Which established infection control interventions are supported by evidence?

Prof Stephan Harbarth
Infection Control Programme, Geneva University Hospitals
Geneva, Switzerland
ACIPC conference (Tasmania), 23 November 2015

It’s midnight in Europe and I had quiet a travel odyssey with 2 missed flights…

“Don’t worry about the world coming to an end today. It is already tomorrow in Australia.”

Charles M Schulz, American cartoonist

Disclosures & acknowledgments

- B.Braun, BioMerieux, DaVolterra, DestinyPharma, Pfizer, EU: Research funding or advisory board honoraria

- Material: Walter Zingg, Caroline Landelle

UNIVERSITÉ DE GENÈVE
HUG Hôpitaux Universitaires de Genève

Established infection control strategies

General measures
Standard precautions
Hand hygiene
Barrier precautions
Surveillance of infections

CAVE: I will not go through all 100+ strong evidence-based measures (category 1A) for infection prevention and MDRO control

Specifically targeted against VAP/HAP
Specifically targeted against UTI

Agenda

- A few thoughts about “evidence” in infection control…

- Evidence-base to implement best infection control practices, incl. examples:
  - HAP/VAP prevention
  - CLABSI prevention
  - Multimodal interventions

- Conclusions

UNIVERSITÉ DE GENÈVE
HUG Hôpitaux Universitaires de Genève

Parachute use to prevent death and major trauma related to gravitational challenge: systematic review of randomised controlled trials

“Parachutes reduce the risk of injury after gravitational challenge, but their effectiveness has not been proved with randomized controlled trials”

Smith GC, Pell JP. BMJ 2003; 327:1459-1461

Evidence vs. common sense?

Do you allow artificial fingernails in your hospitals and ICUs?

Here comes a story from the USA…

Spring, 2000

- An outbreak of *P. aeruginosa* (PSA) in a NICU gained national attention
- Epidemiological evidence demonstrated an association between acquisition of PSA and exposure to 2 nurses
- The evidence supported, but did not prove a possible role for long or artificial nails in hand colonization with PSA

Moolenar et al. A Prolonged Outbreak of *Pseudomonas aeruginosa* in a Neonatal Intensive Care Unit: Did Staff Fingernails Play a Role in Disease Transmission?
Infection Control and Hospital Epidemiology. 2000;21:80-85.

Additional Reports

"*Candida* Osteomyelitis and Diskitis after Spinal Surgery: An Outbreak that Implicates Artificial Nail Use"

- An OR technician with artificial nails was implicated in the outbreak

Parry et al. Clinical Infectious Diseases 2001;32:352-7

Additional Reports (2)

"Endemic *Pseudomonas aeruginosa* in a Neonatal Intensive Care Unit"

- Results: a history of the use of artificial fingernails or nail wraps (P=0.03) was a risk factor for hand colonization with *P. aeruginosa*

Foca et al. N Engl J Med 2000; 343:695-700.

Parachutes in infection control

- Artificial nails, tips, wraps etc. should <u>not</u> be worn by staff members providing direct patient care (CDC recommendation)

$\Rightarrow$ ***" Requiring short natural fingernails is a reasonable policy "***

Which are the most effective, evidence-based and generally applicable elements of hospital infection prevention programmes ?

Situation:

- You are appointed to a new hospital and want to be successful!

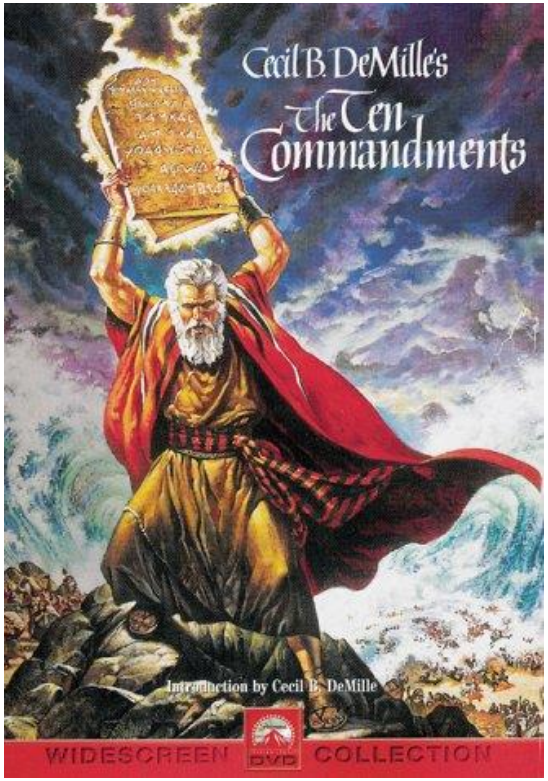
- Which ingredients to you need?

Hospital organisation, management, and structure for prevention of health-care-associated infection: a systematic review and expert consensus

Walter Zingg, Alison Holmes, Markus Dettenkofer, Tim Goetting, Federica Secci, Lauren Clack, Benedetta Allegranzi, Anna-Pelagia Magiorakos, Didier Pittet, for the systematic review and evidence-based guidance on organization of hospital infection control programmes (SIGHT) study group*

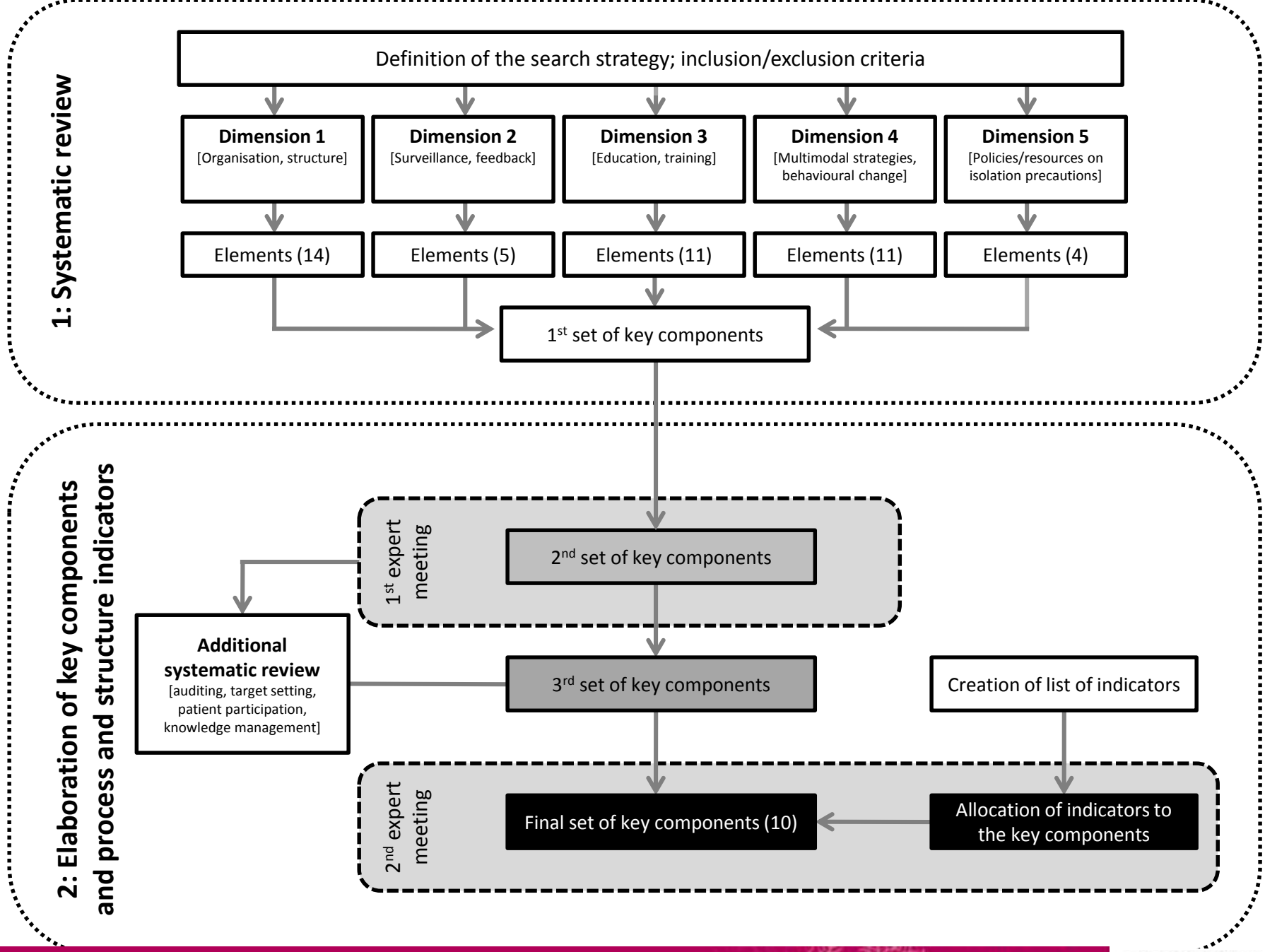
Lancet Infect Dis 2015; 15: 212–24

Despite control efforts, the burden of health-care-associated infections in Europe is high and leads to around 37 000 deaths each year. We did a systematic review to identify crucial elements for the organisation of effective



ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL

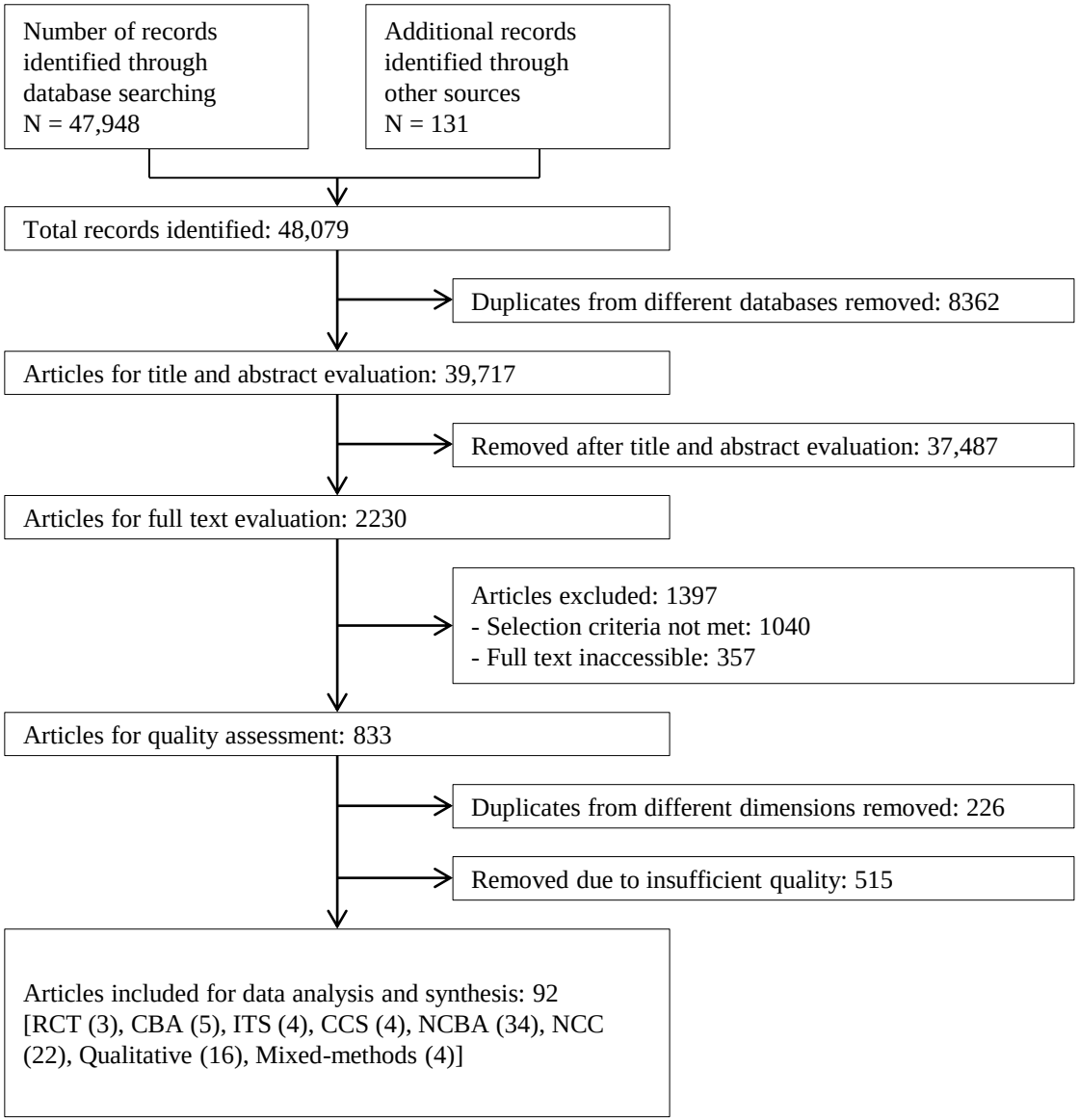
PROHIBIT
Prevention of Hospital Infections by Intervention & Training



Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

UNIVERSITÉ DE GENÈVE

HUG Hôpitaux Universitaires de Genève



Most evidence was from high-income countries, with only eight (8.7%) studies being from upper-middle-income or lower-middle-income countries;

44 (44.6 %) studies had been done in Europe

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

Methods of evaluation

Evidence graded as low (1), intermediate (2), or high (3) on the basis of the median value for the studies contributing to the component.

Ease of implementation and applicability were graded as low (1), intermediate (2), or high (3).

Consensus about grading was reached with the Delphi method.

10 key components for infection control

	Key components	Indicators
1	An effective infection control programme in an acute care hospital must include at least: one full-time specifically trained IC-nurse ≤ 250 beds; a dedicated physician trained infection control; microbiological support; data management support	- Detailed infection control activities: number of ongoing surveillance and prevention programmes, outbreaks, number of performed audits - Established infection control: appropriate staffing, IC committee in place, defined goals for IC, identified IC budget, IC on the agenda of the hospital administration, defined outbreak management, vaccination programmes for health-care workers
2	To make sure that the ward occupancy does not exceed the capacity for which it is designed and staffed; staffing and workload of frontline health-care workers must be adapted to acuity of care; and the number of pool/agency nurses and physicians minimized	- Average bed occupancy at midnight - Average staffing of frontline workers - Average proportion of pool/agency professionals
3	Sufficient availability of and easy access to material and equipment and optimized ergonomics	- Alcohol-based handrub at the point of care - Sinks stocked with soap and single-use towels
4	Use of guidelines in combination with practical education and training	- Guidelines locally adapted - Number of new staff trained using the local guidelines - Teaching programmes are based on local guidelines
5	Education and training involves frontline staff, and is team- and task-oriented	- Audit of education and training programmes - Results of knowledge tests and competency assessments
6	Organizing audits as a standardized (scored) and systematic review of practice with timely feedback	- Number of audits (overall, and stratified by departments/units and topics) for specified time period
7	Participating in prospective surveillance and offering active feedback, preferably as part of a network	- Participation of (inter-) national surveillance initiatives - Number and type of wards with a surveillance - Regular review of the feedback strategy
8	Implementing infection control programmes follow a multimodal strategy including tools such as bundles and checklists developed by multidisciplinary teams and taking into account local conditions	- Verification that established prevention programmes follow a multimodal strategy - Process indicators: hand hygiene compliance, compliance with medical/care procedures by checklists, compliance with cleaning/disinfection procedures - Outcome indicators: standardized rates for HAI, infections with MDROs, transmission of MDROs
9	Identifying and engaging champions in the promotion of a multimodal intervention strategy	- Interviews with frontline staff and infection control professionals
10	A positive organizational culture by fostering working relationships and communication across units and staff groups	- Questionnaires about work satisfaction - Crisis management - Human resource indicators: absenteeism, health-care worker turnover

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

Important note

All key components are important and, although numbered for convenience, the list does not prioritise any over another

Individual hospitals should be encouraged to establish the key components that make sense in terms of the specific needs and resources identified through self-assessment

Organisation of infection control

Key component

An effective infection control programme in an acute care hospital must include at least: **one full-time specifically trained IC-nurse ≤ 250 beds; a dedicated physician trained infection control; microbiological support; data management support**

Indicators

Continuous review of surveillance and prevention programmes, outbreaks, and audits; infection control committee in place, inclusion of infection control on the hospital administration agenda, and defined goals; appropriate staffing and budget for infection control

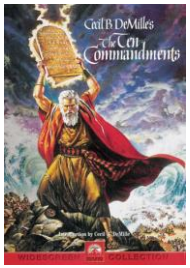
Evidence	**2**
Ease of implementation	3
EU-wide applicability	3

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

UNIVERSITÉ DE GENÈVE

HUG Hôpitaux Universitaires de Genève

Ward occupancy and workload



Key component

Ward occupancy must not exceed the capacity for which it is designed and staffed; **staffing and workload** of frontline staff must be adapted to acuity of care, and the number of pool or agency nurses and physicians used kept to a minimum

Indicators

Average bed occupancy at midnight, average numbers of frontline workers, and the average proportion of pool or agency professionals

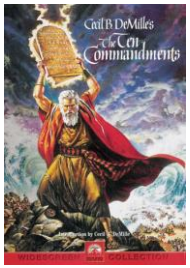
Evidence	**2**
Ease of implementation	2
EU-wide applicability	2

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

UNIVERSITÉ DE GENÈVE

HUG Hôpitaux Universitaires de Genève

Materials, equipment, and ergonomics



Key component

Sufficient availability of and easy access to materials and equipment, and optimisation of ergonomics

Indicators

Availability of alcohol-based hand rubs at the point of care and sinks stocked with soap and single-use towels

Evidence	**2**
Ease of implementation	2
EU-wide applicability	2

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

A Cluster-Randomized, Cross-over Study of the Efficacy of Plain Soap and Water Versus Alcohol-Based Rub for Surgical Hand Preparation (in Rural Africa)

P. Nthumba; E. Poenaru; D. Poenaru; P. Bird; B. Allegranzi; D. Pittet; S. Harbarth

Kijabe Hospital, Kijabe, Kenya;
WHO; Geneva University Hospitals

Nthumba P et al. *Br J Surg 2010; 97: 1621-28*

UNIVERSITÉ DE GENÈVE

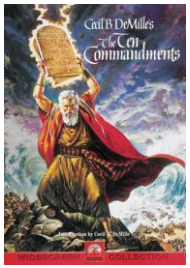
HUG Hôpitaux Universitaires de Genève

Primary outcome: SSI rates

Type of surgical hand prep	Clean surgery (%)	Clean-contaminated surgery (%)	Combined (%)
Total	114 / 1724 (6.6%)	141 / 1409 (10.0%)	255 / 3133 (8.1%)
Plain soap and water	59 / 869 (6.8%)	69 / 727 (9.5%)	128 / 1596 (8.0%)
Alcohol-based handrubs	55 / 855 (6.4%)	72 / 682 (10.6%)	127 / 1537 (8.3%)
***P* values**	0.77	0.50	0.80

Nthumba P et al. *Br J Surg 2010; 97: 1621-28*

Use of guidelines



Key component	Indicators
Use of guidelines in combination with practical education and training	Adaptation of guidelines to local situation, number of new staff trained with the local guidelines, teaching programmes are based on local guidelines

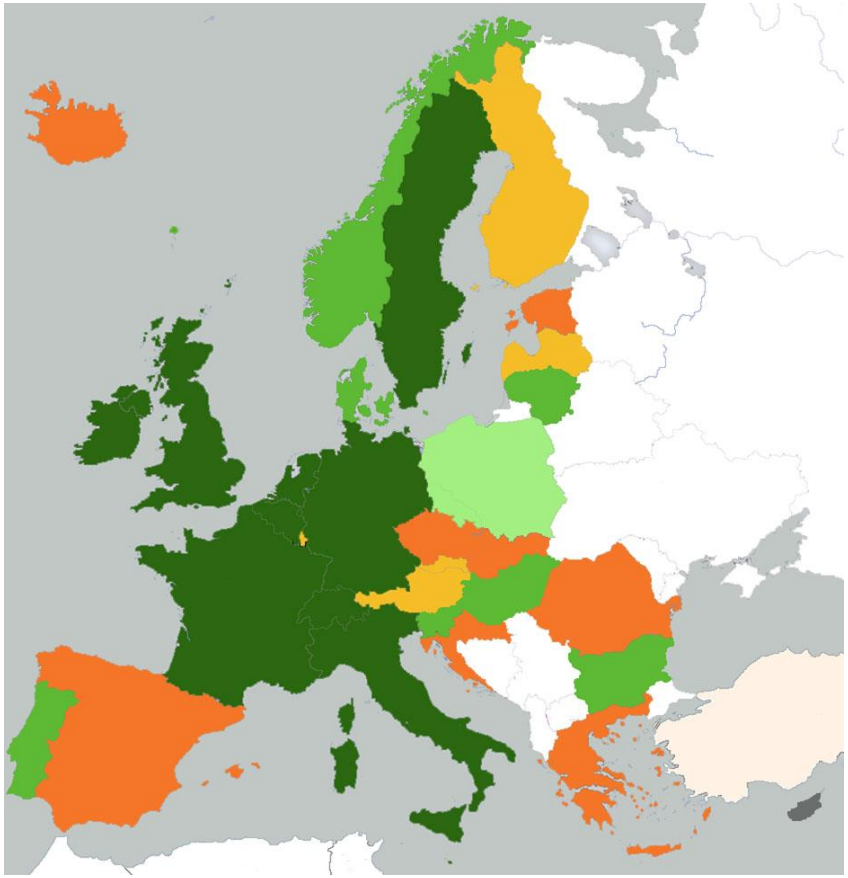
Evidence	**2**
Ease of implementation	3
EU-wide applicability	3

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

UNIVERSITÉ DE GENÈVE

HUG Hôpitaux Universitaires de Genève

National and subnational guidelines



- No guideline
- One guideline
- Two guidelines
- Three guidelines
- Four guidelines
- Five guidelines

PROHIBIT

Prevention of Hospital Infections by Intervention & Training

VAP Prevention

1. Hand hygiene <u>before</u> and <u>after</u> patient contact, preferably using alcohol-based handrubbing
2. Avoid endotracheal intubation if possible
3. Use of oral, rather than nasal, endotracheal tubes
4. Minimize the duration of mechanical ventilation
5. Promote tracheostomy when ventilation is needed for a longer term
6. Glove and gown use for endotracheal tube manipulation

VAP Prevention (con't)

7. Avoid non-essential tracheal suction
8. Oral hygiene with chlorhexidine
9. SDD in selected cases
10. Maintain tracheal tube cuff pressures (>20) to prevent regurgitation from the stomach
11. Avoid gastric overdistension
12. Promote enteral feeding
13. Backrest elevation 30-45°

Author/Society	Hand Hygiene	Microbiologic Monitoring	Invasive Device removal	Avoid Endotracheal Intubation	Reduction in the Prescription of AB	Avoid Reintubation	Promote NIV if possible
Centers for Disease Control and Prevention	YES	NO MENTION	NO MENTION	YES	NO MENTION	YES	YES
IDSA	YES	YES	NO MENTION	YES	NO MENTION	YES	YES
Latin American Thoracic Society	YES	YES	NO MENTION	YES	NO MENTION	YES	YES
Federation of the Infectious Diseases Societies of South Africa	YES	YES	NO MENTION	NO MENTION	YES	NO MENTION	NO MENTION
Association for Professionals in Infection Control and Epidemiology	YES	YES	YES	YES	YES	NO MENTION	YES
The South African Thoracic Society	YES	YES	NO MENTION	YES	YES	NO MENTION	NO MENTION
Brazilian Society of Pneumology and Tisiology	YES	YES	NO MENTION	YES	NO MENTION	NO	YES
The Portuguese Society of Pneumology and Intensive Care	YES	YES	YES	YES	NO MENTION	YES	YES
The British Society for Antimicrobial Therapy	YES	YES	NO MENTION	YES	NO MENTION	YES	YES
Association of Medical Microbiology and Infectious Diseases	YES	YES	NO MENTION	YES	NO MENTION	YES	YES
European HAP Working Group/European Respiratory Society/ESCMID	YES	YES	YES	YES	YES	YES	YES
The French Society of Hospital Hygiene	YES	NO MENTION	NO MENTION	YES	NO MENTION	NO MENTION	YES
The Spanish Society of Pulmonology and Thoracic Surgery	YES	NO MENTION	NO MENTION	NO MENTION	NO MENTION	NO MENTION	YES
Singapore Infection Control Association and Singapore Society of Intensive Care Medicine	YES	NO MENTION	NO MENTION	NO MENTION	NO MENTION	NO MENTION	NO MENTION

Author/Society	Orogastric Tubes	Cuff Pressure (mmHg)	Bed Elevation	Subglotic Aspiration of Secretions	Silver or AB Endotraqueal Tube Revestment	Oral Decontamination	Selective Digestive Decontamination
Centers for Disease Control and Prevention	YES	NO MENTION	YES	NO MENTION	NO MENTION	NO	NO
IDSA	YES	20	YES	YES	NO MENTION	YES	NO
Latin American Thoracic Society	YES	NO MENTION	YES	YES	NO MENTION	YES	NO
Federation of the Infectious Diseases Societies of South Africa	NO MENTION	NO MENTION	YES	not continuous	NO MENTION	YES	NO
Association for Professionals in Infection Control and Epidemiology	NO MENTION	NO MENTION	YES	YES	NO MENTION	YES	NO
The South African Thoracic Society	YES	NO MENTION	YES	NO MENTION	NO MENTION	NO MENTION	NO MENTION
Brazilian Society of Pneumology and Tisiology	YES	20	YES	NO MENTION	NO MENTION	YES	NO
The Portuguese Society of Pneumology and Intensive Care	YES	NO MENTION	YES	NO MENTION	NO MENTION	YES	NO MENTION
The British Society for Antimicrobial Therapy	YES	25	YES	YES	NO MENTION	NO MENTION	YES
Association of Medical Microbiology and Infectious Diseases	YES	20	YES	YES	NO MENTION	YES	NO
European HAP Working Group/European Respiratory Society/ESCMID	YES	20	YES	YES	NOT PRO OR CON	YES	NO
The French Society of Hospital Hygiene	YES	25-30	YES	NOT YET APPROVED	NOT PRO OR CON	YES	NO
The Spanish Society of Pulmonology and Thoracic Surgery	NO MENTION	NO MENTION	YES	YES	YES	YES	NO
Singapore Infection Control Association and Singapore Society of Intensive Care Medicine	YES	NO MENTION	YES	YES	NO MENTION	YES	NO MENTION

Country/Region	Year	Author/Society	Recommendations to HAP outside the ICU	Recommendations to VAP
USA	2003	Centers for Disease Control and Prevention	NO	YES
USA	2005	Iinfectious Diseases Society of America	NO	YES
Latin America	2005	Latin American Thoracic Society	NO	YES
South Africa	2005	Federation of the Infectious Diseases Societies of South Africa	NO	YES
USA	2005	Association for Professionals in Infection Control and Epidemiology	NO	YES
South Africa	2006	The South African Thoracic Society	NO	YES
Brazil	2007	Brazilian Society of Pneumology and Tisiology	NO	YES
Portugal	2007	The Portuguese Society of Pneumology and Intensive Care	NO	YES
England	2008	The British Society for Antimicrobial Therapy	NO	YES
Canada	2008	Association of Medical Microbiology and Infectious Diseases	NO	YES
Europe	2009	European HAP Working Group/European Respiratory Society/ESCMID	NO	YES
France	2010	The French Society of Hospital Hygiene	NO	YES
Spain	2011	The Spanish Society of Pulmonology and Thoracic Surgery	NO	YES
India	2012	The Indian Chest Society	NO	NO
Singapore	2013	Singapore Infection Control Association and Singapore Society of Intensive Care Medicine	NO	YES
Germany	2013	German Society for Infectious Diseases, the German Society for Hygiene and Microbiology, the German Respiratory Society	NO	YES

CDC guidelines for prevention of CVC-related BSI

Evidence-based practice to reduce CVC-related infections

Number of recommendations by category

- Category 1A: 31
- Category 1B: 31
- Category 1C: 4
- Category 2: 28
- Unresolved issues: 4

SHEA/IDSA-Guidelines

- Education of healthcare personnel about CLABSI prevention – AII
- Checklists – BII
- Hand hygiene – B
- Avoiding femoral access – AI
- Using an all-inclusive catheter cart or kit – BI
- Chlorhexidine for skin antisepsis – AI
- Disinfection of catheter hubs, needleless connectors, and injection ports before accessing the catheter (B-I)
- Removing non-essential catheters – AII
- Recommendations about change of dressings, tubes and hubs

Emphasis on procedures and practice change!

Marschall. *Infect Control Hosp Epidemiol* 2008;29:S22

CLABSI Prevention in the ICU (Pan-European Survey)

- Local written policies for central line insertion (90%) and care (87%)
- Standardised daily line assessment (70%)
- Subclavian vein preferred (65% in Eastern, 63% in Southern regions)
- Jugular vein (59% in Northern, 49% in Western regions)

Skin antisepsis:
- alcohol-based chlorhexidine: 37%
- ethanol/isopropyl alcohol alone: 21%
- aqueous iodine: 17%
- alcohol-based iodine: 14%

Technology:
- Impregnated catheters: 31%
- Chlorhexidine impregnated sponge: 16%

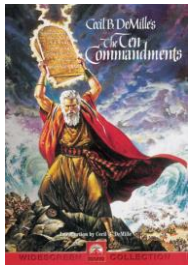
Team- and task-oriented education and training

Key component

Education and training involves frontline staff and is team and task oriented

Indicators

Education and training programmes should be audited and combined with knowledge and competency assessments



Evidence	**3**
Ease of implementation	2
EU-wide applicability	3

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

UNIVERSITÉ DE GENÈVE

HUG Hôpitaux Universitaires de Genève

“Train the trainer“

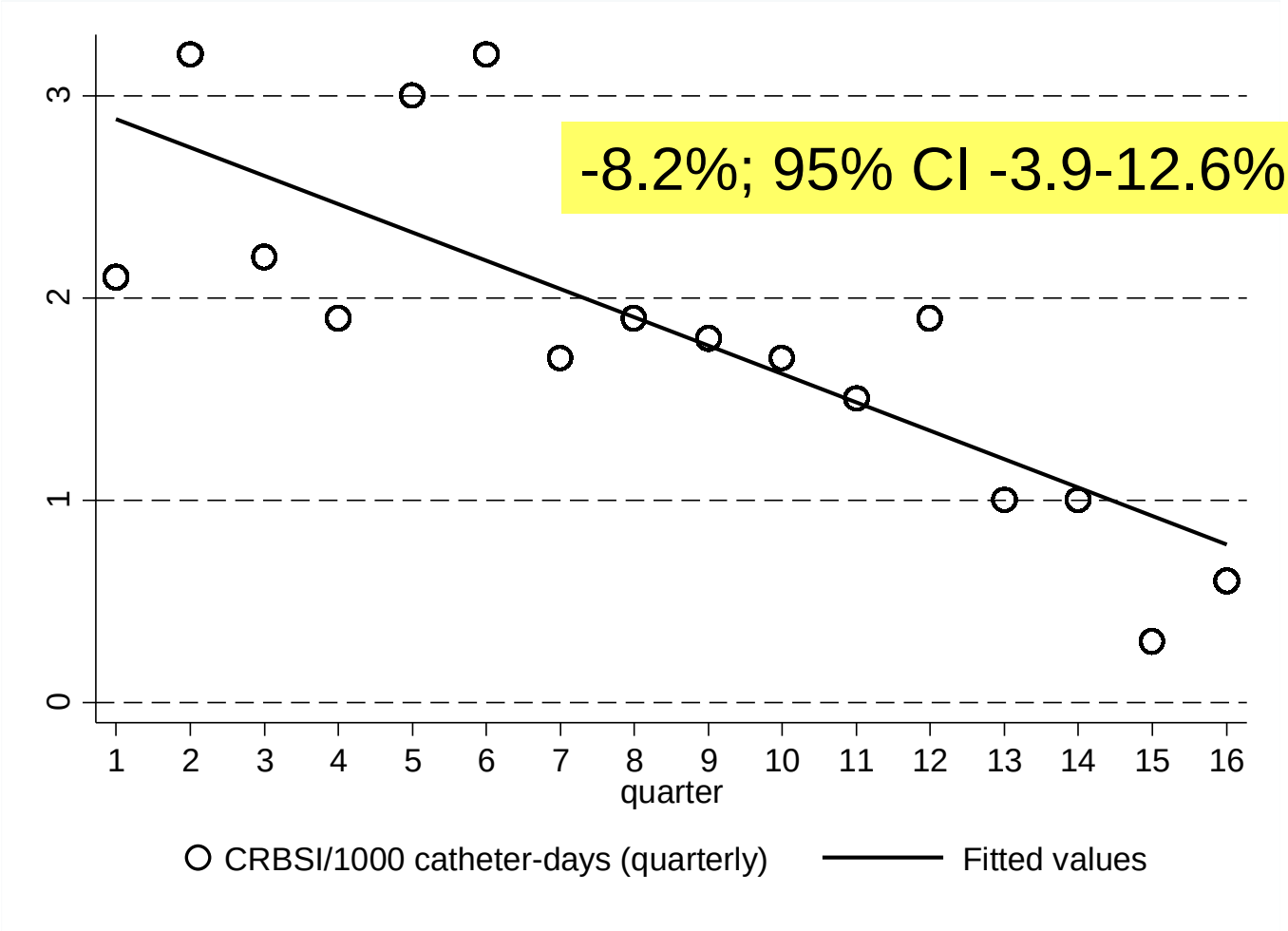
Two workshops per clinical service:
- Presentation of the E-learning tool
- Simulated training sessions

Zingg W et al. *PLOS One*. 2014

UNIVERSITÉ DE GENÈVE

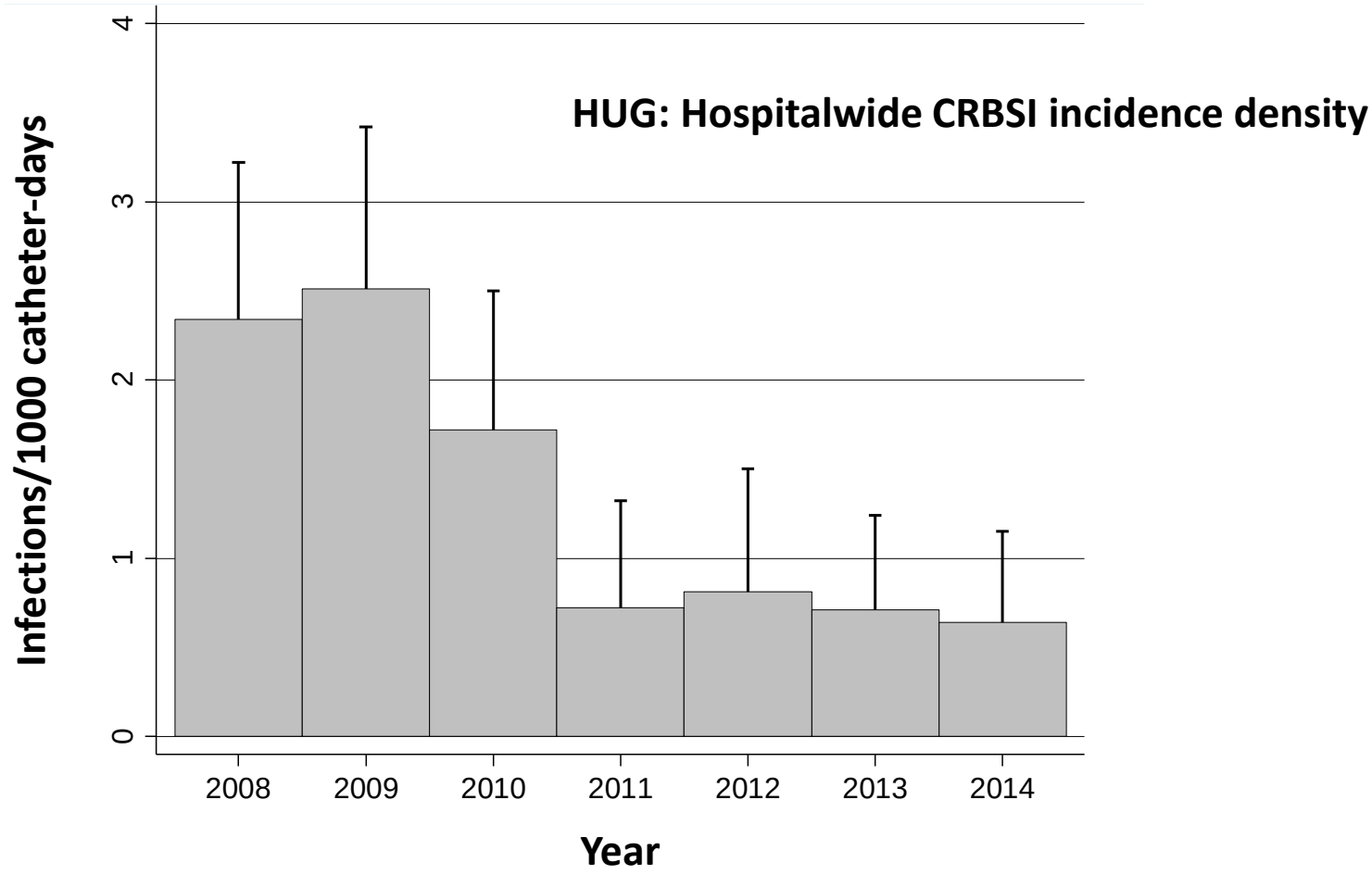
HUG Hôpitaux Universitaires de Genève

Quarterly CRBSI-incidence densities



CRBSI: Central venous catheter related bloodstream infection

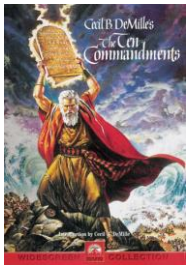
Sustainability



Zingg W et al. *PLOS One*. 2014

UNIVERSITÉ DE GENÈVE
HUG Hôpitaux Universitaires de Genève

Prevention by multimodal strategies



Key component	Indicators
Implementing infection-control programmes following a multimodal strategy, including tools such as bundles and checklists developed by multidisciplinary teams, and taking into account local conditions	Verification that programmes are multimodal; measurement of process indicators; measurement of outcome indicators

Evidence	**2**
Ease of implementation	3
EU-wide applicability	3

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

WHO-Multimodal hand hygiene promotion

The Five Components of the WHO multimodal hand hygiene improvement strategy

1. System Change
   Alcohol-based handrub at point of care
   Access to safe, continuous water supply, soap and towels

+

2. Training and Education

+

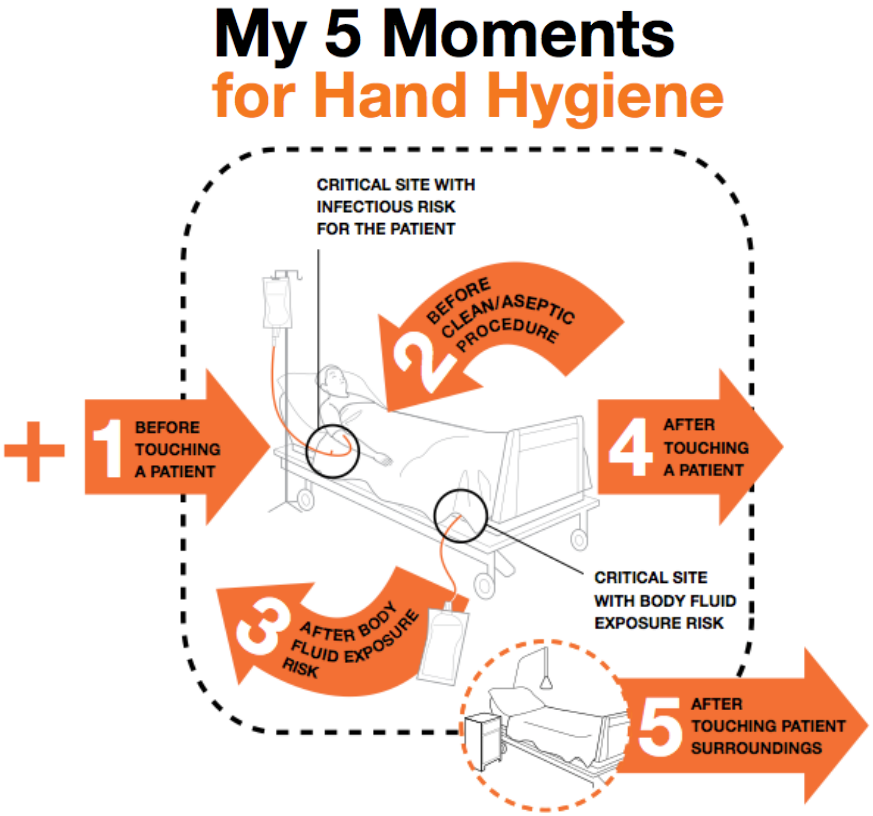
3. Evaluation and Feedback

+

4. Reminders in the workplace

+

5. Institutional safety climate



WHO: Guidelines on hand hygiene in healthcare

Hand hygiene intervention components

	Type of Hand hygiene intervention component	Description
WHO-5	**1. System change**	Ensuring necessary infrastructure is available including a) access to water, soap and towels and b) alcohol-based handrub at the point of care.
	2. Education and Training	Providing training or educational programme on the importance of hand hygiene and the correct procedures for hand hygiene, for healthcare workers.
	3. Feedback	Monitoring hand hygiene practices among healthcare workers while providing the compliance feedback to staff.
	4. Reminders at workplace	Prompting healthcare workers either through printed material, verbal reminders, electronic communications or other methods, to remind them about the importance of hand hygiene and the appropriate indications and procedures.
	5. Institutional safety climate	Active participation at institutional level, creating an environment allowing prioritization of hand hygiene.
Additional components	**6. Goal-setting**	Setting of specific goals aimed at improving hand hygiene compliance, which may both apply at the individual and group level and may include healthcare associated infection rates.
	7. Reward incentives	Interventions involved with providing any reward incentive for the participants once they achieve a particular task or reach a certain level of hand hygiene compliance. Both non-financial and financial rewards are included.
	8. Accountability	Interventions involved with improving healthcare workers' accountability both at an individual and unit level.

OPEN ACCESS

Comparative efficacy of interventions to promote hand hygiene in hospital: systematic review and network meta-analysis

Nantasit Luangasanatip,[1,2] Maliwan Hongsuwan,[1] Direk Limmathurotsakul,[1,3] Yoel Lubell,[1,4] Andie S Lee,[5,6] Stephan Harbarth,[5] Nicholas P J Day,[1,4] Nicholas Graves,[2,7] Ben S Cooper[1,4]

Table 2 | Mean odds ratios with 95% credible intervals for interventions strategies to promote hand hygiene. Results are from random effects network meta-analysis model

Strategies*	Description	Mean OR (95% credible interval)
None/current practice	No intervention or current practice	Reference
Single intervention	Single intervention (system change or education)	4.30 (0.43 to 46.57)
WHO-5†	WHO-5 components	6.51 (1.58 to 31.91)
WHO-5* + others	WHO-5 plus incentives, goal setting, or accountability	11.83 (2.67 to 53.79)

*Model fit statistic: posterior mean residual deviance=10.40 and deviance information criterion (DIC)=23.86.
†Contained five components: system change, education, feedback, reminders, and institutional safety climate (see table 1 for details).

Balancing `No blame` with accountability in Patient Safety

- « In 2009, low hand hygiene rates are generally not a systems problem any more; they are largely an accountability problem. »

- Suggestion:
  « Chronic failure to clean hands will result in a 1-week suspension from clinical practice. »

Wachter & Pronovost, *N Engl J Med 2009*; 361:1401-5

Efficacy of multimodal intervention strategies:

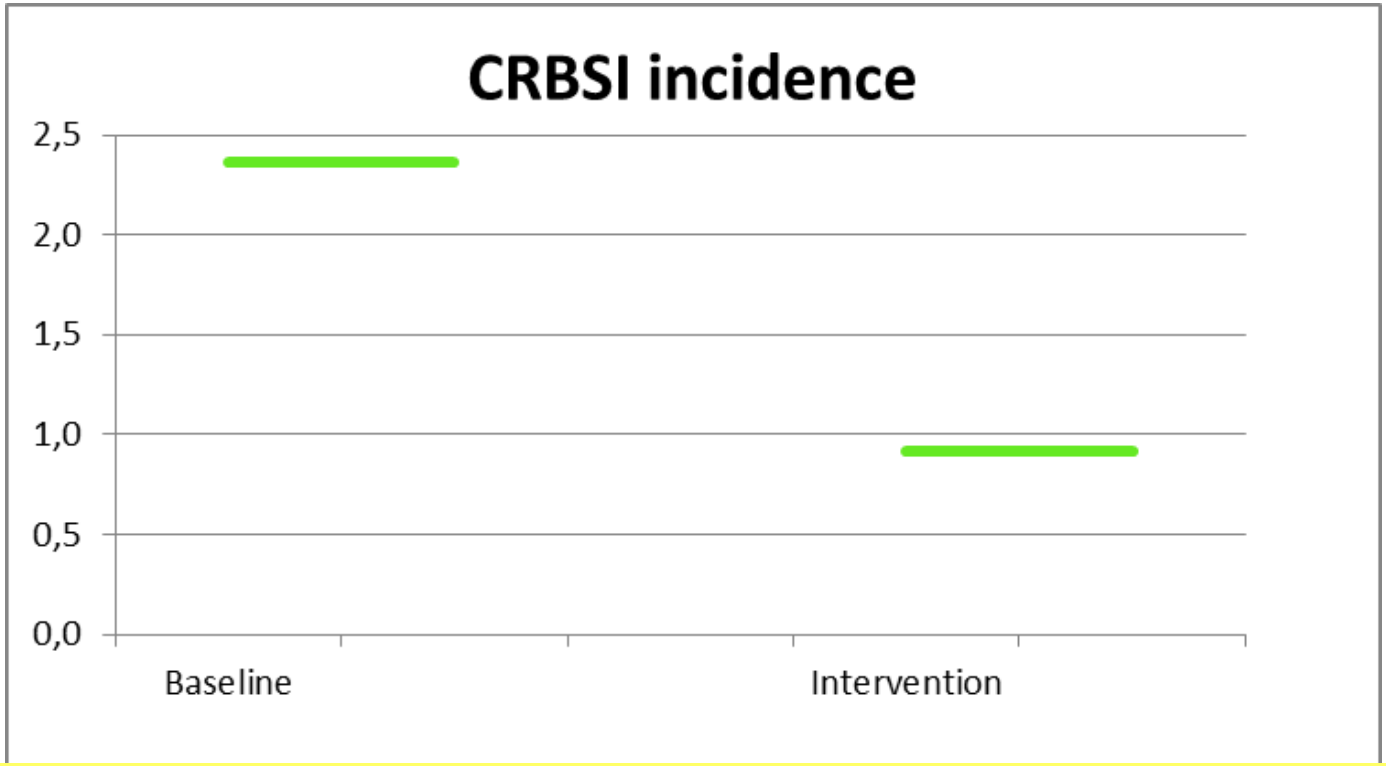
	Baseline	Intervention
Eggimann *Lancet* 2000 *Ann Intern Med* 2005	3.1/1000 catheter-days	1.2/1000 catheter-days
Pronovost *NEJM* 2006	*7.7/1000 catheter-days	*1.4/1000 catheter-days
Zingg *Crit Care Med* 2009	3.1/1000 catheter-days	1.1/1000 catheter-days

***mean** pooled CRBSI-episodes per 1'000 catheter-days

Eggimann P. *Lancet* 2000; 35: 290
Eggimann P. *Ann Intern Med* 2005; 142: 875 – 5 year follow-up
Pronovost P. *N Engl J Med* 2006; 355: 26
Zingg W. *Crit Care Med* 2009; 37: 2167

PROHIBIT – The catheter project

Data from 25,377 patients with 35,894 central venous catheters:
263,093 catheter-days and 384 catheter-related bloodstream infections



An already relatively low CRBSI rate of 2.4/1000 catheter-days was further reduced to 0.9/1000 catheter-days

Bundles in colorectal surgery

Journal of Hospital Infection 78 (2011) 297–301

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevierhealth.com/journals/jhin

A bundle of care to reduce colorectal surgical infections: an Australian experience

A. Bull [a,*], J. Wilson [b], L.J. Worth [a], R.L. Stuart [b], E. Gillespie [b], B. Waxman [b], W. Shearer [b], M. Richards [a]

[a] Victorian Healthcare Associated Surveillance System Coordinating Centre, Melbourne, Victoria, Australia
[b] Southern Health, Melbourne, Victoria, Australia

OPEN ACCESS Freely available online

PLOS | ONE

Reduction of Surgical Site Infections after Implementation of a Bundle of Care

Rogier M. P. H. Crolla[1], Lijckle van der Laan[1], Eelco J. Veen[1], Yvonne Hendriks[2], Caroline van Schendel[3], Jan Kluytmans[2,4]*

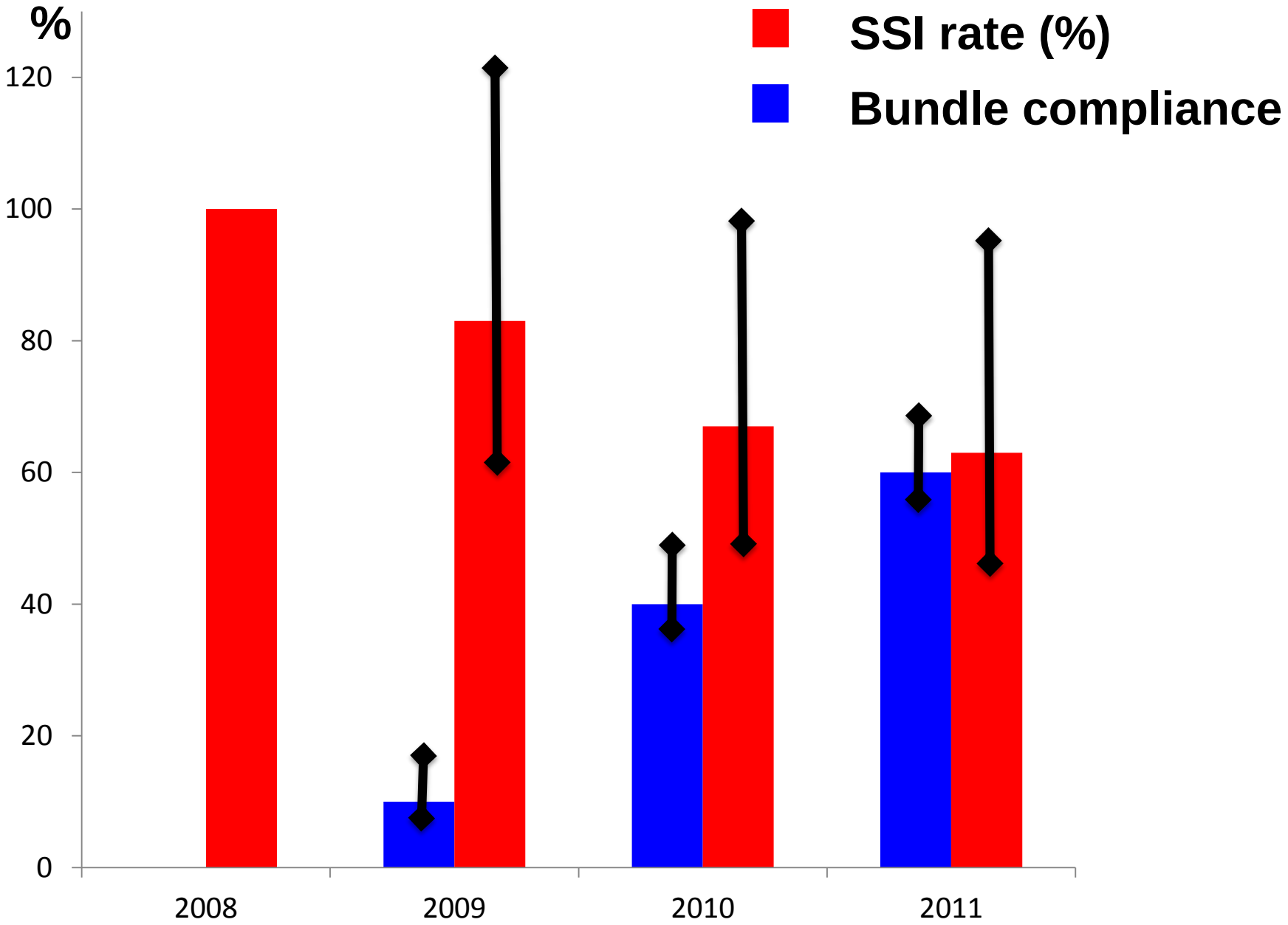
Crolla et al. PLoS One. *2012*

UNIVERSITÉ DE GENÈVE

HUG Hôpitaux Universitaires de Genève

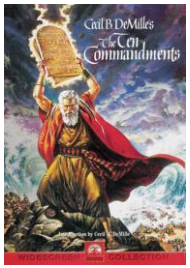
Interventions

- **Hair removal**
  - **Introduction of clippers**
- **Antibiotic prophylaxis**
  - **Correct timing, dosage, duration and drug**
- **Normothermia**
  - **Measurements of patients**
- **Door openings**
  - **Who, When, Why analysis**



Crolla et al. PLoS One. *2012*

Surveillance, feedback, and networks



Key component	Indicators
Participating in **prospective HCAI surveillance and offering active feedback,** preferably as part of a network	Participation in nationals and international HCAI surveillance initiatives, number and type of wards with a surveillance, regular review of the feedback strategy

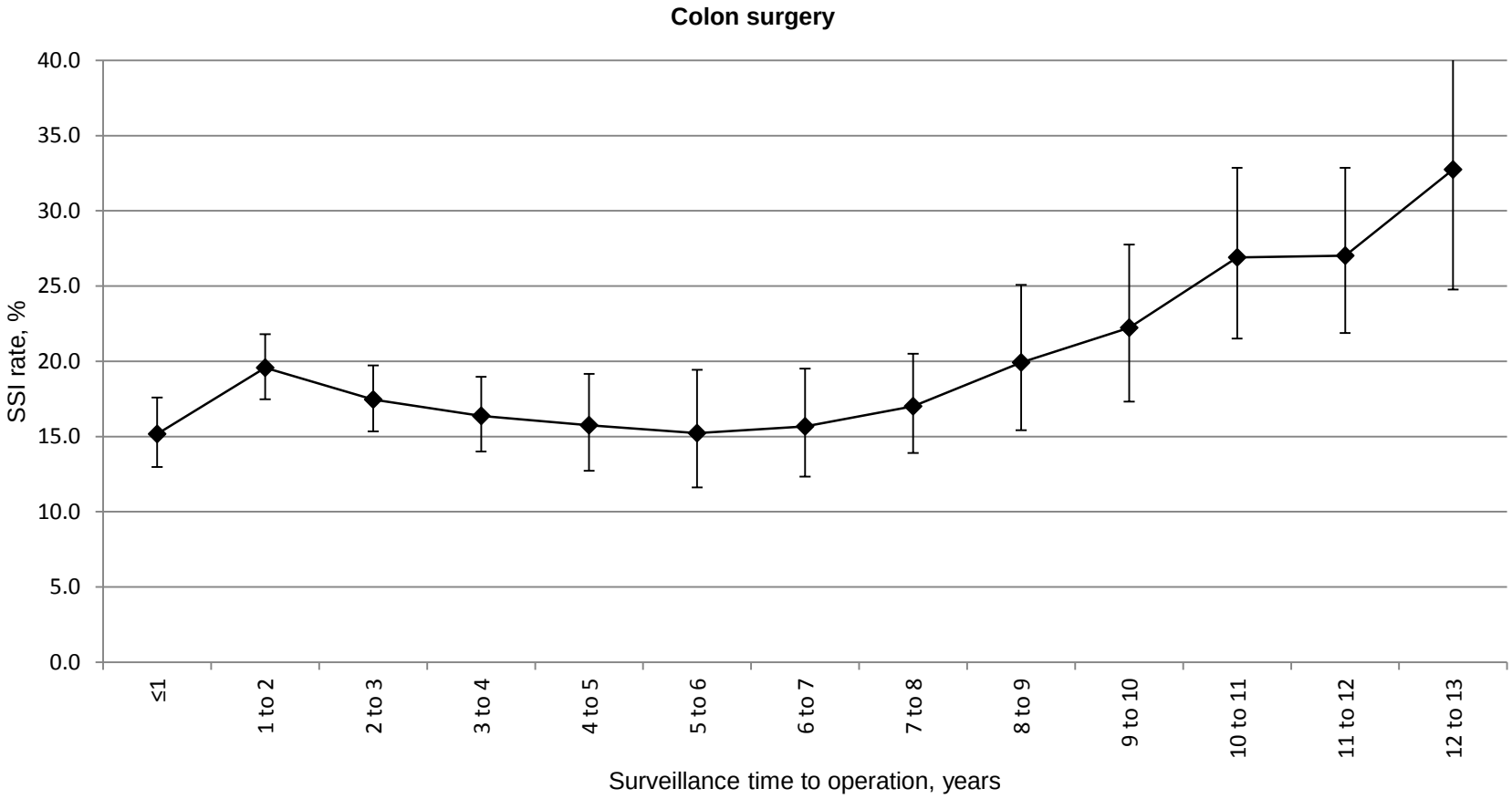
Evidence	**2**
Ease of implementation	2
EU-wide applicability	2

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

UNIVERSITÉ DE GENÈVE

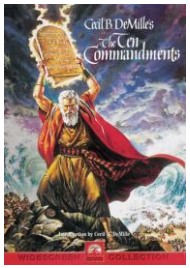
HUG Hôpitaux Universitaires de Genève

SSI rates according to duration of surveillance, Western CH



W. Staszewicz et al. J Hosp Infect 2014; 88: 40-7

Standardisation of audits



Key component

Organising audits as a standardised (scored) and **systematic review of practice with timely feedback**

Indicators

Measurement of the number of audits (overall, and stratified by departments, units and topics) for specified time periods

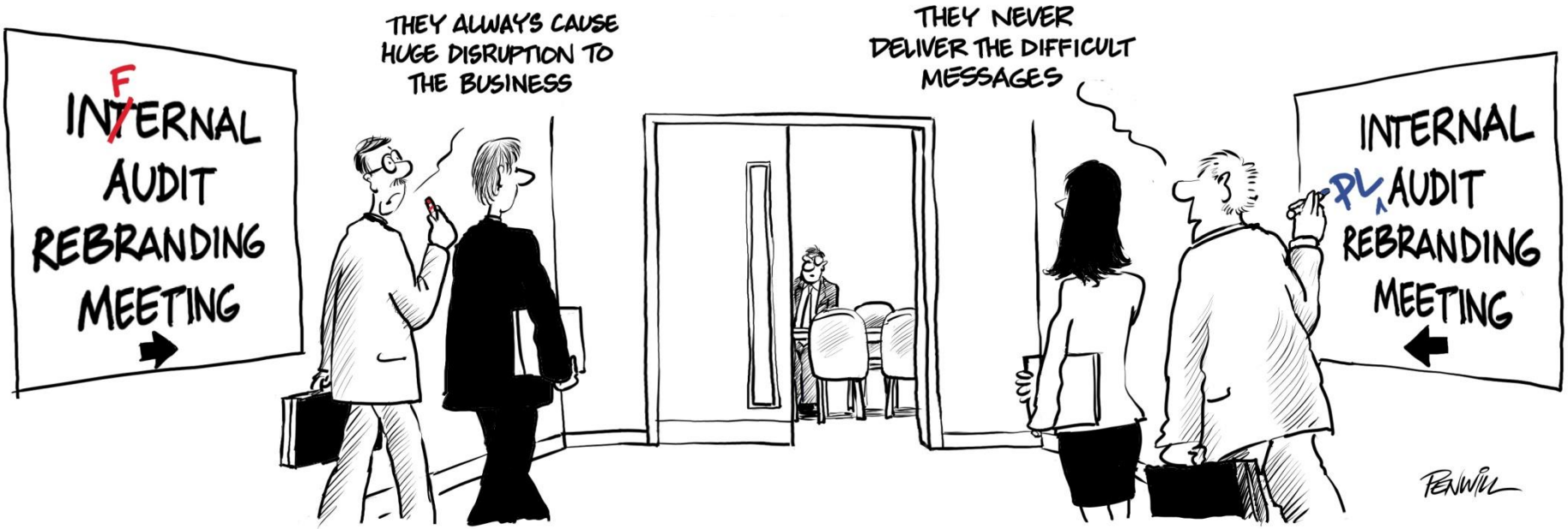
Evidence	**2**
Ease of implementation	2
EU-wide applicability	3

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

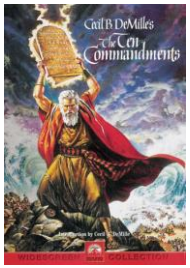
UNIVERSITÉ DE GENÈVE

HUG Hôpitaux Universitaires de Genève

Infection control audits: a reality check…



Role and engagement of champions



Key component

Identifying and engaging champions in the promotion of intervention strategies

Indicators

Interviews with frontline staff and infection-control professionals

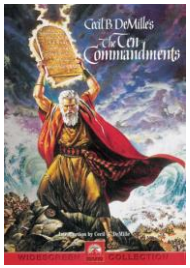
Evidence	**3**
Ease of implementation	2
EU-wide applicability	2

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

UNIVERSITÉ DE GENÈVE

HUG Hôpitaux Universitaires de Genève

Creating a positive organisational culture



Key component

A positive organizational culture by fostering working relationships and communication across units and staff groups

Indicators

Questionnaires about work satisfaction, crisis management, and human resource assessments of absenteeism and staff turnover

Evidence	**3**
Ease of implementation	2
EU-wide applicability	3

Zingg W. *Lancet Infectious Diseases. 2015; 15: 212-24*

UNIVERSITÉ DE GENÈVE

HUG Hôpitaux Universitaires de Genève

Conclusions

- Evidence-base for successful and effective infection control interventions has greatly improved over the last 2 decades

- Still need for more high-quality randomised clinical trials for specific & important questions

- Gaps in patient safety because existing tools and interventions are not implemented widely

Conclusions (2)

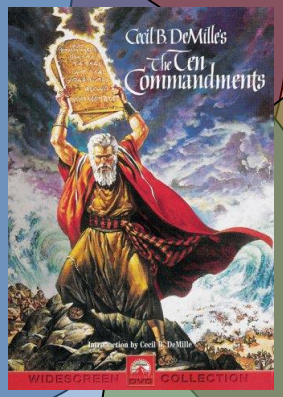
- The question today is not **'what to do'**, but **'how to do it'**

- Hospitals are well advised to think how they can implement practice change in their institutions while respecting local barriers

→ ***Think implementation and practice!***

Structures/activities
- Organisation/staffing
- Surveillance/feedback

Resources/management
- Organisation/staffing
- Bed occupancy/workload



Implementation
- Material/devices/ergonomics
- Guidelines
- Team- and task- oriented education and training
- Multimodal strategies
- Engagement of champions

Organisational culture
Creating a positive organisational culture

Thank You!