-132

Classification of SSI

Superficial

Onset: within 30 days

- Purulent drainage from wound
- Positive wound culture
- Pain, redness, swelling
- Diagnosis by surgeon

Deep

Onset: within 30 days, 1 year (with implant)

- Purulent drainage from deep aspect of the wound
- Dehiscence
- Abscess on exam or CT scan

Organ Space

Onset: within 30 days, 1 year (with implant)

- Infection in the surgical cavity (abdomen)

Classification of Surgical Wound

Clean	Uninfected operative site, with primary skin closure.	Risk of SSI <2%
Clean-contaminated	Entry into respiratory, alimentary, genital, or urinary tracts.	Risk 5-15%
Contaminated	Fresh accidental wounds, major break in sterile technique, gross spillage from gastrointestinal tract, or presence of acute but nonpurulent inflammation at the operative site.	Risk SSI >15%
Dirty-infected	Old accidental wound with devitalized tissue or presence of clinical infection or perforated viscera at the operative site. This definition implies that organisms that might cause postoperative infection were present at the operative site before surgery.	Risk SSI >30 %

(Adapted from Mangram AJ, Horan TC, Pearson ML, et al. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol*. 1999; 20:250-278; quiz 279-280.)

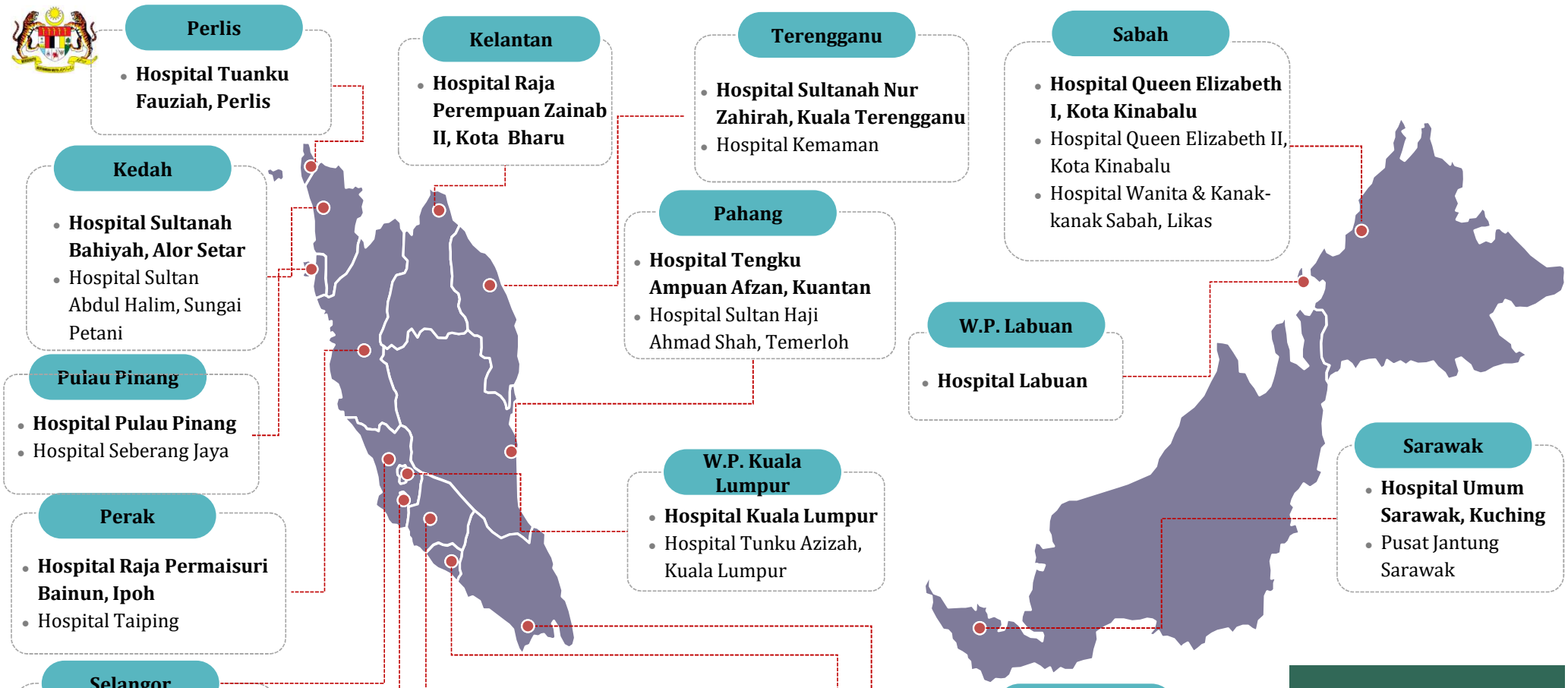
Classification of Surgical Wound

Class I **Clean**	An uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tract is not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Operative incisional wounds that follow non-penetrating (blunt) trauma should be included in this category if they meet the criteria.
Class II **Clean-contaminated**	An operative wound in which the respiratory, alimentary, genital, or urinary tracts are entered under controlled conditions without unusual contamination. Specifically, operations involving the biliary tract, appendix, vagina and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered.
Class III **Contaminated**	Open, fresh, accidental wounds. In addition, operations with major breaks in sterile technique (e.g. open cardiac massage) or gross spillage from the gastrointestinal tract, and incisions in which acute, non-purulent inflammation is encountered are included in this category.
Class IV **Dirty-infected**	Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing postoperative infection were present in the operative field before the operation.

IMPLEMENTATION

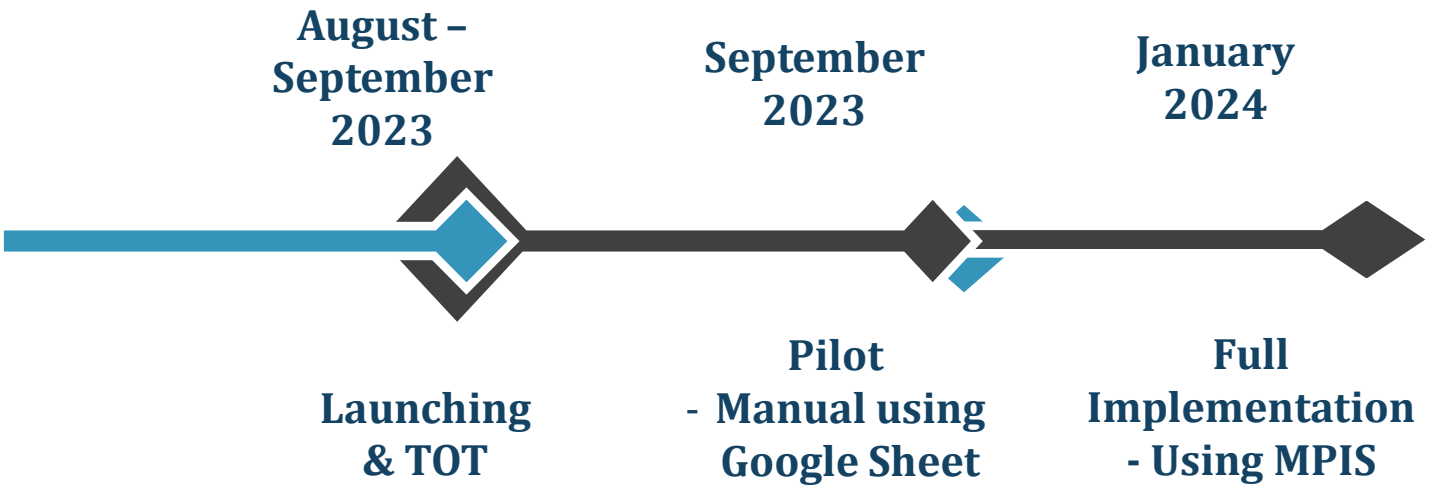
Implementation

- All MOH hospitals
- Data collection and reporting is only required from the pilot hospitals at the moment (as per the list in the next slide)

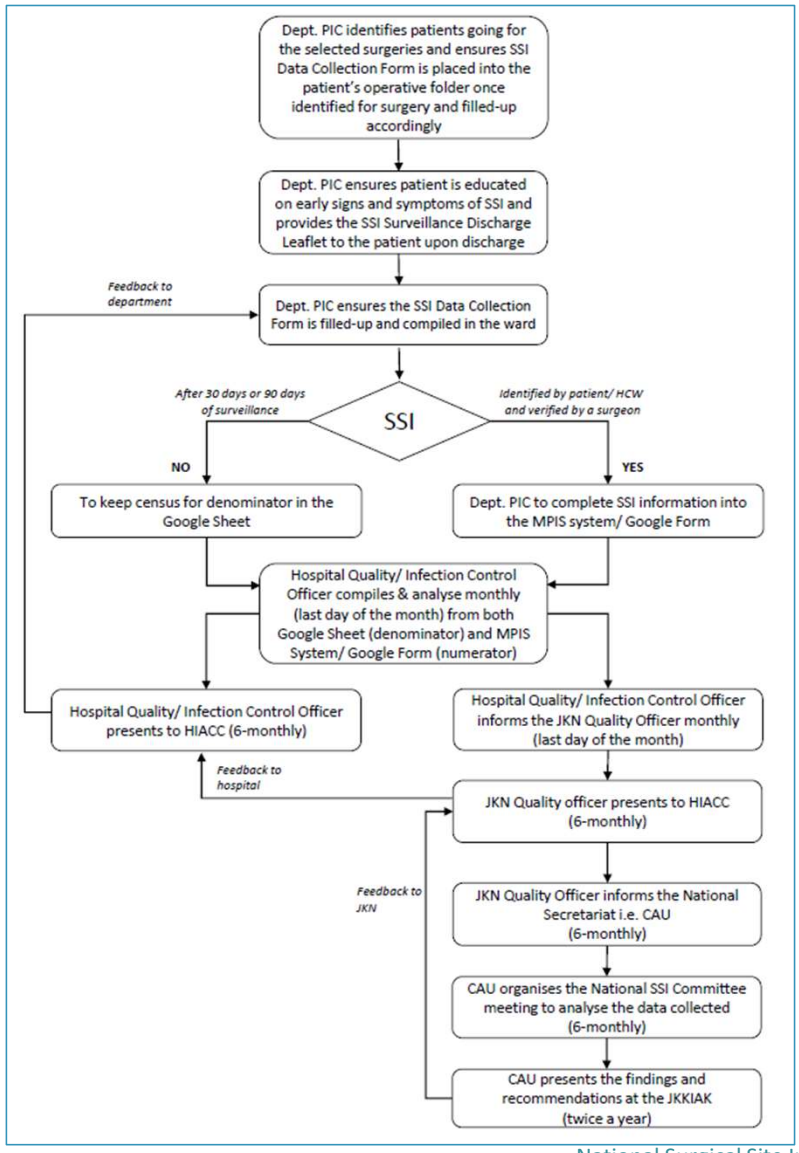


National Surgical Site Infection Committee 2023, MOH

Implementation Timeline



Reporting Flow Chart



National Surgical Site Infection Committee 2023, MOH

Elective Surgery to be monitored for SSI in the pilot hospitals

Neurosurgery
Elective Craniotomy

ORL
Parotidectomy,
Submandibulectomy,
Neck Dissection &
Thyroglossal cyst,
Branchial cyst,
Thyroidectomy,
Cochlea Implant

General Surgery
Colectomy +/- proctocolectomy
Mastectomy +/- AC
Hernioplasty
Thyroid Surgeries
Laparoscopic/ open cholecystectomy

Obstetric & Gynaecology
Open TAH +/- BSO
El LSCS

Maxillofacial
Minor Oral Surgery
El OMF trauma

Orthopaedic
Primary knee arthroplasty
Primary hip arthroplasty

Urology
Open Cystectomy
Open Nephrectomy

Thoracic
Lung Lobectomy

Hepatobiliary
All Elective Surgery

Cardiothoracic
Primary CABG
(Sternal & Harvest Site)
AVR

Paediatric Surgery
Pull through procedure
(open / lap)
Vascular Access Surgery

Ophthalmology
Cataract Surgery

Plastic & Reconstructive Surgery
Cleft Lip Repair
Flap Donor Site
Full Thickness Skin
Graft Donor Site

Vascular Surgery
Open AAA Repair
Renal Access Surgery (AVF)

National Surgical Site Infection Committee 2023, MOH

Criteria

Inclusion Criteria

1. Inpatient elective surgeries which are listed in the guideline.
2. Day-care ophthalmology cataract surgeries
3. Paediatric semi-emergency vascular access surgeries (VAS)
4. Infection of surgical wound occurring within 30-days post-surgery (without implant) or within 90-days* post-surgery (with implant).

Exclusion Criteria

1. SSI not related to the primary surgery

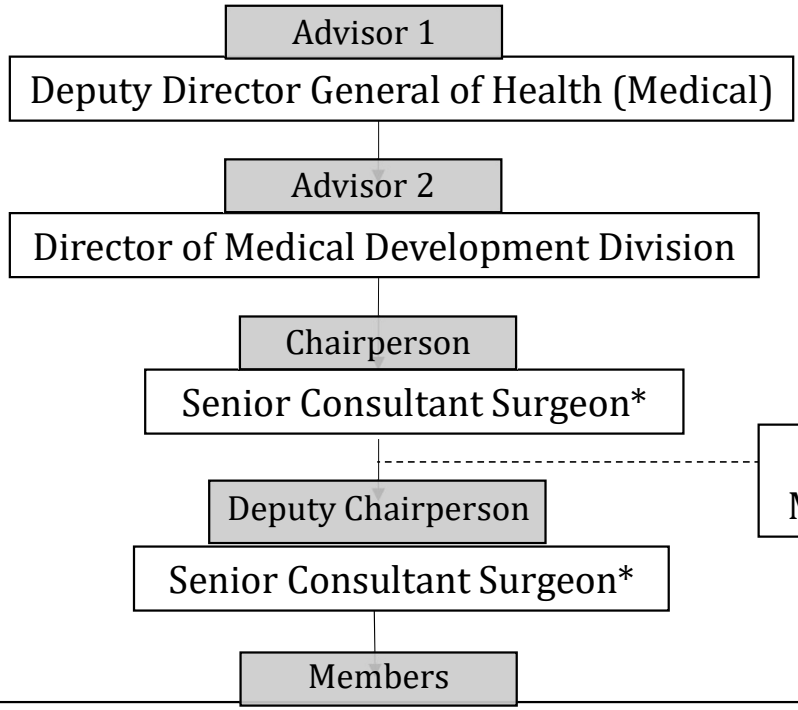
*Although the definition for SSI in surgeries with implants is up to 1 year, but for the purpose of this surveillance, we are only monitoring till 90-days.

Calculation for Surveillance

$$\frac{\text{Number of SSI in the selected surgery}}{\text{Total number of selected surgery}} \times 100$$

COMMITTEE

NATIONAL SSI COMMITTEE

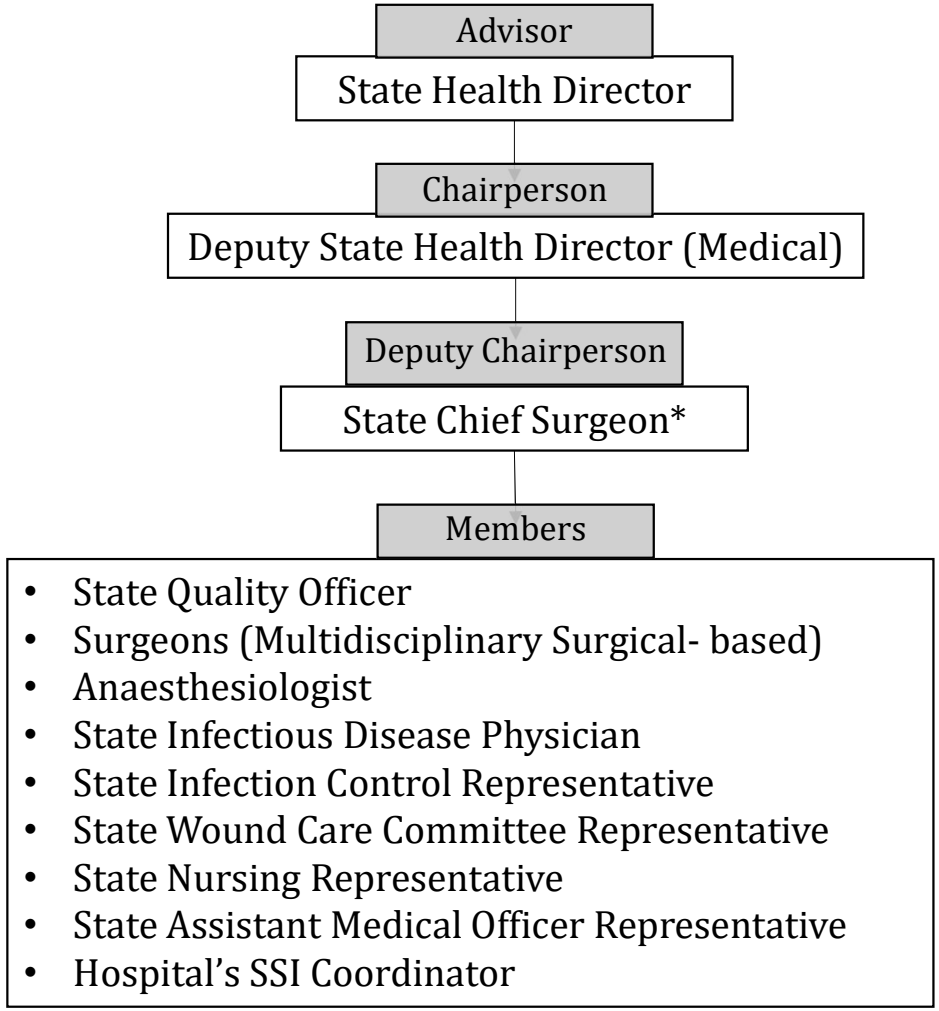


*As appointed by the DDG (Medical)
*Any Surgical-based surgeon

National SSI Committee

- Agree to the terms of reference (TOR).
- Expected to review SSI cases and make recommendations for improvement.
- Expected to prepare case summaries to be published in the bulletin or report.
- Expected to prepare annual national SSI surveillance report.
- Expected to assist the hospital and state committee to ensure the smooth process of surveillance and reporting.
- Expected to aid in education, training and awareness of SSI programme at the hospital, state or national level.
- Expected to participate and contribute to SSI programme activities such as conference, workshop, audit and roadshow.

STATE SSI COMMITTEE

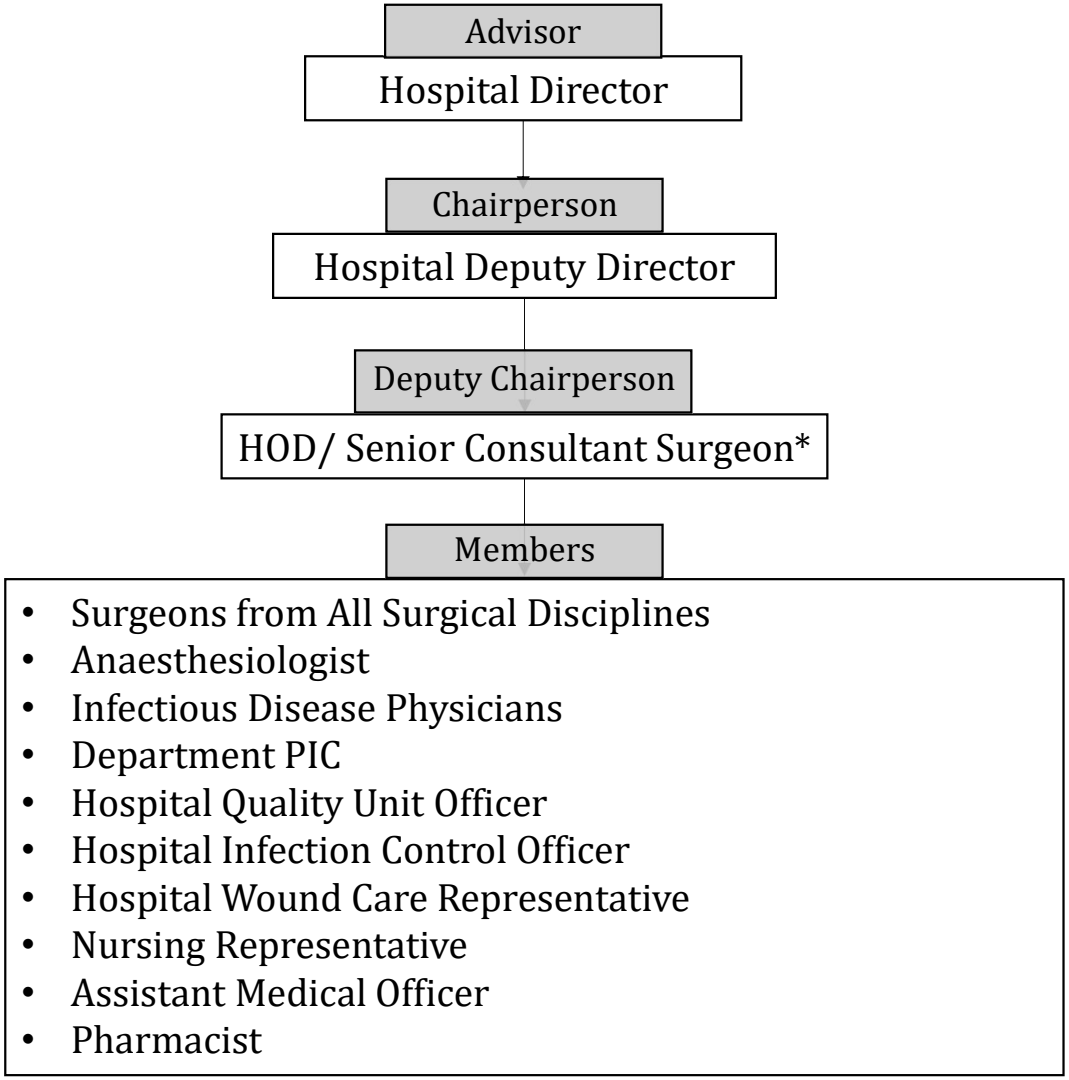


*As appointed by the State Health Director
*Any Surgical-based surgeon

The State Quality Officer's tasks

- As the secretariat for state SSI committee.
- To monitor, compile & analyse the data from the hospitals under their purview on a monthly basis.
- To coordinate state SSI committee meetings biannually.
- To present the analysis of SSI data including identified issues as well as recommendations from the state SSI committee during the state infection & antibiotics control committee (SIACC) meeting.
- To give feedback of the analysis to the hospitals involved and to the SSI national secretariat i.e. Clinical Audit Unit.

HOSPITAL SSI COMMITTEE



*As appointed by the Hospital Director
*Any Surgical-based surgeon
*HOD of surgical services

The Department PIC's tasks

- To identify the patients who are going for the selected elective surgeries
- To ensure that the SSI Surveillance Form is attached to the patient's operative file and completed perioperatively (pre, intra and post-operatively).
- To collect and compile the SSI Surveillance Form upon discharge of the patient
- To enter the data from the SSI Surveillance Form into the google sheet.
- To ensure that the patients who have undergone these surgeries are educated on the early signs and symptoms of SSI
- To ensure that these patients are discharged with the SSI Discharge Leaflet
- To report identified SSI cases into the SSI Module in the MPIS System once the case has been verified by a surgeon in the department.

The Hospital Quality/ Infection Control Officer's tasks

- As the secretariat for Hospital SSI Committee.
- To monitor, compile and analyse the data from the MPIS system on a monthly basis.
- To coordinate Hospital SSI Committee meetings biannually.
- To present the analysis of SSI data including identified issues as well as recommendations from the Hospital SSI Committee during the Hospital Infection & Antibiotics Control Committee (HIACC) meeting.
- To give feedback of the analysis and the HIACC meeting to the departments involved as well as the JKN.

SURGICAL SITE INFECTION (SSI) TRAINING MODULE PART B

National SSI Committee
Ministry of Health Malaysia
2023

DEFINITIONS

Definition of Perioperative Period

PERIOPERATIVE PERIOD

Three phases of any surgery which includes the preoperative phase, intraoperative phase and the postoperative phase.

1. PRE-OPERATIVE PERIOD*

From the time when patient agrees for operation to arrival of patient at Operating Room.

2. INTRAOPERATIVE PERIOD*

From arrival of patient at Operating Room until the arrival of patient at the Recovery Area.

3. POST-OPERATIVE PERIOD*

From arrival of patient at the Recovery Area until completion of surgical care.

*These definitions of terms were based on the consensus of the TWG for the purpose of standardization of practice within Malaysian healthcare facilities.

Definition of Elective Surgery

Elective surgery is planned surgery that can be booked in advance of routine admission to hospital as a result of a specialist clinical assessment.

It occurs within a planned time that suits patient, hospital and staff. It is performed in an elective theatre list for conditions not classified as immediate, urgent or expedited.

PRE-OPERATIVE PREVENTION STRATEGIES

Pre-operative Period

YES,
I DO!

ADMISSION
TO
WARD

AIRLOCK /
OPERATING
ROOM

Pre-operative Factors

PATIENT RISK FACTORS	
A1	Age
A2	General skin condition
A3	Glycemic control
A4	Nutritional status
A5	Smoking
A6	Obesity
A7	Medications
A8	Immunocompromised state
A9	Staphylococcus aureus (MSSA and MRSA) Colonisation

HOSPITALISATION FACTORS	
B1	Types of Surgery
B2	Duration of pre-operative admission
B3	Pre-operative bathing/ wiping
B4	Mechanical bowel preparation

A. Patient Factors

A1 - Age

- Increasing age has increasing risk of SSI due to deteriorating immunological response and presence of comorbidities

- Elderly age – 60 years

A2 - General skin condition

- Elective surgery should be postponed until the skin condition has been treated/ healed
  - E.g., Post radiotherapy, presence of active skin or soft tissue infection and recent wounds at the surgical site increases risk of SSI

A3 - Glycemic control

- Good glycemic control reduces the risk of SSI

- Recommended glycemic control for all patients: 8-10mmol/L
- Preoperative HbA1C ≤8% in diabetic patients
- Insulin infusion may be considered if blood glucose level is >10mmol/L

- Glucose control should be maintained post-operatively
- Paediatric and adolescent age groups should be considered separately
- General ward protocol vs ICU protocol

National Surgical Site Infection Committee 2023, MOH

A4 - Nutritional status

- Patient's nutritional status should be optimized prior to surgery.

  - It has an impact on the immune system

  - malnutrition can delay the healing process

A5 – Smoking/ Vaping

- Advised to stop smoking prior to surgery → Active smokers have an increased risk of SSI.

  - Recommended to stop 3-4 weeks prior to surgery to reduce SSI

  - Advised to continue cessation of smoking post operatively

- Smoking causes vasoconstriction; delays wound healing.
- Vaping carries similar risk as smoking

A6 - Obesity

- BMI of ≥30
- Overweight is 25–29.9
- Advisable for patient to undergo weight reduction programme prior to surgery
- Areas with prominent fatty tissue has higher rate of infection. Healing may be impaired due to decreased blood supply

A7 - Medications

- Certain medications may increase the risk of SSI Identify the patient's medications
  - e.g. Steroids, chemotherapy, anticoagulant and antiplatelet as well as other immunosuppressive medications may increase the risk of SSI.
- We should identify the patient's medication and recommend to withhold/ continue based on the clinical indication

A8 - Immunocompromised State

- Immunocompromised state increases risk of SSI
- They are susceptible to infection from the disease process as well as the treatment
- Includes malignancy, autoimmune diseases, retroviral disease and etc
- Stringent adherence to SSI prevention measures should be practiced

A9 - Staphylococcus aureus (MSSA and MRSA) Colonisation (for indicated elective surgeries)

- MRSA colonization is a risk factor for SSI and associated with worse outcomes.
- Screening is indicated in elective major clean surgeries such as cardiothoracic, transplant, implant surgeries

- Decolonisation bundle (2% mupirocin intranasal ointment regime twice daily + CHG bath or bodywash once daily for 5-7 days) if MRSA is detected
  - Repeat swab after 48 hours of completion
  - 4% CHG bath requires skin contact time of minimum 5 minutes before rinsing
  - Alternative decolonization agents are octanidine and povidone iodine

A9 - Staphylococcus aureus (MSSA and MRSA) Colonisation (for indicated elective surgeries)

- For MSSA or MRSA patients after completion of a five-day decolonization bundle

- If MRSA is positive, contact precautions (CPS) should be practiced in operating and nursing units and add vancomycin to routine/recommended SAP
- If MSSA, surgical prophylaxis should be adequate to cover for MSSA (i.e. Cefazolin)

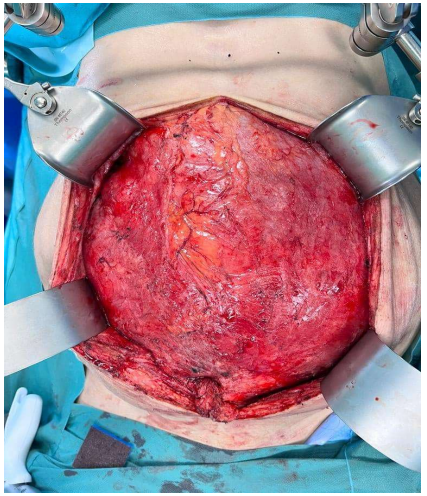
* **Cochlear and intra-ocular implants are not included**

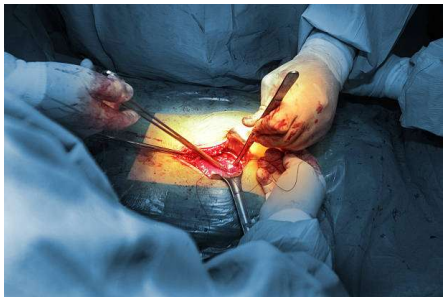
B. Hospitalisation Factors

B1 - Types of Surgery

- Some surgeries are associated with higher risk of SSI
- Recommended to exercise caution when attending to these cases

- Types of surgery considered to have higher risk of SSI are:
  - complex surgeries
  - higher wound classification
  - open surgeries (vs laparoscopic surgery)





B2 - Duration of Pre-operative admission

- Shorter duration of admissions (ideally ≤ 2 days) prior to operation reduces risk of SSI and HAIs
- Pre-operative optimization of patients with comorbidities should be done prior to admission

B3 - Pre-operative bathing/ wiping

- Pre-operative bathing/ wiping reduces risk of SSI
- Bathing (wiping for bedridden patients) prior to surgery reduces bacterial colonization of the skin.
- Soap and water are adequate for bathing/ wiping

B4 - Mechanical Bowel Preparation (MBP)

- The use of oral antibiotics along with mechanical bowel preparation (MBP) in colorectal and related surgeries in adults is recommended
- MBP with oral antibiotics is recommended as it reduces intraluminal bacterial load, thus decreasing risk of SSI

- Suggested regime:
  - MBP + oral neomycin 2g + oral metronidazole 2g

- MBP alone does not reduce SSI

INTRA-OPERATIVE PREVENTION STRATEGIES

Intra-operative Period

AIRLOCK / OPERATING ROOM

OPERATION THEATRE

POST-OP RECOVERY AREA

Intra-operative Factors

FACTORS	
C1	Surgical Antibiotic Prophylaxis (SAP)
C2	Draping
C3	Skin Preparation Solution
C4	Hair Removal
C5	5.1 Operating Room Setup (Traffic)
	5.2 Operating Room Setup (Temperature, Humidity & Ventilation)
C6	Change of Gloves
C7	Hand Washing/ Scrubbing
C8	Irrigation
C9	Homeostasis
C10	Antimicrobial-Impregnated Sutures
C11	Wound Dressing
C12	Prophylactic Negative Pressure Wound Therapy

C1 – Surgical Antibiotic Prophylaxis (SAP)

- Based on latest National Antibiotic Guidelines, Malaysia
- Should be administered within 30-60 minutes before incision
- Re-dosing is required if the duration of surgery exceeds the half-life of the antibiotic and excessive blood loss
- Single dose of prophylaxis is sufficient to reduce SSI

National Surgical Site Infection Committee 2023, MOH

C2 – Draping

- Sterile disposable non-woven

Or

- Sterile reusable woven drapes

C3 – Skin Preparation Solution

- Chlorhexidine/ chlorhexidine gluconate (CHG): 0.5 - 4% CHG in 70 -74% Alcohol with contact time

or

- Povidone iodophore with alcohol 70% with contact time*

or

- Aqueous povidone iodophore with at least 2 minutes contact time followed by alcohol 70% and let air dry.

*based on the product information sheet

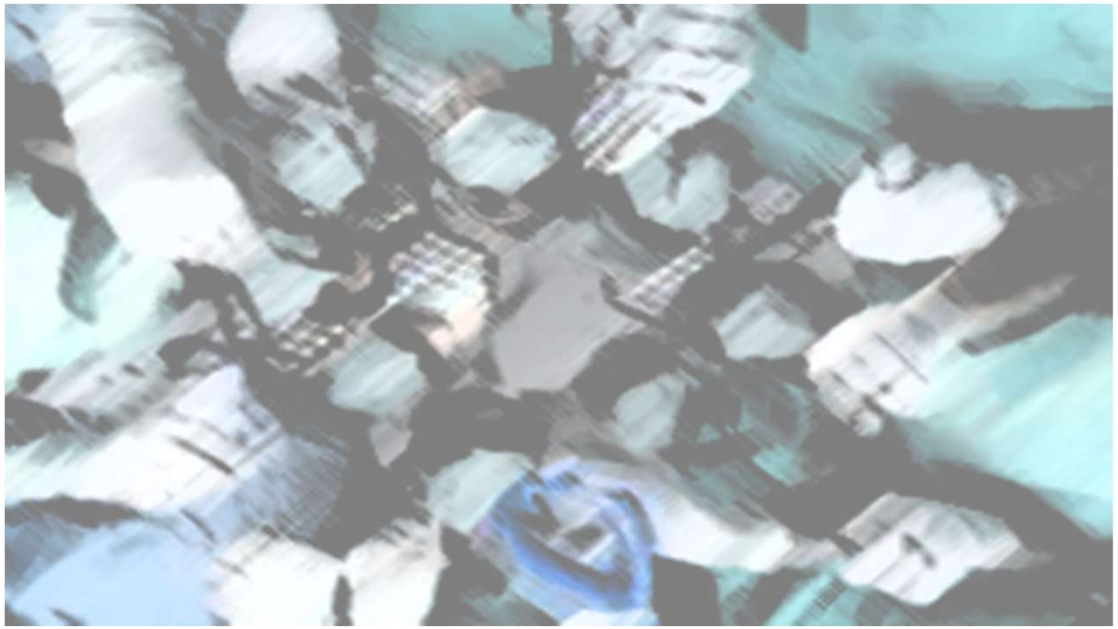
***in ophthalmic surgery, use of povidone 5% is recommended for the preparation of skin and conjunctival sac*

C4 – Hair Removal

- Avoid unnecessary removal of hair
- If required, use a clipper, not a shaver

C5.1 – Operating Room Setup (Traffic)

- Minimise the number of personnel in operating room
- Minimise personnel movement in and out of the operating room



National Surgical Site Infection Committee 2023, MOH

C5.2 - Operating Room Setup (Temperature, Humidity & Ventilation)*

- Maintain the Operating room temperature, humidity and ventilation. Requirements are as follows:

Types of Operating Theatre	Temperature (^oC)	Humidity	Room air changes (ACH)	Flow rate (m/s)	Air Sampling (cfu/m^3)
Conventional	18-22	50-60%	15-25 ACH	0.65 – 0.75	<10
Ultraclean	16-21	50-60%	>25	0.2	<1

*Reference: Infection Control Policy, MOH Malaysia

C6 – Hand Washing/ Scrubbing

- Water & antiseptic solution:
  - Polyvinylpyrrolidone iodophors (PVP-I) scrub solution

    or

  - CHG scrub solution

- Alcohol based hand rub (ABHR):
  - CHG solution plus ethyl alcohol
  - Ethanol plus isopropanol

C7 – Change of Gloves

- To change gloves:
  - when the gloves are visibly soiled or torn
  - when changing from dirty to clean surgery on the same patient
  - before insertion of implants

- Double-gloving is advised

C8 – Wound irrigation

- Irrigate incisional wound before skin closure with aqueous povidone-iodine (PVP-I) solution
- If PVP-I is contraindicated, use saline irrigation
- Antibiotic incisional wound irrigation is not recommended

National Surgical Site Infection Committee 2023, MOH

C9 – Homeostasis

Maintain the patient's homeostasis as below:

- Normothermia
  - Body temperature is maintained between 36.5°C to 37.5°C
- Normovolemia
  - Goal-Directed Fluid Therapy (GDFT) is recommended when indicated
- Oxygenation
  - Maintain SPO2 >95% intra-operatively with basic standard monitoring
- Normoglycemia
  - Target 8-10 mmol/L

C10 - Antimicrobial-impregnated Sutures

- Use of antimicrobial-impregnated sutures may be considered especially in high-risk cases

C11 - Wound Dressing

- Apply sterile dressing
- Wound inspection after 48 to 72 hours or when indicated
- Use advanced dressings when indicated

C12 - Prophylactic Negative Pressure Wound Therapy (NPWT)

- Prophylactic NPWT is only for wounds at high risk of SSI

- Examples:
  - poor tissue perfusion due to soft tissue and skin damage
  - decreased blood flow
  - dead space
  - intra-operative contamination

National Surgical Site Infection Committee 2023, MOH

POST-OPERATIVE PREVENTION STRATEGIES

Post-operative Period

RECOVERY AREA

DISCHARGE CARE

Post-operative Factors

FACTORS	
D1	Standard Precautions of Infection Prevention & Control
D2	Patient and Caretaker Education
D3	Surgical Wound Care
D4	Surgical Drain

D1- Standard Precautions of Infection Prevention & Control*

Maintaining the standard precautions of infection prevention & control at al times, which include :

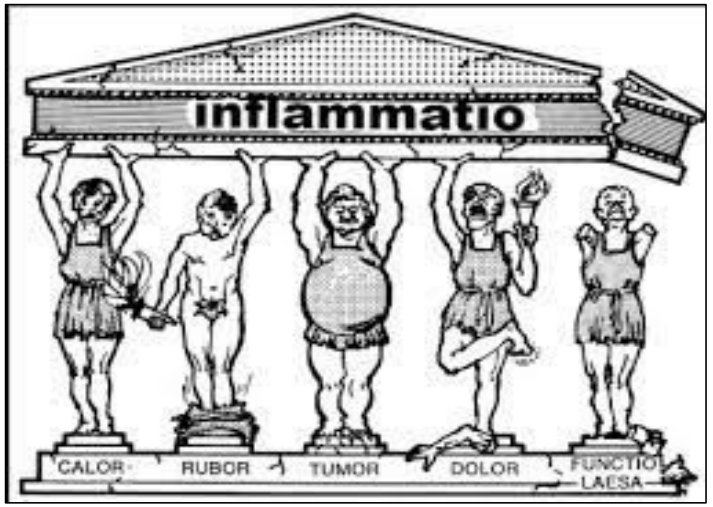
- 5 moments for hand hygiene
- personal protective equipment
- disinfection & sterilization
- Environmental hygiene

National Surgical Site Infection Committee 2023, MOH

Refer policies and procedures on infection prevention and control third edition 2019

D2 - Patient and Caretaker Education

- Educate patients and caretakers regarding wound care and how to identify potential or early signs of SSI such as:
    - Localized pain and tenderness
    - Localized swelling
    - Erythema
    - Increased Warmth
    - Purulent discharge from the incision
    - Fever



National Surgical Site Infection Committee 2023, MOH

D3 - Surgical Wound Care

- HCW should be trained and educated in wound care & signs and symptoms of infection

  - Orientation of new HCW
  - CME, CNE Hospital Level
  - Courses
  - Bedside teaching

D4 - Surgical Drain

- Surgical drains are to be used selectively.
- When a surgical drain is used, **regular inspection of the drain and the drain site** must be done to look for signs of infection.
- The drain should be removed when it is no longer indicated.
- The presence of a drain is not an indication to prolong the usage of prophylactic antibiotic.

National Surgical Site Infection Committee 2023, MOH

DISCHARGE

SSI SURVEILLANCE DISCHARGE LEAFLET

If you experience **any of these following symptoms**, please go to nearest Emergency Department or Health Clinic/ Clinic.*

Hospital	
Patient's Name	
Discharge Ward	
Name of Surgery	
Diagnosis	

Signs and Symptoms		
• Pain	☐ Yes	☐ No
• Swelling	☐ Yes	☐ No
• Discharge	☐ Yes	☐ No
• Fever	☐ Yes	☐ No
• Wound Gap / Open Wound	☐ Yes	☐ No

* For attending doctors (from Emergency Department/ Health Clinic/ Private Clinic), in case an SSI is detected, kindly refer this patient back to us or contact us at this number: _____.

Attending Doctor,

.....

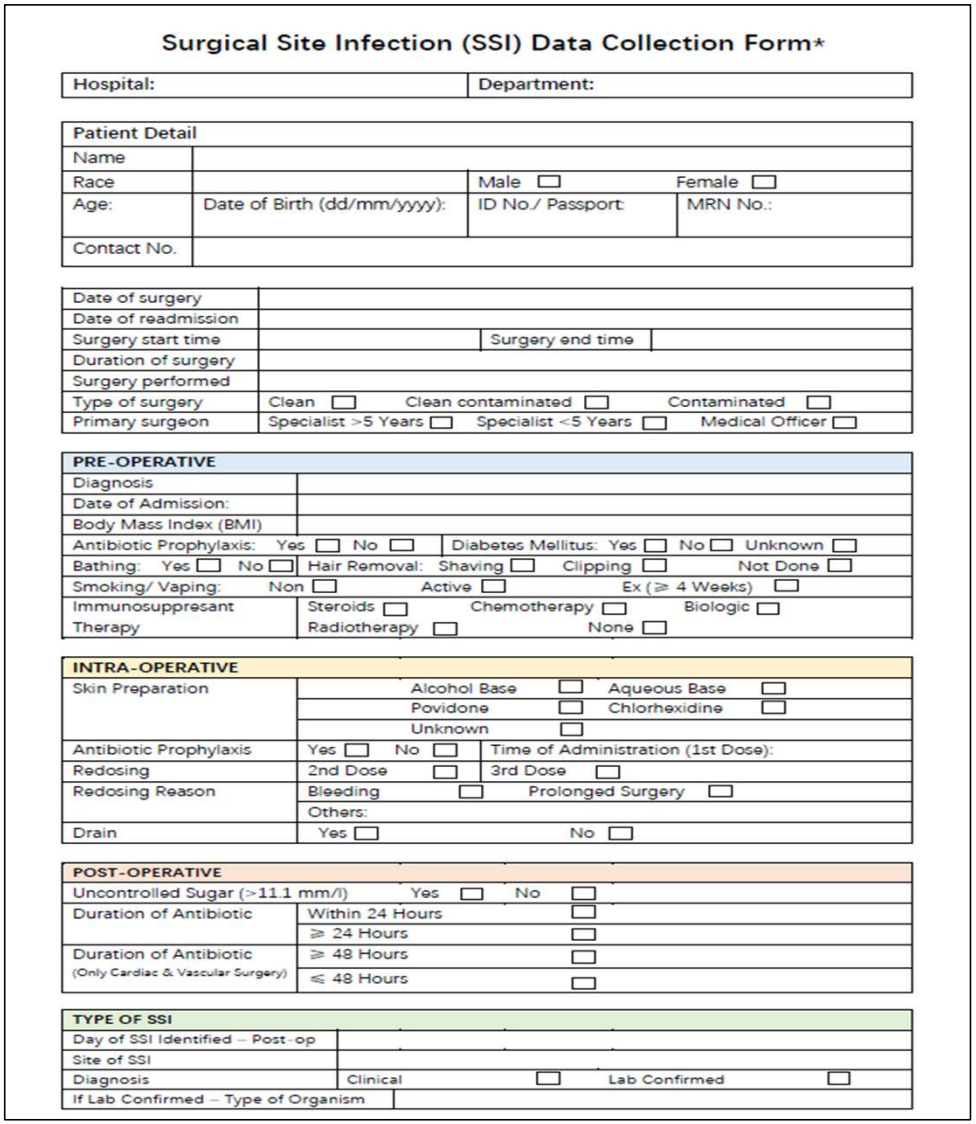
( )

*Official stamp and date.

SSI CAU MOH 2023

SSI Surveillance Discharge Leaflet

National Surgical Site Infection Committee 2023, MOH



Surgical Site Infection (SSI) Data Collection Form*

Hospital:	Department:

Patient Detail			
Name			
Race		Male ☐	Female ☐
Age:	Date of Birth (dd/mm/yyyy):	ID No./ Passport:	MRN No.:
Contact No.			

Date of surgery			
Date of readmission			
Surgery start time		Surgery end time	
Duration of surgery			
Surgery performed			
Type of surgery	Clean ☐	Clean contaminated ☐	Contaminated ☐
Primary surgeon	Specialist >5 Years ☐	Specialist <5 Years ☐	Medical Officer ☐

PRE-OPERATIVE			
Diagnosis			
Date of Admission:			
Body Mass Index (BMI)			
Antibiotic Prophylaxis:	Yes ☐ No ☐	Diabetes Mellitus: Yes ☐ No ☐ Unknown ☐	
Bathing: Yes ☐ No ☐	Hair Removal: Shaving ☐	Clipping ☐	Not Done ☐
Smoking/ Vaping:	Non ☐	Active ☐	Ex (≥ 4 Weeks) ☐
Immunosuppresant Therapy	Steroids ☐	Chemotherapy ☐	Biologic ☐
	Radiotherapy ☐	None ☐	

INTRA-OPERATIVE		
Skin Preparation	Alcohol Base ☐	Aqueous Base ☐
	Povidone ☐	Chlorhexidine ☐
	Unknown ☐	
Antibiotic Prophylaxis	Yes ☐ No ☐	Time of Administration (1st Dose):
Redosing	2nd Dose ☐	3rd Dose ☐
Redosing Reason	Bleeding ☐	Prolonged Surgery ☐
	Others:	
Drain	Yes ☐	No ☐

POST-OPERATIVE		
Uncontrolled Sugar (>11.1 mm/l)	Yes ☐	No ☐
Duration of Antibiotic	Within 24 Hours	☐
	≥ 24 Hours	☐
Duration of Antibiotic (Only Cardiac & Vascular Surgery)	≥ 48 Hours	☐
	≤ 48 Hours	☐

TYPE OF SSI		
Day of SSI Identified – Post-op		
Site of SSI		
Diagnosis	Clinical ☐	Lab Confirmed ☐
If Lab Confirmed – Type of Organism		

Link:

1. MPIS System
www.cprchospital.moh.gov.my

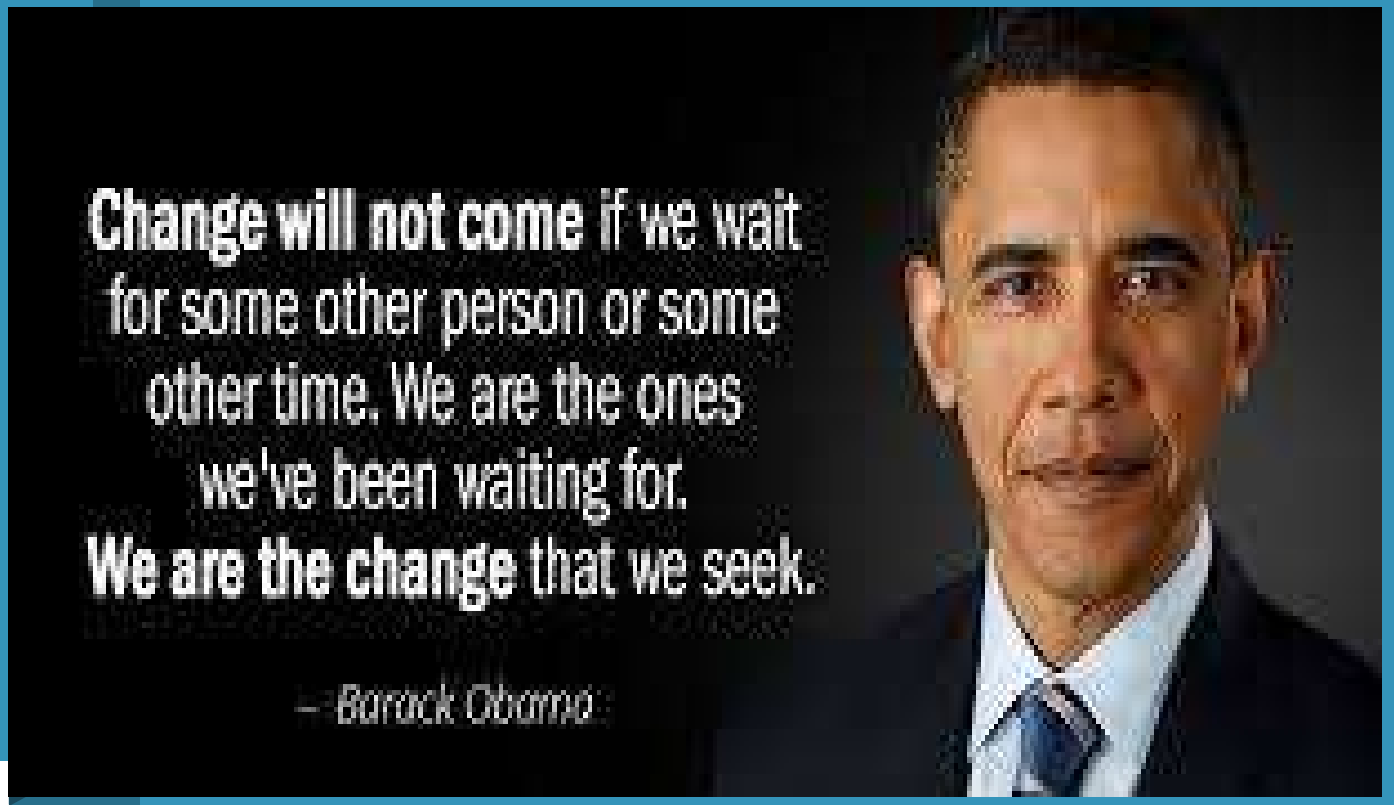
2. Google Form
https://docs.google.com/forms/d/e/1FAIpQLSfFPbsbZnS7NCIFOGAjBLBJYhKThd3vLnZ8dqldIRsT47ueFw/viewform

SUMMARY
Take Home Message

In a Nutshell

- SSI is **PREVENTABLE.**
- SSI is one of the most common HAI.
- Treating SSI is **EXPENSIVE** (to the patient and healthcare system). Hence, prevention is better than cure.
- Surveillance is vital to identify issues, remedial actions and room for improvements.
- Pay attention to the prevention strategies:
  - Pre-operative (Factor A (9 factors) & B (4 factors))
  - Intra-operative (Factor C (12 factors))
  - Post-operative (Factor D (4 factors))
- Work closely with the hospital committee and clinical administrators.
- Continuous training and transparency of data and reporting
- Practice makes better!!!


yes!
We
can!


Change will not come if we wait
for some other person or some
other time. We are the ones
we've been waiting for.
We are the change that we seek.
– Barack Obama

Thank you