World Health Organization

# IMPLEMENTATION MANUAL

## to support the prevention of surgical site infections at the facility level – TURNING RECOMMENDATIONS INTO PRACTICE

(INTERIM VERSION)

Build it Teach it Check it Sell it Live it

WHO/HIS/SDS/2018.18



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# FOREWORD

I believe the 2000s will be remembered and commemorated as the 'guidelines era'. The World Health Organization (WHO) led the initiative for the first global surgical site infection prevention guidelines and took a step further by establishing a global guideline that also embraces low– and middle-income country realities. With this innovative implementation manual we, surgeons, can now bring all these surgical site infection prevention improvements to real life with ease and can translate the global guidelines to the bedside.

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The infection prevention and control world is largely foreign to the regular surgeon – one in which we as surgeons are often fearful of treading into. However, because surgical practice is an integral part of infection prevention and control practices, the surgeon must boldly walk into this world to look for and to develop appropriate skills for the safety of our patients. Surgical site infections, the development of antimicrobial resistance and the paucity of new antimicrobial agents, are such a threat to the practice of surgery that no surgeon can afford to ignore this threat any longer. The WHO surgical site infection prevention implementation and improvement manual is a very timely tool – coming shortly after the publishing of the WHO global guidelines on surgical site infection prevention. This manual provides an excellent companion for the surgical team seeking to improve patient safety within the surgical ecosystem. It is equally relevant to any resource setting. A must-read for every surgeon and a must-use for every health care institution providing surgical care.

**Peter M Nthumba**
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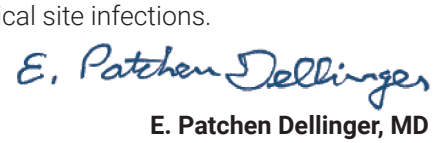
Surgical site infection is feared by patients and surgeons alike. While we would like to have zero infections after surgery, the only way to accomplish that would be to have no surgery. What we should accomplish is the lowest possible number of infections and this new manual by WHO, which represents the work of dozens of experts from around the world, now gives us the means and opportunity to achieve the lowest possible number of surgical site infections.



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**Overall coordination and writing of the document**

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**Photograph contributions**

Courtesy of Didier Pittet, MD (University of Geneva Hospitals, Switzerland); courtesy of Juliana Cusack (Patrick Okao, MD, Surgeon, Butaro District Hospital, Rwanda, and James Cusack, MD, Visiting Surgeon from Massachusetts General Hospital and Harvard Medical School, United States of America [USA]).

# ABBREVIATIONS AND ACRONYMS

| | |
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| ABHR | alcohol-based handrub |
| AMR | antimicrobial resistance |
| CHG | chlorhexidine gluconate |
| CUSP | Comprehensive Unit-based Safety Program |
| $FiO_2$ | fraction of inspired oxygen |
| GDFT | goal-directed fluid therapy |
| HAI | health care-associated infection |
| HIC | high-income countries |
| IPC | infection prevention and control |
| LMICs | low- and middle-income countries |
| MBP | mechanical bowel preparation |
| OR | operating room |
| pNPWT | prophylactic negative pressure wound therapy |
| PVP-I | povidone-iodine |
| SAP | surgical antibiotic prophylaxis |
| SOP | standard operating protocols |
| SSI | surgical site infection |
| SUSP | Surgical Unit-based Safety Program |
| USA | United States of America |
| WASH | water, sanitation and hygiene |
| WHO | World Health Organization |

# GLOSSARY OF TERMS

**Adaptive approaches** consider the behavioural, organizational and cultural complexity in health care systems. They aim to improve the local safety climate and motivate local teams to consistently perform best practices by shaping attitudes, beliefs and values of clinicians. This could include engaging leadership, improving collaborations and team work, and facilitating staff ownership of the intervention.

**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.

**Antimicrobial skin sealants** refer to sterile, film-forming cyanoacrylate-based sealants that are commonly used as additional antimicrobial skin preparation after antisepsis and prior to skin incision. These sealants are intended to remain in place and block the migration of flora from surrounding skin into the surgical site by dissolving for several days postoperatively.

**Cleaning** refers to the removal, usually with detergent and water, of adherent visible soil, blood, protein substances, microorganisms and other debris from the surfaces, crevices, serrations, joints and lumens of instruments, devices and equipment by a manual or mechanical process that prepares the items for safe handling and/or further decontamination. Cleaning is essential prior to the use of heat or chemicals.

**Decontamination** refers to the use of physical or chemical means to remove, inactivate or destroy pathogenic microorganisms from a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use or disposal. This term is used to cover cleaning, disinfection, or sterilization.

**Disinfection** refers to either thermal or chemical destruction of pathogenic and other types of microorganisms. Disinfection is less lethal than sterilization because it destroys most recognized pathogenic microorganisms, but not necessarily all microbial forms (for example, bacterial spores). It reduces the number of microorganisms to a level that is not harmful to health or safe to handle.

**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.

**Interactive (advanced) wound dressings** refer to modern (post-1980) dressing materials that are designed to promote the wound healing process through the creation and maintenance of a local, warm, moist environment underneath the chosen dressing when left in place for a period indicated through a continuous assessment process. Examples are alginates, semipermeable film membranes, foams, hydrocolloids and fibrous hydrocolloids, non-adherent wound contact materials and combinations of those.

**High, 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 fiscal year, calculated using the World Bank Atlas method. For the current (2017) fiscal year, low-income economies are defined as those with a gross national income (GNI) per capita of US$ 995 or less in 2017; lower middle-income economies as those with a GNI per capita between US$ 996 and US$ 3895; upper-middle-income economies as those with a GNI per capita of between US$ 3896 and US$ 12 005; and high-income economies as those with a GNI per capita of US$ 12 056 or more.

**Mechanical bowel preparation** refers to the preoperative administration of substances to induce voiding of the intestinal and colonic contents.

**Multimodal strategy:** A multimodal strategy comprises several elements or components (three or more; usually five, http://www.ihi.org/topics/bundles/Pages/default.aspx) 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 (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

**Sterilization** refers to the complete destruction of all microorganisms including bacterial spores.

**Strength of WHO recommendations**

- **Strong** recommendation means that the expert panel was confident that the benefits of the recommended intervention outweighed risks and that most patients would want to receive the recommended intervention and only a small proportion would not. The expert panel considered that the recommendation can be adopted as policy and can be adaptable for implementation in most (if not all) situations and that patients should receive intervention as course of action.

- **Conditional** recommendation means that the expert panel considered that benefits of intervention probably outweighed the risks; a more structured decision-making process should be undertaken locally to evaluate whether to implement the recommendation, based on stakeholder consultation and involvement of patients and health care professionals.

**Surgical antibiotic prophylaxis** refers to the prevention of infectious complications by administering an effective antimicrobial agent prior to exposure to contamination during surgery.

**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