Objectives

- Highlight the problem of SSI and antimicrobial resistance (AMR) in surgical services

- Describe key SSI prevention recommendations and the steps for implementing them, including a locally driven and evidence-based multimodal improvement strategy

- Describe the available WHO resources to support successful implementation including for reducing AMR in surgical services
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World Antibiotic Awareness Week *

IPC activities

- **Presentation** by Claire Kilpatrick on implementation strategies and resources for SSI prevention, hosted by Webber Training on 14 November, 2:30-3:30 pm CET
  (https://webbertraining.com/schedule/1.php?command=viewClass&ID=1424)

- New **technical infographic** on how to improve use of antibiotics in surgical services
  (http://www.who.int/infection-prevention/tools/focus-amr/en/)

- **E-learning** version of the recently released SSI prevention training module
  (http://www.who.int/infection-prevention/tools/surgical/training_education/en/)

- New **animation video** on best practices for insertion and maintenance of urinary catheters
  (http://www.who.int/infection-prevention/tools/core-components/en/)

- Announcement of the **2019 IPC Global Survey**

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Prevention of Surgical Site Infections
Claire Kilpatrick, World Health Organization
Sponsored by the WHO Global Infection Prevention and Control Unit

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- New **animation video** on best practices for insertion and maintenance of urinary catheters (http://www.who.int/infection-prevention/tools/care-components/catheters)

- Announcement of the **2019 IPC Global Survey**


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The problem of SSI and AMR in surgical services

- Up to 33% of surgical patients get a postoperative infection, of which 51% can be antibiotic resistant

- 43% of patients have surgical antibiotic prophylaxis (SAP) inappropriately continued after the operation

- More than 1 in 10 people who have surgery in low and middle income countries get surgical site infections

- Surgical site infections threaten the lives of millions of surgical patients each year and contribute to the spread of antibiotic resistance

SSI burden – an overview (1)

- Second most frequent type of HAI in Europe and the USA

- Most frequent type of HAI on admission (67% in the USA, 33% in Europe)
  
  - SSI incidence (per 100 procedures)
    - USA 2014: 1.9%
    - Europe 2013–14: 0.6–9.5%
  
  - Incidence varies according to type of procedure (very low in clean procedures, such as arthroplasty; higher in contaminated/dirty procedures, such as colon surgery)

  - Most frequent pathogens: Gram-positive cocci (such as Staphylococcus aureus (S. aureus) at 17–30%), followed by Gram-negative bacilli

  - AMR: 39–51% of SSI pathogens are resistant to standard prophylactic antibiotics in the USA

References:
- National and state healthcare-associated infections progress reports. Atlanta, USA: National Center for Emerging and Infectious Diseases, Centers for Disease Control and Prevention, 2013.
SSI burden – an overview (2)

- Most frequent type of HAI in LMICs
- Infection is the most frequent complication of surgery in Africa
- Pooled SSI incidence in LMICs (WHO unpublished data, 2017)
  - 5.9 per 100 procedures
  - 11.2 per 100 surgical patients
- A few studies from LMICs report SSI rates by surgical procedure and data on microbiological causes of SSI
- Most frequent pathogens are *S. aureus* (20.3%) and *Escherichia coli* (E. coli) (20.3%)
- Average methicillin resistance among *S. aureus* isolates (MRSA): 54.5%
- SSI pooled incidence in South-east Asia: 7.7%
- Surgical sepsis = 30% of all patients with sepsis

Source:
Prevention of Surgical Site Infections
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WHO global guidelines for SSI prevention


SSI prevention recommendations (1)

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WHO recommendations for SSI prevention (2)

WHO recommendations for SSI prevention (3)

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WHO recommendations for SSI prevention (4)

World Antibiotic Awareness Week 2018
Highlighting WHO strong and conditional recommendations

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Translating guidelines to action

WHO hand hygiene strategy impact

Meta-analysis from 22 studies confirmed that the WHO hand hygiene strategy is effective at increasing health care workers compliance and results of 19 studies showed reduction of health care associated infections

- Allegranzi B et al, Lancet ID 2013
- Luangasanatip N et al, BMJ 2015

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Prevention surgical site infections - implementation document

The purpose of this document is to present a range of tested approaches to achieve successful SSI prevention implementation at the facility level, including in the context of a broader surgical safety climate.
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Claire Kilpatrick, World Health Organization
Sponsored by the WHO Global Infection Prevention and Control Unit

Section I - summary of strategies to facilitate implementation of the Checklist

<table>
<thead>
<tr>
<th>Strategy</th>
<th>National/state level applications</th>
<th>Hospital level applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage existing communication channels, networks and relationships</td>
<td>Use existing meetings to present the work and convince participants. Disseminate information through professional organisations, trade groups and partners.</td>
<td>Leverage teams that work on other quality improvement projects. Share information about the project at every opportunity, staff meetings, grand rounds, and within existing committees.</td>
</tr>
<tr>
<td>Develop and support clinical champions</td>
<td>Build a state-level community that consists of representatives from disciplines touched by the work and a variety of facility types. Offer a variety of programme activities for individuals to learn about the project. Make materials to walk organizations through the key steps of implementation and offer advice on how to overcome common barriers. Convene facility champions so that they can share their experiences and help each other solve problems.</td>
<td>Build a multidisciplinary team that consists of at least one representative from every discipline touched by the project. Provide champions with resources and time to implement the project.</td>
</tr>
<tr>
<td>Support implementation through coaching</td>
<td>Conduct hospital site visits to learn about implementation and provide feedback to organisations. Remember coaches need to be trained in how to give feedback.</td>
<td>Create a coaching programme leveraging your implementation team and clinical champions. Remember coaches need to be trained in how to give feedback. If needed, implement parts of the project instead of the entire programme.</td>
</tr>
<tr>
<td>Encourage incremental change</td>
<td>Provide guidance on how to implement the project in smaller parts or to put some components into place when an organisation is not ready for the entire project.</td>
<td></td>
</tr>
<tr>
<td>Build in implementability, modification of interventions to meet the local context should be encouraged and supported through guidance.</td>
<td>Plan interventions that can be implemented and modified. Create template and programme materials that meet the needs specific to your environment. Consider culture, resources, and prior quality improvement projects that may inform the work.</td>
<td>Modify programme materials to meet your organization’s culture and workflow following guidance provided by national and state programme teams.</td>
</tr>
<tr>
<td>Build leadership support</td>
<td>Gather a national leadership team to guide the work.</td>
<td>Create a facility-level leadership team to guide the work and provide resources for it.</td>
</tr>
</tbody>
</table>

Section II - improvement intervention examples

Describes the key evidence- and practice-based elements identified as being successful in improving processes and practices that contribute to preventing SSI in a range of countries.
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Implementation example


Impact on preventive measures

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Impact on SSI

Summary of success factors

- Use of multimodal strategies (this does not mean checklists and bundles)
- Having a step-wise action plan
- Mapping recommendations according to the surgical patient journey
- Empowering teams and involving front-line staff
- Engaging leadership
- Letting teams take the lead on adaptation
- Catalysing collective and individual ownership
- Using data to create awareness
- Awarding teams and work demonstrating a safety culture spirit
Section III - The WHO multimodal approach as a proven and successful way to implement SSI prevention recommendations

Describes the features of a multimodal strategy that WHO proposes for the implementation of SSI prevention recommendations.

Practical application of proven implementation and improvement approaches

Implementation manual to prevent surgical site infections at the facility level – turning recommendations into practice
Prevention of Surgical Site Infections
Claire Kilpatrick, World Health Organization
Sponsored by the WHO Global Infection Prevention and Control Unit

SSI prevention recommendations (1)


Bringing improvement to life

Example Scenario – surgical staff would like to establish a standard preoperative bathing regimen for all patients undergoing surgery

What is the presenting problem – no standard protocol, procedures or guidance for preoperative bathing exist

Case study – The surgical team received a call from a nurse on a surgical ward saying that a patient had been admitted, asking questions about preoperative bathing. The nurse said she wasn’t clear how to answer these questions. The surgeon told the nurse that all patients should bathe prior to surgery and had thought this was standard procedure. When informed that it was not, the surgeon met with colleagues to establish a protocol for preoperative bathing for both inpatients and outpatients. The surgical and nursing teams met with the IPC team to understand challenges and pose questions. The IPC team noted that plain soap would be sufficient for preoperative bathing but the nursing teams highlighted that soap is not routinely available and that patients are not counseled on perioperative bathing when presenting for surgery as an out-patient. The IPC team provides WHO information on the guidelines recommending preoperative bathing, and reinforced that outpatients should be counseled to bathe and all inpatients should be routinely bathed the night before surgery.

<table>
<thead>
<tr>
<th>What has to be addressed to make the improvement required?</th>
<th>Why? Reinforcing evidence based recommendations</th>
<th>When? Help teams know exactly when to act</th>
<th>Who should be involved to make sure improvement happens?</th>
<th>How should you make the improvement?</th>
</tr>
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Summary of a multimodal improvement strategy

1. Build it
   - Coordination
   - Partnerships
   - Leadership

2. Teach it
   - Training
   - Education
   - Awareness

3. Check it
   - Monitoring
   - Feedback
   - Evaluation

4. Sell it
   - Enrollment
   - Communication
   - Advocacy

5. Live it
   - Institutional change
   - Continuous improvement
   - Sustainability

Figure 5.1: The five components of the WHO multimodal hand hygiene improvement strategy

1a. System change – alcohol-based handrub at point of care
   + 1b. System change – access to safe, continuous water supply, soap and towels
   + 2. Training and education
   + 3. Evaluation and feedback
   + 4. Reminders in the workplace
   + 5. Institutional safety climate

New WHO implementation package for SSI prevention

Infection prevention and control

Surgical site infections tools and resources
A range of tools exist for you to adopt and adapt to support local improvement. They are proven to achieve change if used as part of a multi-modal strategy as represented in the 5 components listed here.

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Understanding the multimodal strategy for SSI prevention (1)

System change

“Build it”

- Ensuring that the health care facility has the necessary infrastructure and resources in place to allow for steps to be taken to prevent SSI based on the known modifiable risk factors

- The right infrastructure and available resources can streamline interventions for consistent delivery of care and make execution easier and safer.


System change - “Build it” (cont’)

Necessary infrastructure and resources

- Allocated budget
- Standard operating procedures, protocols, local policies and tools/mechanisms for training
- An IT system (or paper) for monitoring and feedback on infrastructure and resources and other improvement steps
- Laboratory services
- Surgical services/human resources including a dedicated, competent team for ensuring SSI prevention activities working to an action plan
- Supplies for surgical hand preparation*
  - ABHR, antimicrobial soap
  - Procurement vs local production
  - Sterile drapes and gowns
  - The correct antibiotics for SAP (and if need to be given with MBP) - easily accessible
  - Clippers (if hair removal essential)
  - Chlorhexidine-alcohol-based (skin prep) solution*
  - Mupirocin 2% ointment
  - Oxygen
  - Standard postoperative wound dressings

To consider:
- Antimicrobial-coated sutures
- Negative pressure wound therapy devices
- Nutritional formulas
- Warming devices
- Fluid therapy
- Aqueous povidone iodine solution (irrigation)
System Change: Modified WHO formulations for surgical hand preparation

**Formulation I**

Final concentrations: ethanol 80% wt/wt, glycerol 0.725% vol/vol, hydrogen peroxide 0.125% vol/vol.

**Ingredients:**
1. ethanol (absolute), 800 g
2. H₂O₂ (3%), 4.17 ml
3. glycerol (98%), 7.25 ml (or 7.25 x 1.26 = 9.135 g)
4. top up to 1000 g with distilled or boiled water

**Formulation II**

Final concentrations: isopropanol 75% wt/wt, glycerol 0.725% vol/vol, hydrogen peroxide 0.125% vol/vol.

**Ingredients:**
1. isopropanol (absolute), 750 g
2. H₂O₂ (30%), 4.17 ml
3. glycerol (98%), 7.25 ml (or 7.25 x 1.26 = 9.135 g)
4. top up to 1000 g with distilled water

Understanding the multimodal strategy for SSI prevention (2)

Training and education – “Teach it”

- Practical training and education methods aligned with the recommendations for SSI prevention
  - Onsite hospital courses
  - Bolus (single relatively large) sessions
  - Simulation sessions for skills training
  - Use of locally made or online videos
  - Online e-learning courses and webinars
  - Focus groups and workshops
  - Bedside training
  - In-person sessions, e.g. during ward or grand rounds, town hall meetings, coaching visits
  - Pre and post knowledge and perception tests
  - Training support materials (handouts, e-learning, etc.)

Education and training improving surgical hand preparation

1. Local production of modified WHO formulation for ABHR

2. Surgical hand preparation
   - Antimicrobial soap + water = 2–5 minutes
   - Alcohol-based = 1.5–3 minutes
   - The right technique is crucial
   - Nailbrushes are not recommended.
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Education and training - surgical hand preparation

Surgical Handrubbing Technique

- Handwash with soap and water on arrival to OR, after having donned theatre clothing (gown, hood, mask).
- Use an alcohol-based handrub (ABHR) product for surgical hand preparation, by carefully rubbing the technique illustrated in images 1 to 4, before every surgical procedure.
- If any non-sterile lot or biological fluid are present when gloves are worn, following the execution, handwash with soap and water.

https://www.youtube.com/watch?v=h16JPtqOOGs

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Education and training - wound management

How to perform
SURGICAL WOUND EVALUATION AND DRESSING

An educational video produced by the World Health Organization

Education and training - key facts documents

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Education and training - training package

Advanced Infection Prevention and Control (IPC) Training

- Slides deck
- Trainer’s manual
- Student’s handbook
- E-learning module

Prevention of surgical site infection (SSI)

http://www.who.int/infection-prevention/tools/core-components/en/

Understanding the multimodal strategy for SSI prevention (3)

Evaluation and feedback

“Check it”

Regular monitoring and timely feedback of:

- risk factors for SSI;
- compliance with recommended procedures and practices;
- infrastructures and available resources and supplies;
- knowledge and perception of the problem;
- SSI rates.

It should not be seen as a component separate from implementation or only to be used for scientific purposes. Targeted tools and use of observations are inherent.

This is an essential step in:

- identifying areas deserving major efforts and feeding crucial information into development of local/local action plan;
- measuring the changes induced by improvement efforts and ascertaining whether interventions have been effective;
- engaging staff in deciding upon different formats for providing feedback (real time and personalised feedback have proven beneficial).

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Monitoring example - recording SSIs

http://www.who.int/infection-prevention/tools/surgical/SSI-surveillance-protocol.pdf?ua=1

The WHO approach to SSI surveillance in settings with limited resources

**Adapted approach** that has been used in settings with limited resources to conduct surveillance in the context of interventions to reduce SSI.

The protocol is based on the widely accepted US Centers for Disease Control and Prevention –National Healthcare Safety Network (CDC-NHSN) definitions for SSI but **definitions based on clinical signs and symptoms should be prioritized**, given the lack of quality microbiology laboratory support.

For feasibility reasons, this protocol is based on **post-discharge surveillance up to 30 days** only.

Patient follow-up after discharge includes **phone calls and involvement of the patient** in recognizing signs and symptoms of SSI.

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Monitoring example – tools

Understanding the multimodal strategy for SSI prevention (4)

Reminders and communications

“Sell it”

- Reminding and prompting health care workers about the importance of practices to prevent SSI when they are working at the point of care
- Informing patients and their visitors of the standard of care that they should expect to receive
- Communications to inform senior leaders and decision-makers regarding the standards that they should assure

- Posters
- Leaflets
- Banners
- Stickers
- Flowcharts
- Infographics
- Letter templates
- Advocacy messages suitable to the local setting, e.g. memos
- Manuals
- Electronic reminders (built in to hospital IT system)
- Telephone call (including for patient reminders)
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Reminders and communication

SSI prevention throughout the patient journey – IPC in action

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Embedding hand hygiene in a surgical patient’s journey

WHAT’S THE SOLUTION?
A range of precautions - before, during and after surgery - reduces the risk of infection.

BEFORE SURGERY
- Ensure patients wash or shower.
- Do not shave patients.
- Use clean surgical gowns and gloves.
- Use antimicrobial impregnated films to clean skin.
- Surgical scrub should strongly optimize environment and preoperative room space.

DURING SURGERY
- Limit the number of people and ensure they wear gloves.
- Ensure all hospital equipment is sterilized and available.
- Ensure all surgical equipment is available to the surgical procedure.

AFTER SURGERY
- Check that hand hygiene was done and that no surgical procedure was performed.

SEE YOUR HANDS
HAND HYGIENE SUPPORTS SAFE SURGICAL CARE
Surgical patients are IN your hands. See what’s ON your hands. Practice hand hygiene for surgical patients FROM ADMISSION TO DISCHARGE.

HANDLE ANTIBIOTICS WITH CARE IN SURGERY
Misuse of antibiotics puts all surgical patients at risk.

WHAT SHOULD HEALTH WORKERS DO TO PREVENT AMR IN SURGERY?
- Give narrow-spectrum antibiotics when recommended, depending on the type of surgery.
- Follow 12-hour intervals prevailing surgical indication.

WHAT SHOULD YOU NOT DO?
- Avoid prescribing narrow-spectrum antibiotics.
- Avoid antibiotics except guidelines.
- Avoid continuing antibiotics for non-sterile wounds in isolation from the bacteria.
- Avoid giving prophylaxis antibiotics unless there is a temporary, i.e. surgical option.

WHO SHOULD BE INVOLVED IN ENSURING APPROPRIATE ANTIBIOTIC USE IN SURGERY?
- Physicians
- Surgeons
- Anesthesiologists
- Pharmacists
- Infection Preventionists
- Infectious Diseases doctors

http://www.who.int/infection-prevention/tools/focus-amr/en/
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Understanding the multimodal strategy for SSI prevention (5)

Institutional safety climate and culture

“Live it”

Creating an environment and the perceptions that facilitate awareness-raising about SSI prevention at all levels:

- a climate that understands and prioritizes surgical safety issues;
- team spirit and cohesion;
- awareness of self-capacity to make a change, ownership of the intervention.

- Motivated, multidisciplinary well functioning teams
- Champions
- Role models
- Visible leadership including on ward/grand rounds, through photographs and signatures
- Morbidity and mortality meetings including senior hospital staff – to learn from defects and facilitate sharing for improvement
- Advocacy messages from leaders (delivered in a timely manner)

Example adaptive tools – addressing the culture

CUSP for Safe Surgery Perioperative Staff Safety Assessment

CUSP for Safe Surgery (CUSP) Executive Safety Rounds Kickoff Template

CUSP for Safe Surgery (SUSP)
Safety Issues Worksheet for Senior Executive Partnership

The Learning From Defects Tool

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Leadership videos - in local context supports culture change

Helping health facilities prepare for implementation

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New WHO SSI Prevention Implementation Package

Announcing the focus for 5 May 2019
SAVE LIVES: Clean Your Hands campaign

- Assessing and monitoring your infection prevention progress
- WHO resources exist for use at the facility level

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The spirit of assessments

- Regular assessments of IPC programmes are essential for continuous quality improvement.

- Assessment helps to create a sense of urgency for the changes needed to improve IPC, taking account of the WHO core component guideline recommendations.

- Assessment also helps to identify existing strengths and take stock of achievements made so far to convince decision-makers that success and progress is possible.

- By using a validated tool (e.g. WHO IPCAT2), you can be confident that the information collected is meaningful and will support improvement.

WHO IPC global survey 2019
Use the two tools*, calculate your score, show your progress, act on your gaps!

Prepare: Read the tools and documents1,2,3,4
Take part in WHO webinars, hear more about using the tools and how to take part in the global survey3
Jan-Feb - complete IPCAF3, act on your results and submit your results to WHO online
Mar-Apr – complete HHSAF4, act on your results and submit your results to WHO online

Be part of the WHO global survey starting Jan 2019!
(the report will be launched end of 2019)

*Two free, valid tools to use: IPC Assessment Framework (IPCAF), Hand Hygiene Self Assessment Framework (HHSAF)
1. http://www.who.int/infection-prevention/whointernational/whointernational
5. Find more here: http://www.who.int/infection-prevention/whointernational/whointernational
Survey: Practice variation perioperative O₂ use

Perioperative high FiO₂ may help prevent SSI

WHO, CDC & ACS recommendation on high FiO₂ sparked debate

Research indicates a large global practice variation may exist

Survey to quantify the problem and guide potential implementation efforts – led by the University of Amsterdam (The Netherlands) & supported by WHO

Contribute by filing in the survey via the link and forward it to your colleagues!

https://goo.gl/forms/9P0o14eKx4yTG3im89
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www.webbertraining.com/schedulep1.php

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<th>Topic</th>
<th>Speaker and Details</th>
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<td>November 15, 2018</td>
<td>HEPATITIS C IN PRISONS - FROM INDIVIDUAL CARE TO VIRAL ERADICATION</td>
<td>Dr. Roberto Ranieri and Dr. Ruggero Giuliani, Penitentiary Infectious Diseases Unit, Santi Paolo e Carlo Hospital, University of Milan, Italy</td>
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<tr>
<td>November 22, 2018</td>
<td>NEONATAL SEPSIS PREVENTION IN LOW-RESOURCE SETTINGS</td>
<td>Prof. Dr Angela Dramowski, Stellenbosch University, Cape Town</td>
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<td>December 6, 2018</td>
<td>INFECTIOUS DISEASE HIGHLIGHTS AND LOWLIGHTS IN 2018, AND WHAT TO</td>
<td>Dr. Larry Madoff, ProMED Editor, Director, Division of Epidemiology and Immunization, Massachusetts Dept. of Public Health</td>
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<td>EXPECT IN 2019</td>
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<td>December 12, 2018</td>
<td>CONTROL OF CARBAPENEMASE-PRODUCING ENTEROBACTERIAEA IN AN ENDEMIC SETTING: DO CLASSICAL IPC METHODS WORK FOR NEW AGE BUGS?</td>
<td>Dr. Kalisvar Marimuthu, Tan Tock Seng Hospital, Singapore</td>
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<td>December 13, 2018</td>
<td>THE BEST WAYS TO GET YOUR HOSPITAL TO TALK ABOUT INFECTION CONTROL</td>
<td>Prof. Andreas Voss, Radboud University, The Netherlands</td>
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