Protocol for surgical site infection surveillance with a focus on settings with limited resources



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Acronyms

ABHR	alcohol-based handrub
ASA	American Society of Anesthesiologists
CDC-NHSN	Centers for Disease Control and Prevention – National Healthcare Safety Network
GNI	gross national income
HAI	health care-associated infection
IPC	infection prevention and control
LMIC	low- and middle-income countries
NNIS	National Nosocomial Infection Surveillance
SSI	surgical site infection
SUSP	Surgical Unit-based Safety Programme
USA	United States of America
WHO	World Health Organization

Glossary of terms

Alcohol-based handrub refers to an alcohol-based preparation designed for application to the hands to inactivate microorganisms and/or temporarily suppress their growth. Such preparations may contain one or more types of alcohol, other active ingredients with excipients and humectants.

The American Society of Anesthesiologists (ASA) score is a classification system used to measure a patient's pre-operative physical condition. Together with other parameters it is used to evaluate the patient's risk of acquiring infection. Class I: A normally healthy patient. Class II: A patient with mild systemic disease. Class III: A patient with severe systemic disease that is not incapacitating. Class IV: A patient with an incapacitating systemic disease that is a constant threat to life. Class V: A moribund patient who is not expected to survive for 24 hours with or without the operation.

Health care-associated infection, also referred to as "nosocomial" or "hospital" infection, is an infection occurring in a patient during the process of care in a hospital or other health care facility, which was not present or incubating at the time of admission. Health care-associated infections can also appear after discharge. They represent the most frequent adverse event during care.

Low- and middle-income countries: WHO Member States are grouped into four income groups (low, lower-middle, upper-middle, and high) based on the World Bank list of analytical income classification of economies for the 2014 fiscal year, calculated using the World Bank Atlas method. For the 2016 fiscal year, low-income economies are defined as those with a gross national income (GNI) per capita of US\$ 1045 or less in 2014; middle-income economies are those with a GNI per capita of more than US\$ 1045, but less than US\$ 12 736; (lower middle-income and upper-middle-income economies are separated at a GNI per capita of US\$ 4125) high-income economies are those with a GNI per capita of US\$ 12 736 or more.

Multimodal strategy consists of several elements or components (three or more, usually five) implemented in an integrated way with the aim of improving an outcome and changing behaviour. It includes tools, such as bundles and checklists, developed by multidisciplinary teams that take into account local conditions. The five most common components include: (i) system change (that is, availability of the appropriate infrastructure and supplies to enable infection prevention and control good practices); (ii) education and training of health care workers and key players (for example, managers); (iii) monitoring infrastructures, practices, processes, outcomes, and providing data feedback; (iv) reminders in the workplace/communications; and (v) culture change with the establishment or strengthening of a safety climate.

Surgical hand preparation refers to an antiseptic handwash or antiseptic handrub performed preoperatively by the surgical team to eliminate transient flora and reduce resident skin flora. Such antiseptics often have persistent antimicrobial activity.

Surgical procedure or operation refers to an operation where at least one incision (including a laparoscopic approach) is made through the skin or mucous membrane, or reoperation via an incision that was left open during a prior operative procedure **and** takes place in an operating room.

Surgical site infection refers to an infection that occurs after surgery in the part of the body where the surgery took place. Surgical site infections can sometimes be superficial infections involving the skin only. Other surgical site infections are more serious and can involve tissues under the skin, organs, or implanted material. (Source: United States Centers for Disease Control and Prevention. https://www.cdc.gov/HAI/ssi/ssi.html, accessed 21 February 2018.)

Surgical site infection is also defined as an infection that occurs within 30 days after the operation and involves the skin and subcutaneous tissue of the incision (superficial incisional) and/or the deep soft tissue (for example, fascia, muscle) of the incision (deep incisional) and/or any part of the anatomy (for example, organs and spaces) other than the incision that was opened or manipulated during an operation (organ/space). (Source: European Centre for Disease Prevention and Control. http://ecdc.europa.eu/en/publications/Publications/120215_TED_SSI_protocol.pdf, accessed 21 February 2018.)

Surveillance is defined as the ongoing, systematic collection, analysis, interpretation and evaluation of health data closely integrated with the timely dissemination of these data to those who need it.

Surgical wound refers to 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.

1. Introduction

This protocol for surgical site infection (SSI) surveillance is designed to support the implementation of the World Health Organization (WHO) *Global guidelines on the prevention of SSI (1)* and their implementation strategy.

The need to focus on SSI surveillance and prevention is primarily due to the following evidence (1-3).

- SSI is the most frequent type of health care-associated infection (HAI) on admission. SSI is the most frequent type of HAI in low- and middle-income countries (LMICs). Approximately one in 10 people who have surgery in LMICs acquire a SSI.
- In Africa, up to 20% of caesarean section procedures lead to a wound infection.
- SSI is also reported as the second most common HAI in Europe and the United States of America (USA). In Europe, SSI affects more than 500 000 people per year, costing €19 million; in the USA, SSI contributes to patients spending more than 400 000 extra days in hospital, costing US\$ 10 billion a year.
- In the USA, 39-51% SSI pathogens are resistant to standard prophylactic antibiotics.
- Surgical sepsis accounts for approximately 30% of all patients with sepsis.

Implementation of SSI prevention measures, especially using multimodal strategies, is effective to reduce the occurrence and the burden of infection (4-6). For example, a 17% decrease in SSI related to 10 selected procedures was reported between 2008 and 2013 in the USA (7) following improvement programmes. In African hospitals, a 60% SSI risk reduction was observed following the implementation of a WHO multimodal strategy in the context of the WHO Surgical Unit-based Safety Programme (SUSP) including SSI surveillance (8).

HAI surveillance and timely feedback of results, including SSI surveillance, are strongly recommended by WHO as part of the core components of effective infection prevention and control (IPC) programmes (4). Every health facility should be committed to this in order to provide quality, safe health care and to ensure that surveillance is not undertaken in isolation, but is instead connected to other evidence-informed activities.

Conducting high-quality SSI surveillance is crucial to detect the magnitude of the problem and to assess the impact of any prevention/improvement intervention.

This document provides a practical, reproducible and low-resource SSI surveillance methodology.

2. Purpose of this document and target audience

This protocol provides an approach to SSI surveillance that has been developed by WHO according to research-based evidence and previous experience in resource-poor settings, in particular those with limited laboratory capacity, although it can be used by any country. It was tested in the WHO SUSP programme in five African hospitals (8) and subsequently revised based on lessons learned and in the light of the 2016 WHO recommendations for SSI prevention.

There are many possible ways to conduct SSI surveillance, but variations in the methods and definitions used (that is, inconsistent application) reduce the reliability and comparability of results. This protocol is based on the widely accepted US Centers for Disease Control and Prevention – National Healthcare Safety Network (CDC-NHSN) definitions for SSI (Annex 1) (9), as acknowledged in the WHO *Global guidelines on the prevention of SSI*.

The protocol is intended for use by health professionals in charge of training and/or supervising and/or undertaking SSI surveillance. It should be supported by IPC teams and will be of interest also to local senior managers, including national organizations and governments, in understanding how SSI data collection should be undertaken and the organizational and resource implications.

The objectives of SSI surveillance are as follows (1):

- to systematically collect data on the occurrence of SSI in the facility and post-discharge in a defined population;
- to analyze the incidence of SSI and help identify at-risk populations/procedures;
- to assess the need for and plan implementation of SSI strategies and prevention measures;
- to examine and monitor the impact of prevention measures for controlling the incidence of SSI;
- to feedback results to surgical/IPC staff and decision-makers to to lever support for the appropriate allocation of resources and efforts;
- to compare the incidence of SSI over time and with those of other hospitals, if appropriate and feasible.

Therefore, this protocol should be used to introduce and support the conduct of SSI surveillance possibly on a routine basis or regularly (for a defined period of time. for example, six months or

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