

# The importance of surface cleaning and disinfection to prevent hospital infections

18th WORLD STERILIZATION CONGRESS  
JOINT MEETING OF WFHCC AND DGSV  
BONN – GERMANY – OCTOBER 4-7, 2017

Prof. Martin Exner and Dr. Jürgen Gebel





# The beginnings of evidence-based disinfection by Robert Koch in 1881

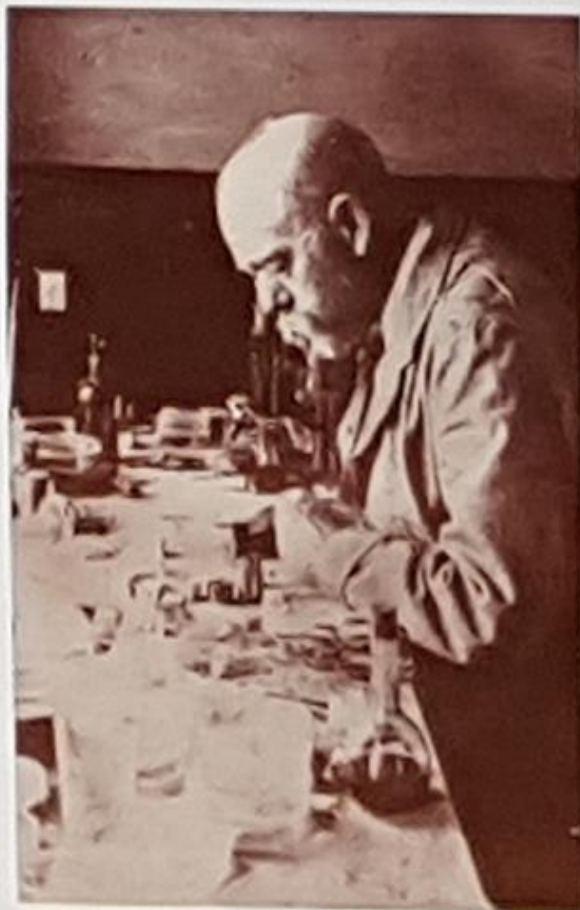
## Über Desinfektion,<sup>1)</sup>

Von  
Dr. R. Koch,  
Königsberg.

Das ganze Kerne der Desinfektionslehre ist hingeworfen auf die Art und Weise, wie sie vorher war, was allerdings unrichtig klingt, ob es überhaupt so sei, wie man sich bei ihrer Begründung und Ausübung verhielt, hat sich bis jetzt nicht erheben lassen. Es kann das aber auch nicht verstanden werden, wenn man bedenkt, daß die Infektionslehre, so diese die Desinfektionslehre sein Wirkung werden soll, auch so wenig bekannt war. Es ist daher auch nicht einmal so freigelegt zu betrachten, daß die Infektionslehre eigentlich ungenügend war und auch so, wie sich viele ihrer Vorgänger schiedlich gegenwärtigen Infektionslehre anschauen und, ist es immer noch möglich, daß dieselben sich in ihren Lebensbedingungen sehr ähnlich verhalten und auch von der Desinfektionslehre nicht in gleicher Weise beherzigt werden. Dagegen wird es, wenn ein Desinfektionsmittel in ganz anderer Weise gewirkt werden sollte, notwendig sein, denselben für seine Wirkung an einer für die Infektionslehre, gegen die es überhaupt gewirkt werden soll, gewöhnlich doch aber an anderen Infektionsstellen, und zwar unter ähnlichen Verhältnissen, die welche es bestrahlt ist, auf seine Wirksamkeit zu untersuchen. Wenn insbesondere schwebelige Stämme zur Desinfektion von geschlossenen Räumen dienen soll, müssen Karbonium, die durch Typhus, Puer, Dysenterie, Cholera, etc. Erreger können werden, durch bestrahlt werden und abtöten von diesen Erregern hergestellt werden, daß in ihnen die verschiedenen Infektionsstoffe auch wirklich vollständig getödtet sind. Wie sollte das aber nachgewiesen sein? Nur wenn der Inhalt der Desinfektion in Kiste hinein, habe sich durch gewisse Erkrankungen von Menschen in einem Räume abgelehrt und die nach bester Weise Wirkung der Infektionsstoffe abtöten, während aus dem Umstand, daß niemand mehr erkrankt, allerdings auch nicht die Vermeidung der Infektionsstoffe erwiesen ist. Eine solche Sache kann die wissenschaftliche Prüfung der Desinfektionsmittel nur in dem Falle gewinnen, daß die Desinfektion aller der Infektionsmittel, diese Kiste von dem Desinfektionsmittel werden wissen sollte, auf diese Weise sich wirklich anschauen und die Verhältnisse gewissermaßen als Frage auf die Wirksamkeit der Kiste zu verweisen sind. Vollständig und ohne Bedingungen kann die eine oder die andere der bekannten Infektionskrankheiten ausbleiben und es ist nicht möglich, ob sie jemals für alle oder doch für die die Wirkung der Infektionskrankheiten zu erfüllen sein werden.

Das was zunächst erst einmal über die Wirksamkeit der Desinfektionsmittel durch den Anhalt es gewonnen und es erfahren, was unter der besten Reihe der in Leucht-keimigen Infektionskrankheiten gegenwärtigen Desinfektionsmittel dann auch die andere so-

<sup>1)</sup> Aus Mittheilungen aus dem Kaiser. Gesundheitsamt, 1881, 24. J. Seite.



Robert Koch in seinem Laboratorium in Berlin im Jahre 1884

## Topics

- The change of risk assessment
- The situation now and in the future
- The new risk assessment of the environment and HAI
- The German Guideline on Hospital Hygiene
- New problems in surface disinfection systems
- Environmental monitoring / risk assessment
- Testing of surface disinfection



## Healthcare-Acquired Infections

More than 25 years ago, Dr Robert Weinstein estimated, that the source of pathogens causing a healthcare-associated infection in the intensive care unit was as follows:

- patients' endogenous flora, 40%–60%;
- cross infection via the hands of personnel, 20%–40%;
- antibiotic-driven changes in flora, 20%–25%;
- other (including contamination of the environment), 20%.

Weinstein RA. Epidemiology and control of nosocomial infections in adult intensive care units. *Am J Med* 1991;91(suppl 3B):9S–184S.



## AIC letters to the Editor

It is AIC's policy that letters are given an opportunity to appear in any format permitting us to deal with them cheaply to do so.

### Routine surface disinfection in health care facilities: should we do it?

To the Editor:

The new Draft Guidelines for Disinfection and Sterilization in Health Care Facilities, prepared by William A. Rouds, David J. Weber and the Health Care Infection Control Practices Advisory Committee (ICPAC), is now open for public comment. It recommends that environmental surface disinfection should routinely be done with alcohol on a regular basis (Category II) in any patient and an Environmental Protection Agency (EPA)-registered hospital-grade disinfectant designed for hospitalizing should be used (Category III). Horizontal surfaces should regularly (e.g., daily or three times a week) be wet down using these disinfectants. EPA-registered hospital disinfectants (Cat. II) are recommended for implementation and supported by some experimental, clinical, or epidemiological studies and a strong theoretical rationale. None of these recommendations can be recommended. There is not a single study to date which shows routine environmental disinfection has any effect on hospital-acquired infections and (concerns) published which suggest that microorganisms in the hospital environment, particularly on surfaces, are the sole contributors to nosocomial infections. There were no differences in hospital-acquired infection rates in an acute care unit when floors were cleaned with disinfectant compared with 6 times a day (category I) in a 6-month study comparing the effect of disinfectant versus plain soap on hospital-acquired infection rates, the combined nosocomial infection rate for the 8 acute care nursing units showed no difference between disinfectant and detergent, nor were any differences in floor contamination observed.<sup>1</sup> Duran and coworkers<sup>2</sup>

reported no change in the incidence of hospital-acquired infections during the 4 month trial compared with the preceding 13 months, when using detergent as compared with disinfectant.

To our knowledge no national center for nosocomial infection control in Europe recommends the use of disinfectants for routine housekeeping purposes.

Even the principle authors of the Draft Guidelines, Rouds and Weber,<sup>3</sup> do not strongly recommend

Franz Allerberger, Innsbruck, Austria  
Graham Ayliffe, Birmingham, UK  
Maffeo Bassetti, Genova, Italy  
Ija Bravay, München, Germany  
Aira Eucher, Oslo, Norway  
Nizdam Damani, Portadown, N. Ireland  
Franz Dorschner, Freiburg, Germany  
Markus Dottenhofer, Freiburg, Germany  
Carmen Espeleta, Bilbao, Spain  
Petra Gastmeier, Hannover, Germany  
Christine Gellera, Berlin, Germany  
Helin Giannakidou, Athens, Greece  
Donald Goldman, Boston, Mass, USA  
Pawel Grzesiowski, Warsaw, Poland

In conclusion, there are insufficient scientific data to support the strong recommendation to routinely disinfect environmental surfaces in health care facilities except in certain high risk areas (e.g., isolation units) or possibly to prevent transmission of high-risk organisms (e.g., MRSA, VRE).

appear to justify the routine use of a disinfectant.<sup>4</sup>

If floors are to be disinfected on a regular basis then all carpets must be removed from hospitals since carpets cannot be effectively disinfected.

If we advocate soap and water for hands, we should also allow soap/detergent and water for cleaning environmental surfaces in hospitals.

The papers by Trout and Klumbert<sup>5,6</sup> are cited to support the recommendation that chest coats be

Juhani Ojajärvi, Helsinki, Finland  
Henning Ruden, Berlin, Germany  
Geoff Scott, London, Great Britain  
Pranod Shah, Frankfurt, Germany  
Arjana Tambic-Andraszevic, Zagreb, Croatia  
Klaus Ueherl, Tübingen, Germany  
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2001



## The role of surface disinfection in infection prevention

Jürgen Gebel,<sup>1</sup> Martin Exner,<sup>1</sup> Gary French,<sup>2</sup> Yves Chartier,<sup>3</sup> Bärbel Christiansen,<sup>4</sup> Stefanie Gemein,<sup>1</sup> Peter Goroncy-Bernea,<sup>5</sup> Philippe Hartemann,<sup>6</sup> Uwe Heudorf,<sup>7</sup> Axel Kramer,<sup>8</sup> Jean-Yves Maillard,<sup>9</sup> Peter Oltmanns,<sup>5</sup> Manfred Rotter,<sup>10</sup> and Hans-Günther Sonntag<sup>11</sup>

**Methods and findings:** After discussion and review of current scientific literature the authors agreed that contaminated surfaces contribute to the transmission of pathogens and may thus pose an infection hazard. Targeted surface disinfection based on a risk profile is seen as an indispensable constituent in a multibarrier approach of universal infection control precautions. Resistance and cross-resistance depend on the disinfectant agent as well as on the microbial species. Prudent implementation of surface disinfection regimens tested to be effective can prevent or minimize adverse effects.

**Conclusions:** Disinfection must be viewed as a holistic process. There is a need for defining standard principles for cleaning and disinfection, for ensuring compliance with these principles by measures such as written standard operating procedures, adequate training and suitable audit systems. Also, test procedures must be set up in order to demonstrate the efficacy of disinfectants including new application methods such as pre-soaked wipes for surface disinfection.



## Healthcare-Acquired Infections in Germany

- Data on estimated rates of nosocomial infections vary, likely to be between 600,000 and 1,000,000.
- Large percentage of HAI is preventable, especially intravascular-catheter-associated blood-stream infections (BSI)
- Highest rate of HAI: Postoperative wound-infections (approx. 225,000)
- Pathogens of special concern: multiple antibiotic resistant organisms, e.g. *A. baumannii*, *K. pneumoniae*, *P. aeruginosa*; MRSA (significantly reduced) (Gastmeier Dtsch Arztebl Int 2014; 111(19): 331-6)
- *C. difficile*

Peter Walger, Walter Popp, Martin Exner: Prevalence, Mortality and Prevention Potential of Healthcare-Associated Infections in Germany in 2013: Critical Appraisal and Statement from the German Society for Hospital Hygiene. HygMed 2013; 38 – 7/8, 329-338.

Mitteilung der Kommission für Krankenhaushygiene und Infektionsprävention (KRIG/O.) Ergänzung zu den Hygienemaßnahmen bei Infektionen oder Besiedlung mit multiresistenten gramnegativen Stäbchen (2012) im Rahmen der Anpassung an die epidemiologische Situation. Epid Bull 29. Mai 2014.

## Trends in MRSA in % in different European Countries reported by EARSS

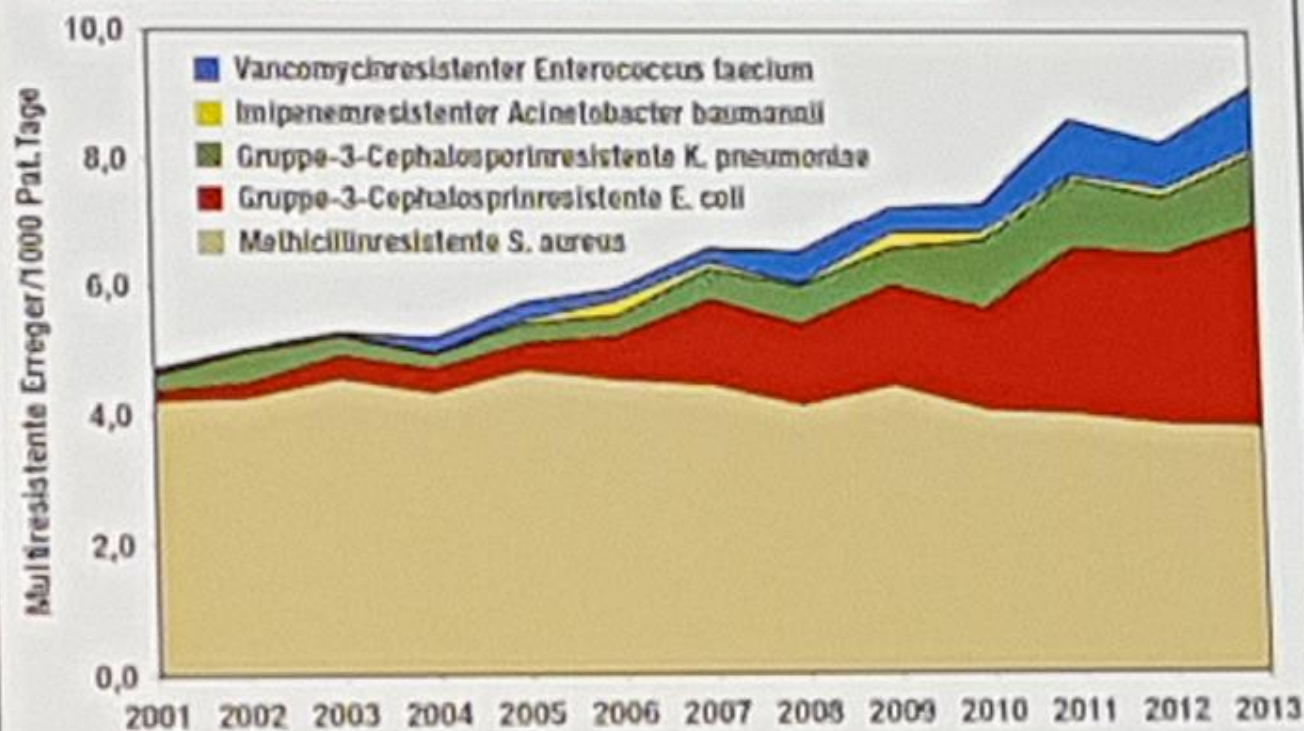




Surveillance der Antibiotikaaan- dung und bakterieller Resistenzen auf Intensivstationen (SARI) aus klinischen Isolaten: Die Inzidenzdichte bestimmter multiresistenter Bakterien wie *A. baumannii* nimmt zu. Die imipenemresistenten *A. baumannii* sind in der Regel 4MRGN-Stämme.

## GRAFIK

### Multiresistente Bakterien auf deutschen Intensivstationen



Quelle: DGB-Gesetz, Praxis-Gesundheitswesen, Charité Berlin

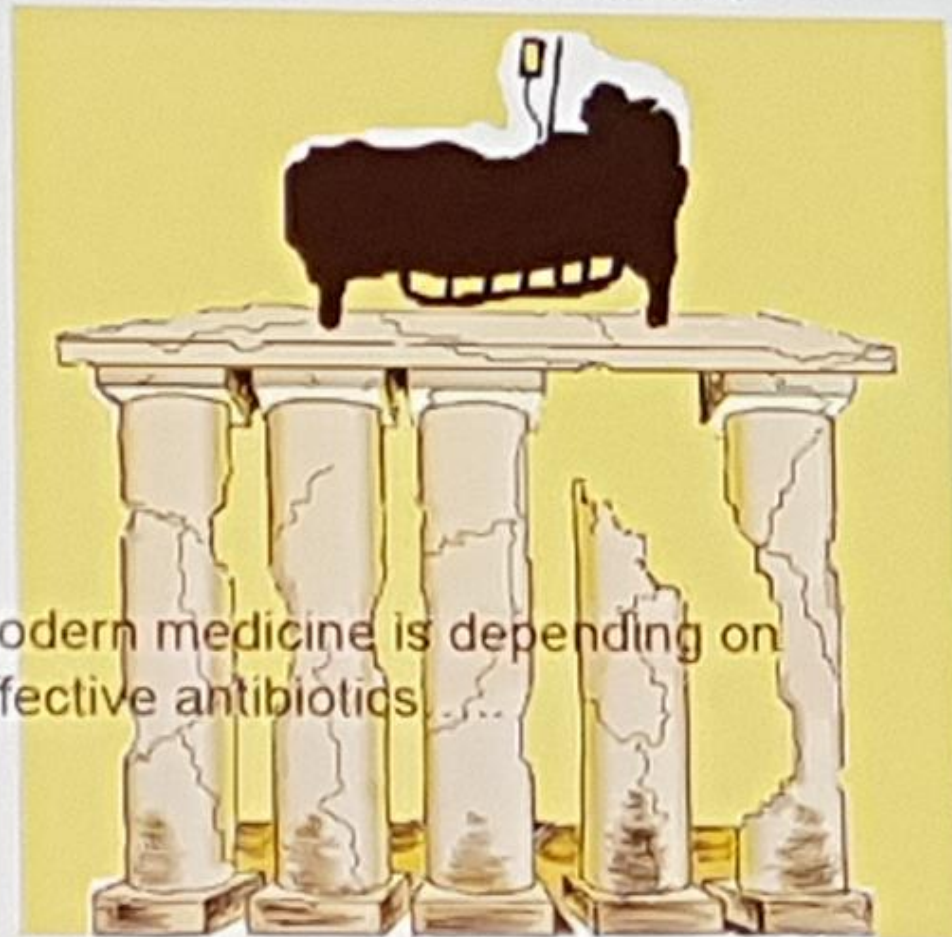
Deutsches Ärzteblatt 2015



## Prof. Otto Cars

Chairman

The Swedish Strategic programme  
against antibiotic resistance (Strama)

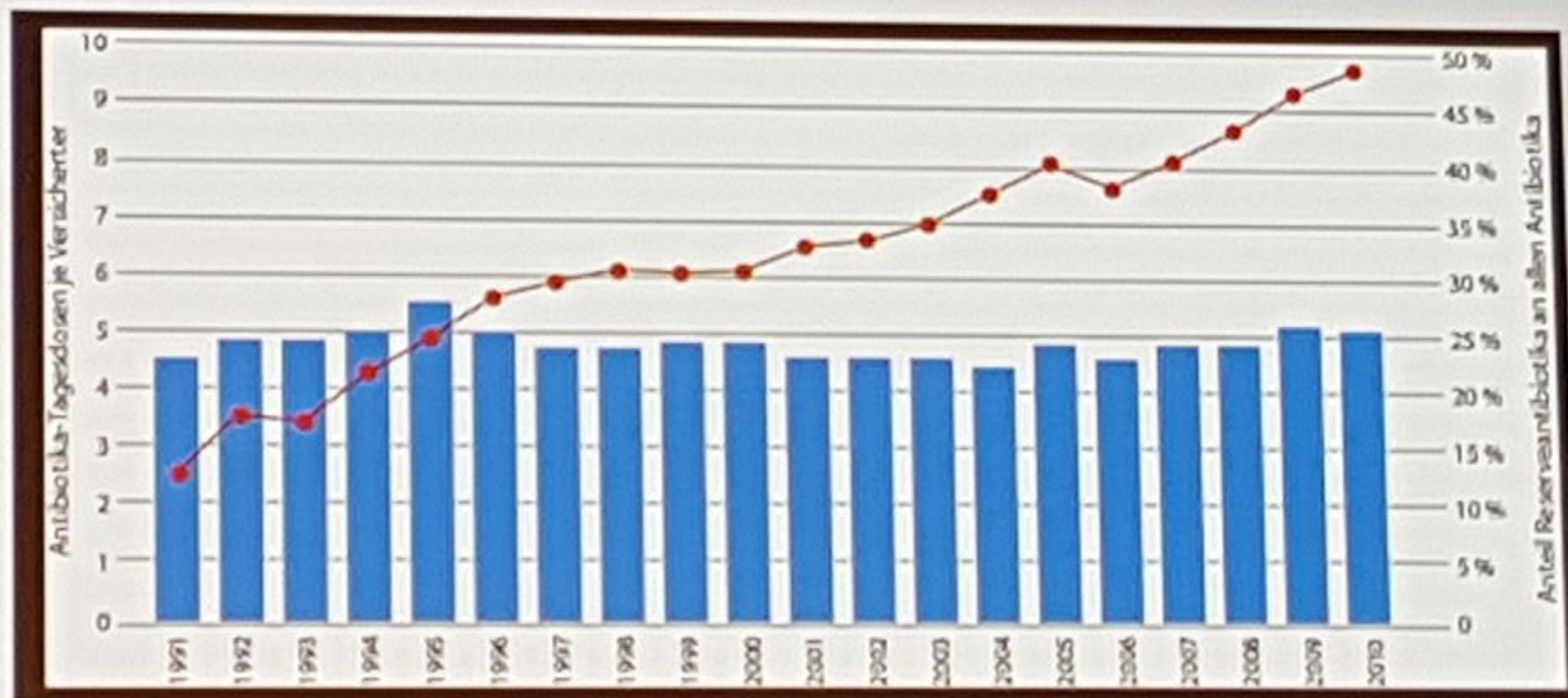


Modern medicine is depending on  
effective antibiotics...

Strama



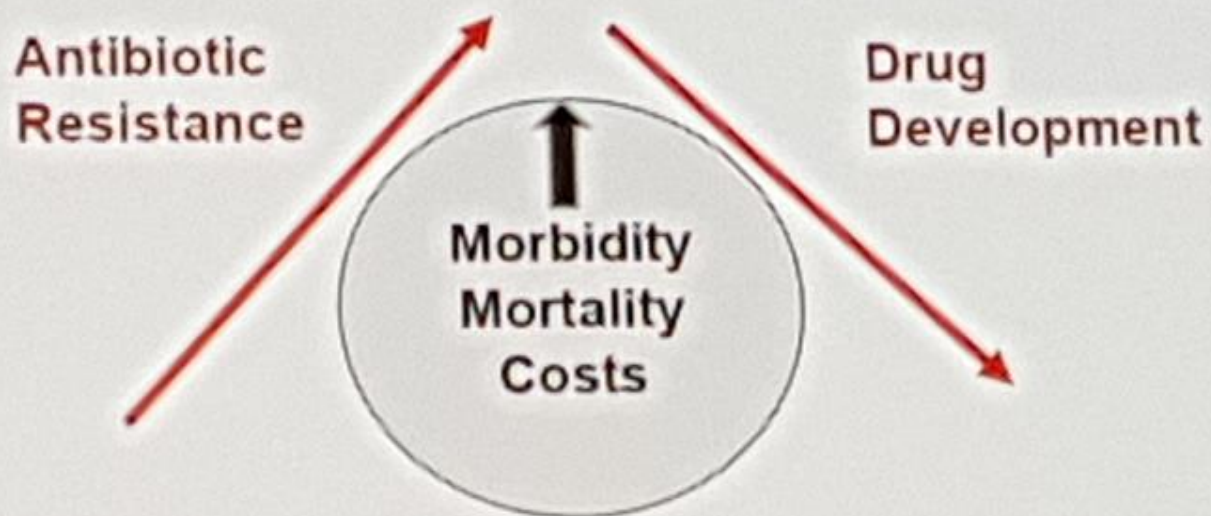
## Challenge: Fewer Antibiotics approved and more reserve antibiotics used



WIdO; Datenbasis: GKV Arzneimittelindex 2010



## The Current Paradox:



Strama



## Notified infections with percentage of hospitalization and case fatality (minimum 100 cases, Germany, 2016)

	Fälle gesamt	Fälle mit Angaben zur Hospitalisierung	Hospitalisierte Fälle		Fälle mit Angabe zum Tod	Verstorbene Fälle	
	Anzahl	Anzahl	Anzahl	Anteil (%)	Anzahl	Anzahl	Anteil (%)
Adenovirus-Konjunktivitis	731	563	68	12	704	0	0
<i>Campylobacter</i> -Enteritis	73.999	64.952	15.527	24	71.323	4	0
<i>Clostridium-difficile</i> -Erkrankung, schwere Verlaufsform	2.337	2.270	2.203	97	2.251	624	28
Denguefieber	956	839	286	34	950	0	0
EHEC-Erkrankung	1.816	1.607	419	26	1.767	0	0
FSME	348	337	296	88	347	1	0
Giardiasis	1.484	2.865	357	13	3.390	0	0
Legionellose	992	947	912	96	962	45	5
Listeriose	707	665	642	96	678	48	7
Masern	326	306	168	55	315	0	0
Meningokokken, invasive Infektion	338	334	332	99	337	21	6
MRSA, invasive Infektion	3.136	3.031	2.932	97	3.015	196	7



## Current and Future Challenges

- Increase in immunocompromised patients in hospital and domestic settings
- Increase in pathogens with multiple antimicrobial resistances, increase of gram-negative organisms, increase in CDAD and VRE
- Transfer/admission of patients with unknown status of infection/colonisation
- Biofilm formation and microorganisms in the VBNC status

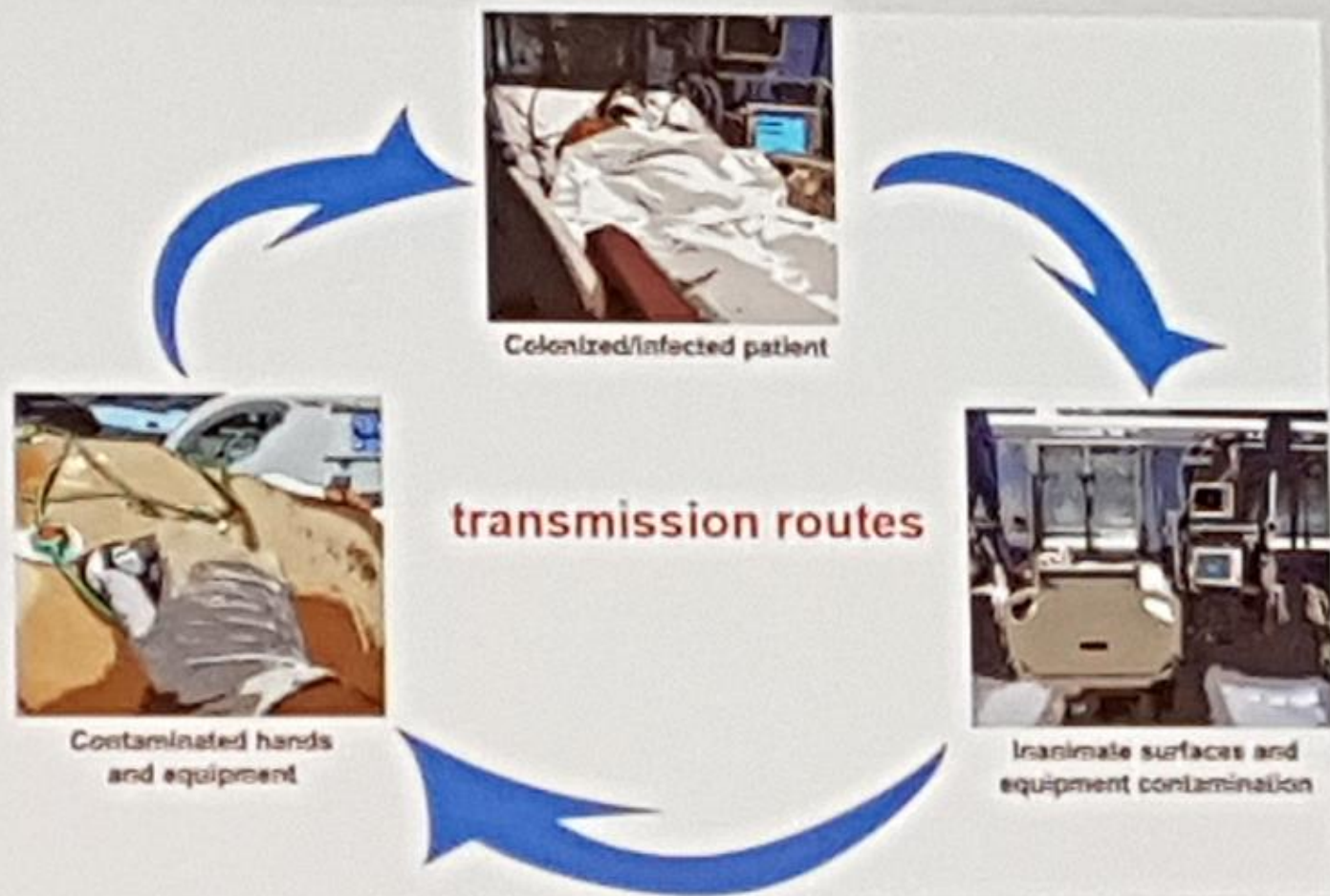


## Transmission of Healthcare-Associated Pathogens

- Hospitalization in a room in which the previous patient had been colonized or infected with MRSA, VRE, *C. difficile*, multidrug-resistant *Acinetobacter*, or multidrug-resistant *Pseudomonas* has been shown to be a risk factor for colonization or infection with the same pathogen for the next patient admitted to the room
- Multiple studies have demonstrated that less than 50% of hospital room surfaces are adequately cleaned and disinfected when chemical germicides are used

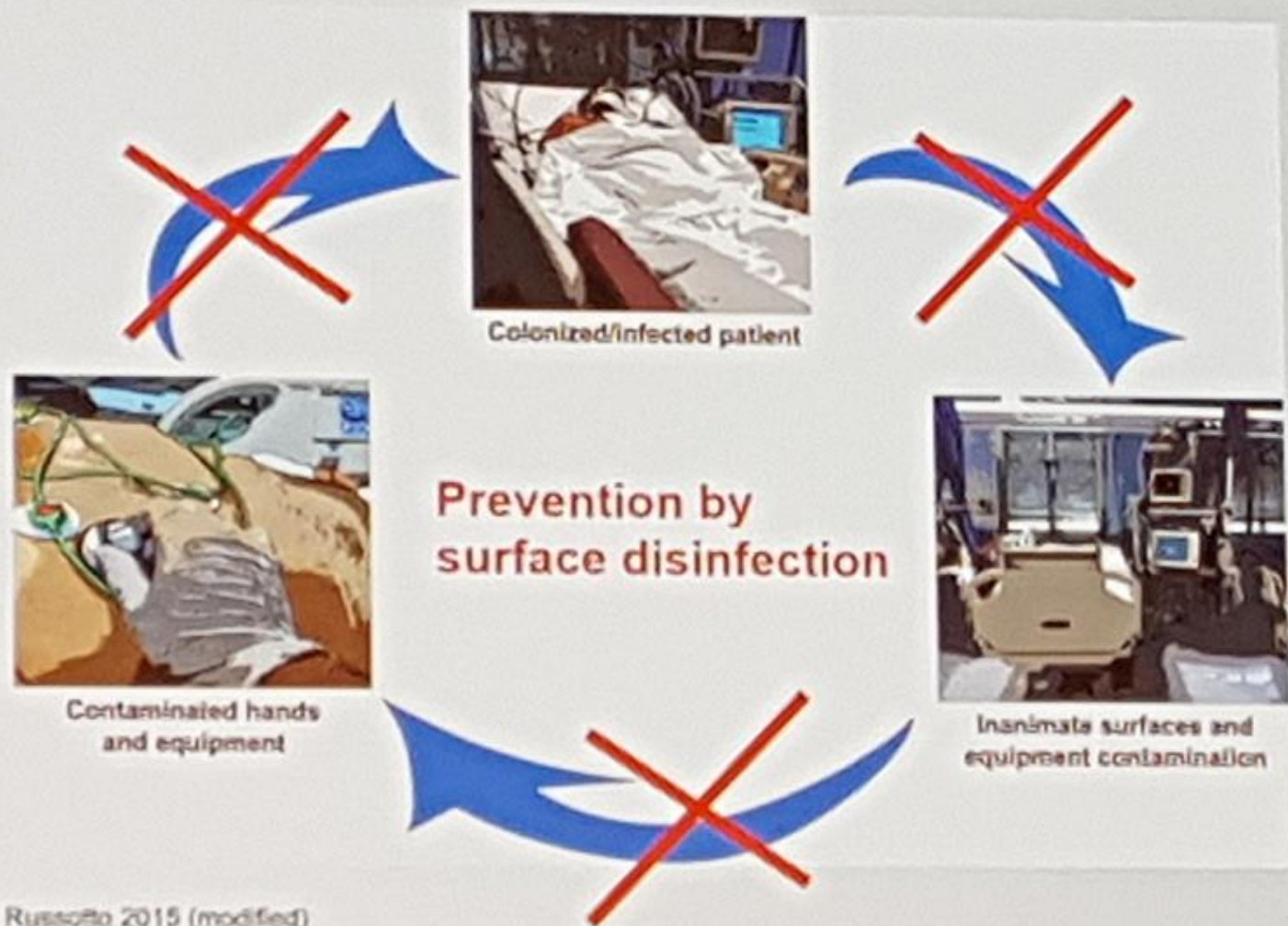
Weber, Rutala et al. 2013 (Infection control and hospital epidemiology,34,5)





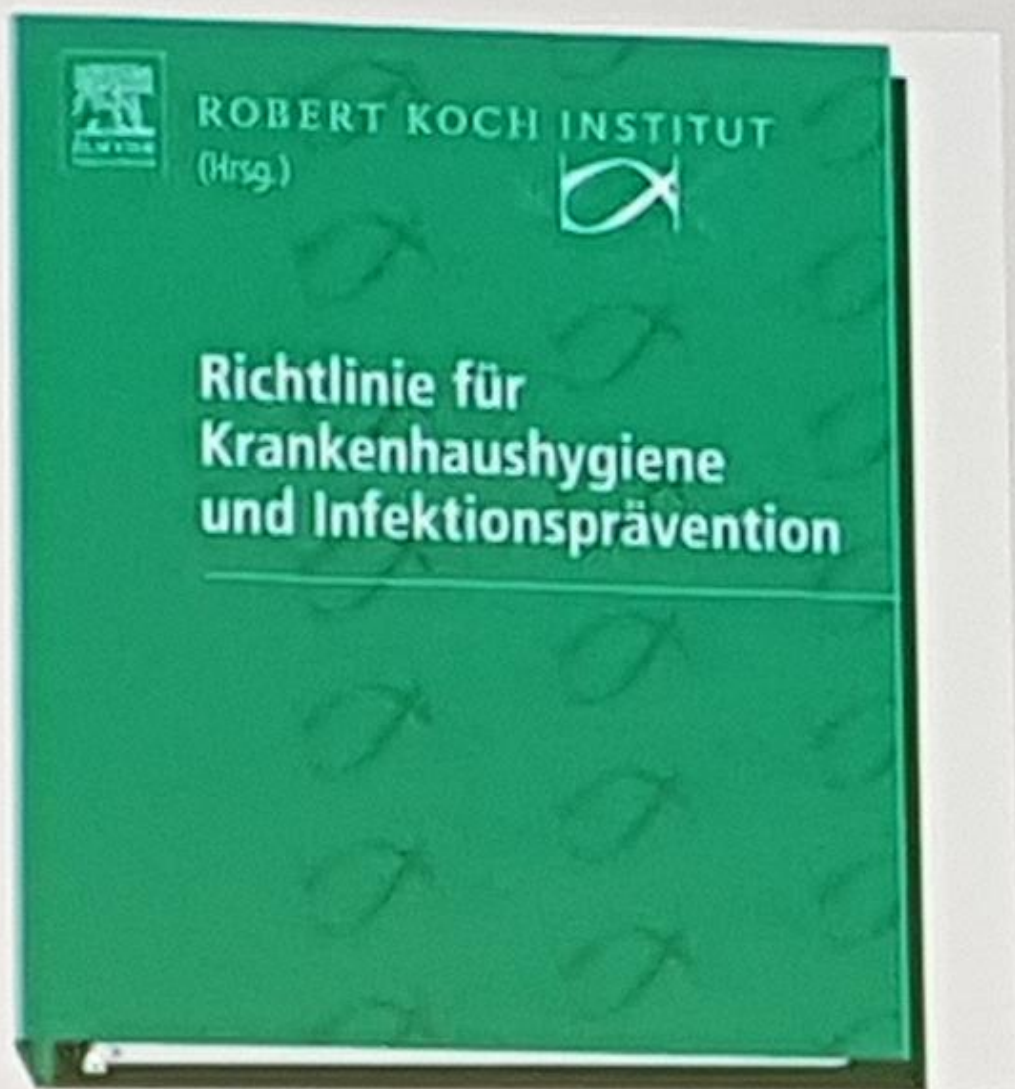
source: Russotto 2015 (modified)





source: Russoffo 2015 (modified)





## RKI-Guideline: Surface Cleaning and Disinfection

Table 2: Cleaning and disinfection measures in different risk areas

Areas without infection risk <sup>1</sup>	Areas with possible infection risk	Areas with special infection risk	Areas with patients harboring microbes in or on their body such that there could be a risk of transmission	Areas where infection risk posed to patients <sup>2</sup>
All surfaces: Cleaning	Surfaces with frequent hand/skin contact:  Disinfection (Cat. II)  Floors: cleaning  Other surfaces: cleaning	Surfaces with frequent hand/skin contact:  Disinfection (Cat. IB)  Floors: disinfection (Cat. II)  Other surfaces: cleaning	Surfaces with frequent hand/skin contact:  Disinfection (Cat. IB)  Floors: disinfection (Cat. II)  Other surfaces: cleaning	See Technical Regulation on Biological Substances (TRBA) (Cat. IV)

When deciding whether routine cleaning or detergent surface disinfection is to be carried out, practicability and safe conductance must also be taken into account

<sup>1</sup>Based on the general risk in the population

<sup>2</sup>More information on risk evaluation can be consulted in the Technical Regulations on Biological Substances e.g. TRBA 250 "Biological Substances in the Health Services and Welfare Services" (75)



## Hand contact areas





## Other areas





## Requirements for Surface Cleaning and Disinfection Procedures

- No increase of cfu and no dissemination of pathogens into the patient environment
- Proven antimicrobial effectivity

## Requirements for Surface Cleaning and Disinfection Procedures

- No increase of cfu and no dissemination of pathogens into the patient environment
- Proven antimicrobial effectivity
- Fast acting antimicrobial effectivity – and remanent effect (new)



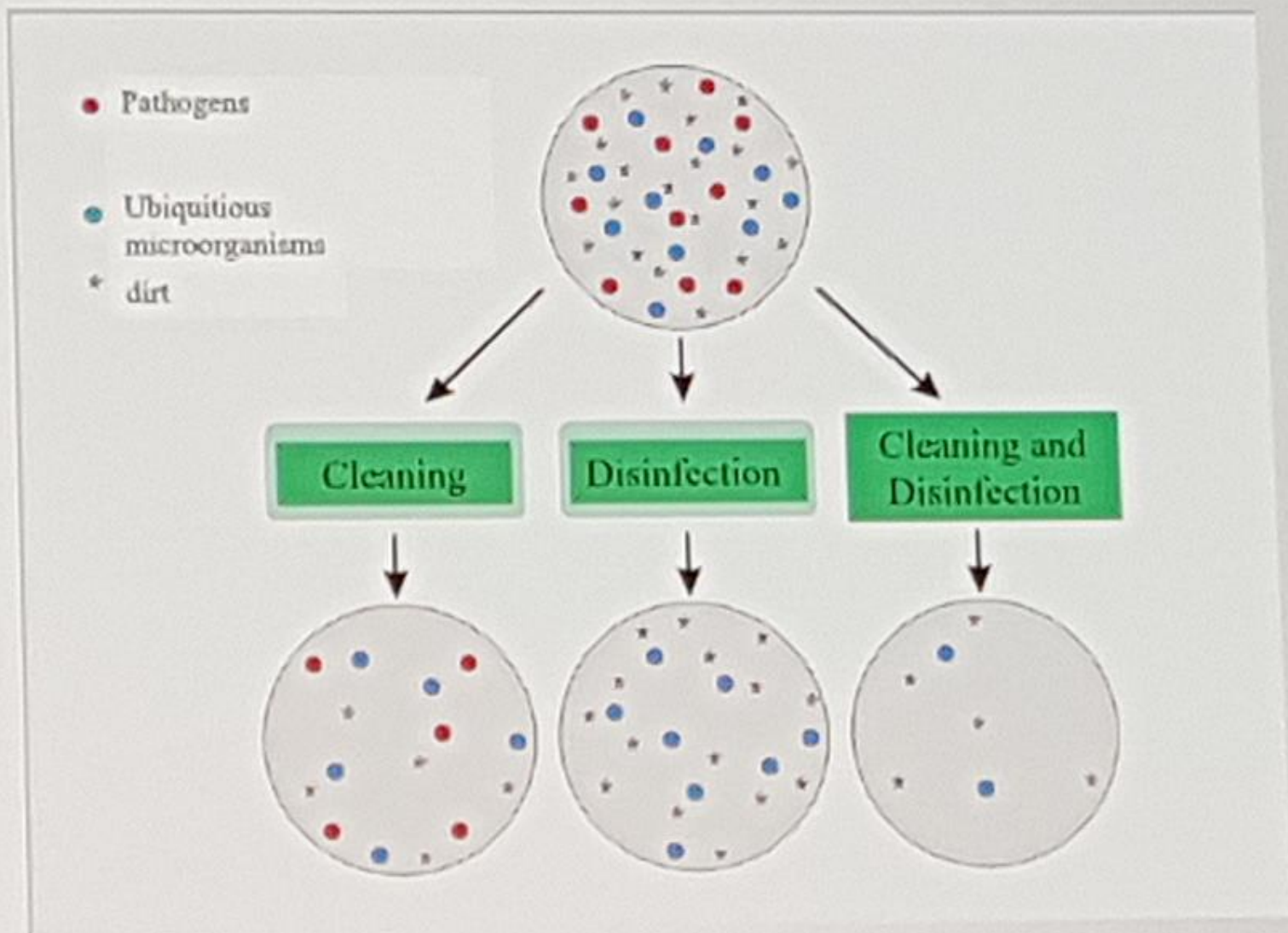
## Requirements for Surface Cleaning and Disinfection Procedures

- No increase of cfu and no dissemination of pathogens into the patient environment
- Proven antimicrobial effectivity
- Fast acting antimicrobial effectivity – and remanent effect (new)
- Broad antimicrobial spectrum of activity to prevent selection of pathogens

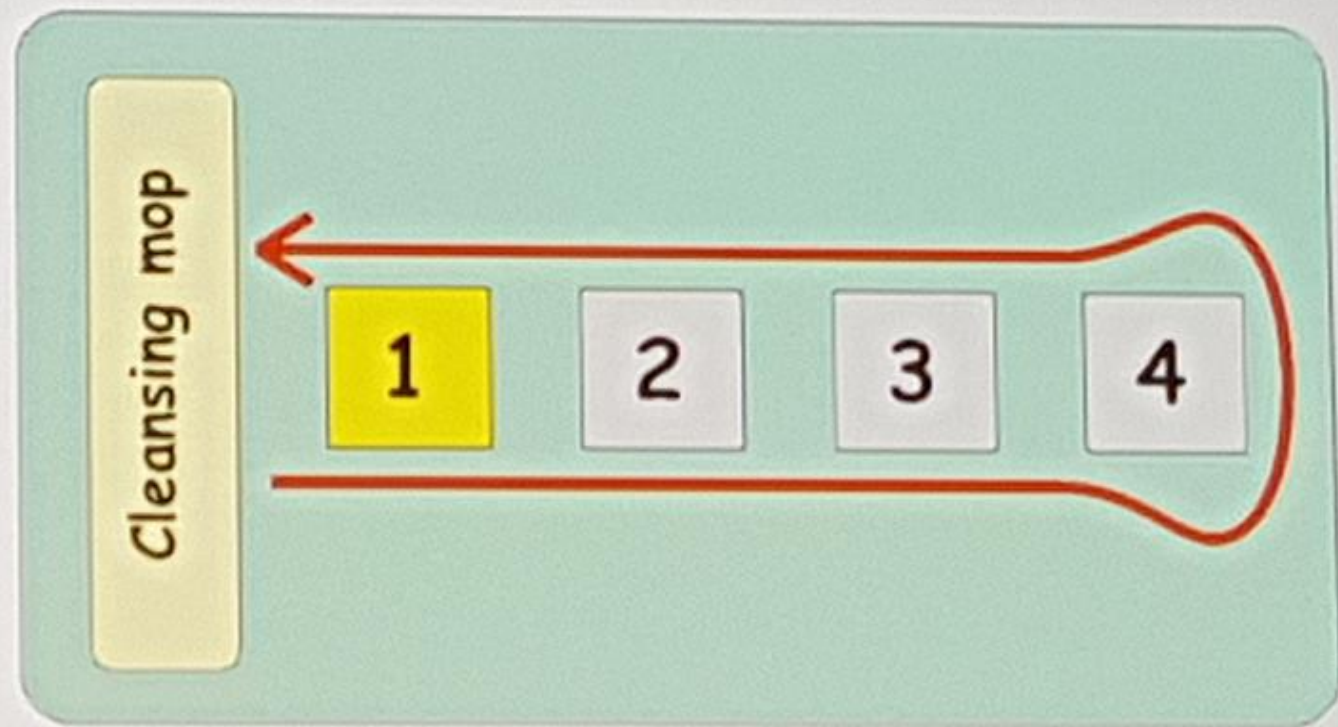
## Requirements for Surface Cleaning and Disinfection Procedures

- No increase of cfu and no dissemination of pathogens into the patient environment
- Proven antimicrobial effectivity
- Fast acting antimicrobial effectivity – and remanent effect (new)
- Broad antimicrobial spectrum of activity to prevent selection of pathogens
- Ecologically friendly



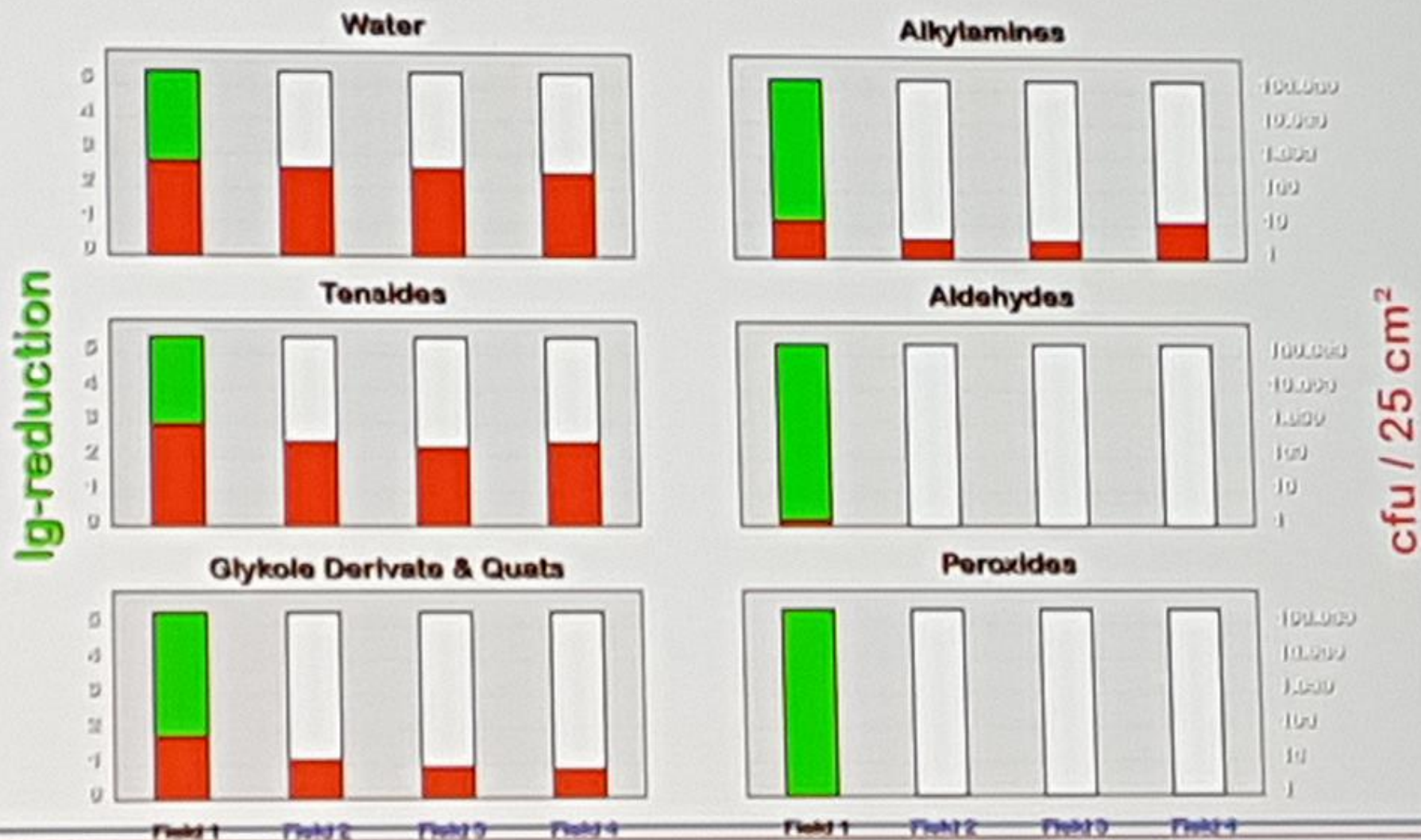


## Principle of the 4-field test





# Efficacy of cleaning and disinfection in the 4-field test with *S. aureus*



## Application of Surface Disinfectants

bucket and wipe



source: IHPH University-Hospital Bonn

pre-moistened wipes



source: IHPH University-Hospital Bonn

ready-to-use wipes

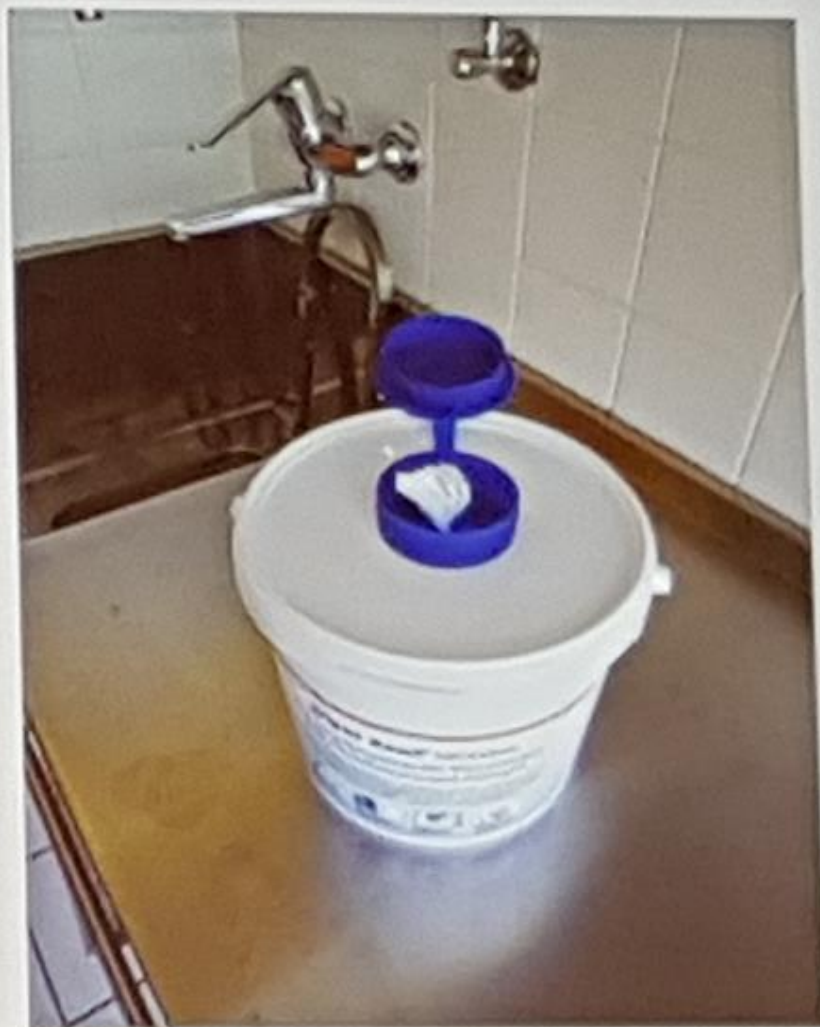


source: IHPH University-Hospital Bonn











## Choosing Pre-Wetted Wipes

Disinfectants Commission in the Association for Applied Hygiene (VAH) in collaboration with the „4+4 Working Group“



**Recommendation on the monitoring of critical control points for the use of dispensing systems for pre-moistened surface disinfectant wipes<sup>1</sup>**

<sup>1</sup> English translation of the German original publication „Empfehlung zur Kontrolle kritischer Punkte bei der Anwendung von Tuchspendensystemen im Vortränksystem für die Flächendesinfektion“. HygMed. 2012;37(11):468-472. © VAH e.V.

## Critical control points which need to be monitored

- Disinfectant solution for dispenser system is contaminated
- Wipes are not compatible with the disinfectant
- Prolonged reuse periods (longer than 28 d)
- Wipes are dried out
- Contamination of wipes hanging outside the dispenser
- Multiplication of Gram-negative bacteria in the bucket (threshold values 0 cfu/10 ml and for airborne spore formers 3 cfu/10 ml)



## Monitoring of critical control points

- Rapid detection of contamination of disinfectant solution during filling procedure
- Expert report on the compatibility of wipe material and disinfectant
- Expert report for extended reuse periods
- Tight closure of the dispenser
- Adequate reprocessing of dispensers before refilling
- Laboratory examination during outbreaks



## Recovery rate of culture methods for nosocomial pathogens from environmental surfaces is low

S. Galvin et al. / Journal of Hospital Infection 82 (2012) 143–151

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Table 1  
Examples of culture methods used to recover nosocomial pathogens from environmental surfaces

Organism	Number of environmental sites studied	% Recovery	Methods		Reference
			Sampling method	Culture	
Vancomycin-resistant <i>Enterococcus</i> spp.	40*	15%	Contact plate (tryptone soya agar + 5% blood + VACC <sup>®</sup> )		Hacsek, 2000 <sup>14</sup>
		7.5%	Premoistened swab	Brain–heart infusion broth	
		10%	Premoistened swab	Brain–heart infusion broth + YC <sup>®</sup>	
	102 (before cleaning)	71%	Cotton-tipped moistened swabs	Enterococcosel agar and broth + vancomycin (20 µg/mL)	Eckstein, 2007 <sup>15</sup>
	102 (after cleaning)	57%			
	500	27.8%	Cotton-tipped moistened swabs	Tryptone soy broth + vancomycin (6 µg/mL) + ciprofloxacin (8 µg/mL)	Reisner, 2000 <sup>16</sup>
	7.2%		Campylobacter agar <sup>†</sup>		
	5.6%		Enterococcosel agar + vancomycin (8 µg/mL)		

Other methods like ATP-luminescence only provide a rough assessment of contamination



## Risk assessment together with the cleaning staff



## Certification of Disinfectants

- Medical applications – public facilities:  
VAH for routine and prophylactic disinfection,  
certification by VAH, products published with exposure time/concentration ratios in *VAH List of Disinfectants*  
  
RKI for disinfection measures issued by health authorities according to the Infection Protection Act (IfSG § 18), products suitable for this purpose published with exposure time/concentration ratios in *RKI List of Disinfectants*
- Veterinary applications, foods sector:  
DVG (German Veterinary Society)





BVÖGD



Bundesverband der Ärztinnen  
und Ärzte des Öffentlichen  
Gesundheitsdienstes e.V.



Verband für Angewandte Hygiene e.V



G  
H  
U  
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## Association for Applied Hygiene

- consolidation of competence in applied hygiene
- elaboration of test protocols and evaluation standards for decontamination, disinfection, antiseptics and sterilization procedures
- exchange of ideas and multidisciplinary cooperation with the relevant medical and non-medical disciplines
- national and international harmonization of efforts with regard to indication, toxicological and ecological aspects of products and procedures employed for preventing infections



6. October 2017

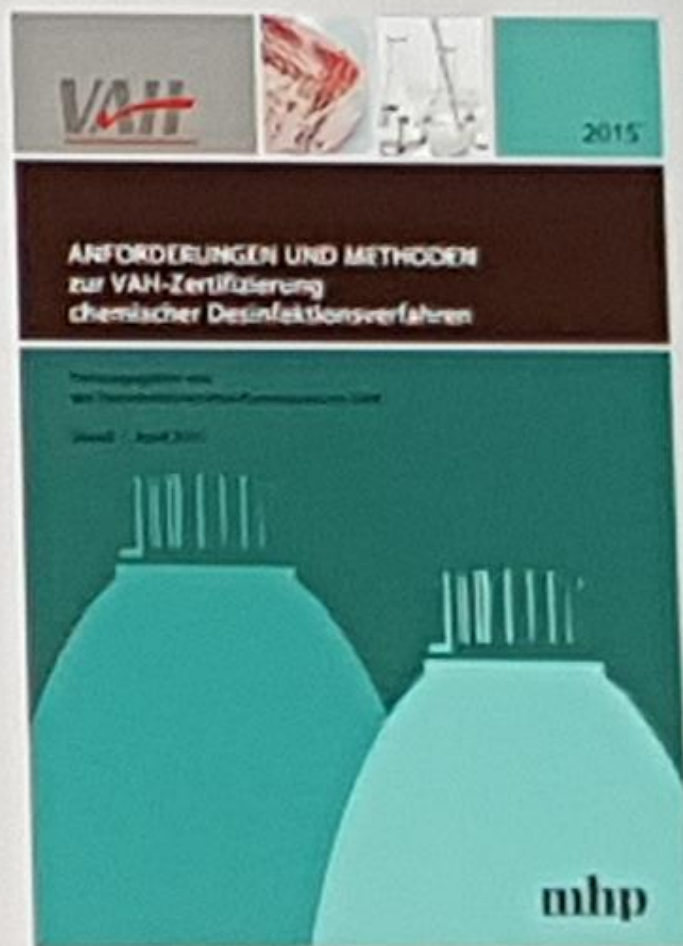
Dr. Jürgen Gebel, Association for Applied Hygiene e.V.  
Institute for Hygiene and Public Health, University-Hospital Bonn



# Conformity Evaluation

## Standard Methods and Requirements of VAH

- Testing since 1959 in 2 steps
  - *in-vitro* tests
  - tests under practical conditions
- Determination of MIC (minimal inhibition concentration) and suitable neutralizer
- Qualitative suspension test
- Quantitative suspension test
- Quantitative test under practical conditions (hands and skin)
- Quantitative carrier test (surface, instruments, linen)







## Spectrum of microbicidal activity

- Bactericidal (**obligatory**)
- Levurocidal (**obligatory**)
- Fungicidal (optional)
- Tuberculocidal (optional)
- Mycobactericidal (optional)
- Virucidal (optional)  
*(conformity assessment according to DVV –  
German Association for Controlling Viral Diseases)*
  
- Sporocidal (optional)

- Online-Version

VAH SEARCH ADDITIONAL CONTENT LIST OF FAVORITES 1 2

VAH LIST OF DISINFECTANTS

Quick Search      Advanced Search

ADVANCED SEARCH  
For further information on product applications and test methodology, please refer to the document section "Additional Content"

Field of application  
Surface Disinfectant      **SHOW 134 PRODUCTS**

Product: All      Complete name: All      Active ingredient: All

SEARCH DETAILS  
Spectrum of activity: Bactericidal, Fungicidal (C, others)

Additional spectrum of activity	Contact time	Surface contamination	Type of application
<input type="checkbox"/> Fungicidal (20 products)	<input type="checkbox"/> Up to 5 min	<input type="checkbox"/> Clean conditions (71 products)	<input type="radio"/> All (134 products)
<input type="checkbox"/> Tuberculocidal (12 products)	<input type="checkbox"/> 15 min	<input type="checkbox"/> Dirty conditions (17 products)	<input type="radio"/> All disinfectant
<input type="checkbox"/> Mycobactericidal (2 products)	<input type="checkbox"/> 30 min		<input type="radio"/> Enclosing tissues
<input type="checkbox"/> Active against enveloped viruses (24 products)	<input type="checkbox"/> 60 min		<input type="radio"/> Without specified wipe material (118 products)
<input type="checkbox"/> Virucidal (8 products)	<input type="checkbox"/> 240 min		<input type="radio"/> Pre-moistened wipes with specified material (2 products)
			<input type="radio"/> Ready-to-use pre-moistened wipes (17 products)
			<input type="radio"/> Disinfectant Enclosing
			<input type="radio"/> Without using e.g. sprayer

- open access:  
1st of January  
2018

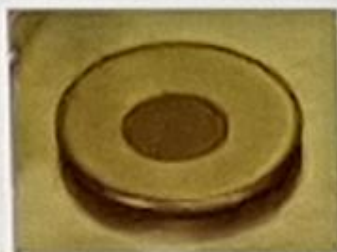


## CEN TC 216 – Chemical Disinfectants and Antiseptics – development of standards in Europe

<b>CEN TC 216</b> Chemical Disinfectants and Antiseptics Secretariat: AFNOR founded in 1990 - 2010: 36 member states	
<b>TC 216 / WG 1</b> Human medicine DIN	<b>NAMed NA 063-04-07 AA</b> Humanmedizin DIN
<b>TC 216 / WG 2</b> Veterinary use BSI	<b>NAL</b> Tierhaltung DIN
<b>TC 216 / WG 3</b> Food hygiene and domestic and institutional use AFNOR	<b>NAL</b> Lebensmittel, Haushalt und Institutionell DIN
<b>TC 216 / WG 5</b> Strategy Group DIN	<b>NAMed/NAL</b> Strategie-Gruppe DIN

## Disinfectant Testing according to CEN-TC 216 – EN 14885 - 3-Phase-Model

- Phase 1: Basis test
- Phase 2 / Step 1 Suspension test
- Phase 2 / Step 2 Carrier test
- Phase 3: Field trials





# EN-Standards CEN TC 216 WG1 – 2017

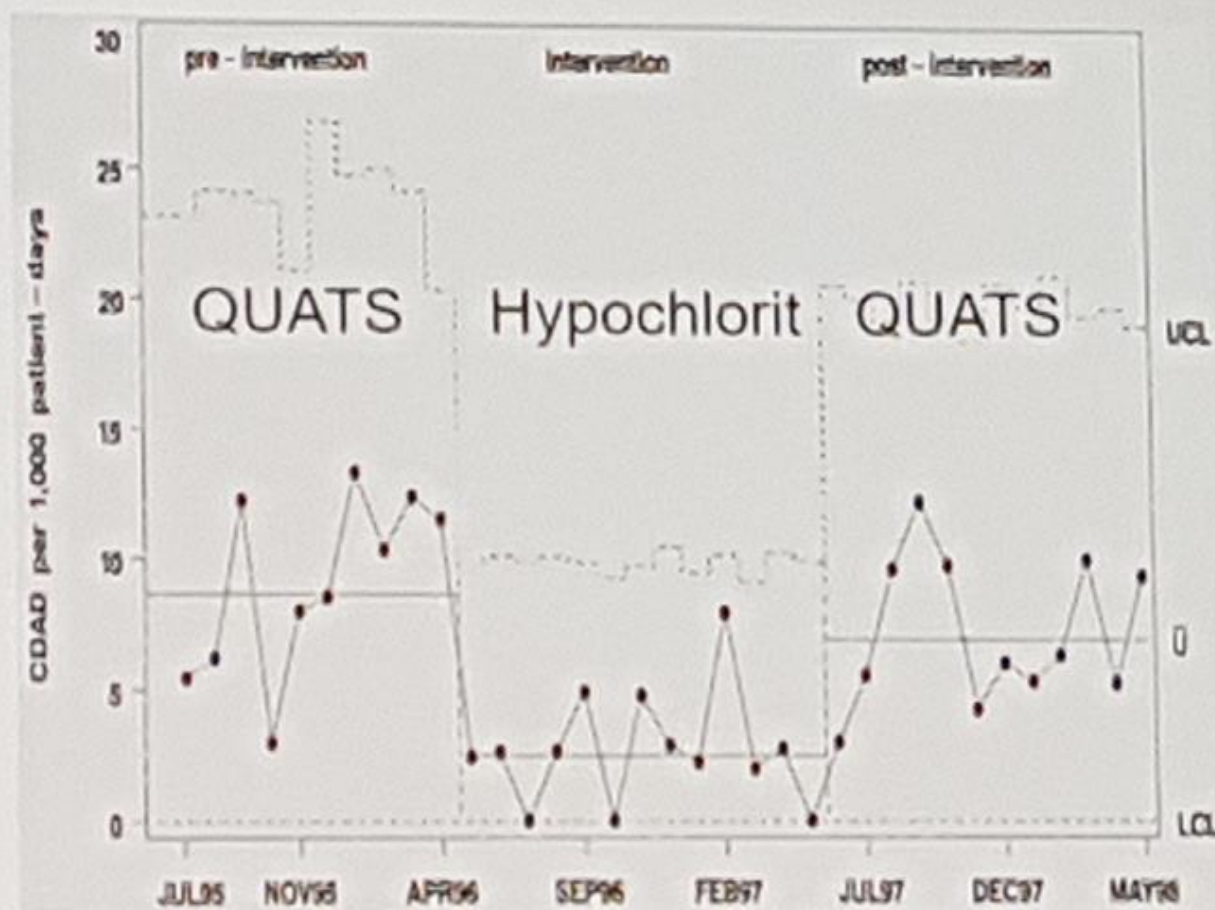
Type and/or Purpose of product	Phase / Step	Activity claims						
		Bactericidal	Yeasticidal	Fungicidal	Tuberculocidal	Mycobactericidal	Virucidal	Sporicidal
Hygienic hand wash	2/1	EN 13727	EN 13624prA1	**	–	–	EN 14476 A1prA2 - expected 20-2017	–
	2/2	EN 1400	**	–	–	–	–	–
Hygienic hand rub	2/1	EN 13727	EN 13624prA1	–	–	–	EN 14476 A1prA2 - expected 10-2017	–
	2/2	EN 1500	–	–	–	–	WPC216098 (March July 2015)	–
Surgical hand rub and surgical hand wash	2/1	EN 13727	EN 13624prA1	–	–	–	–	–
	3/2	EN 12791prA1	–	–	–	–	–	–
Surface disinfection, clean and dirty conditions	2/1	EN 13727	EN 13624prA1	EN 13624prA1	EN 14345	EN 14346	EN 14476 A1prA2 - expected 10-2017	prEN 17125 (07-2017) - expected 10-2018
	2/2	EN 12097 mod	EN 13697 mod	EN 13697 mod	EN 13697 mod	EN 13697 mod	prEN 18277 V2 (Apr 2016) - expected 2018	–
	2/2	EN 16610	EN 15815	*	*	*	WPC216104 (March 2016)	proposal Germany/Gebel
Instrument disinfection, clean and dirty conditions	2/1	EN 13727	EN 13624prA1	EN 13624prA1	EN 14346	EN 14346	EN 14476 A1prA2 - expected 10-2017	prEN 17125 (07-2017) - expected 10-2018
	2/2	EN 14581	EN 14581	EN 14581	EN 14581	EN 14581	prEN 17111 (Nov 2016) - expected 07-2018	WPC216099 (Nov 2015)
Water treatment against Legionella	2/1	EN 12623pr	–	–	–	–	–	–
	2/2	–	–	–	–	–	–	–
Chemical thermal lichen disinfection	2/1	EN 13727	EN 13624prA1	*	EN 14346	EN 14346	EN 14476 A1prA2 - expected 10-2017	prEN 17126 (07-2017) - expected 10-2018
	2/2	EN 15816	EN 15815	*	EN 15816	EN 15815	–	–

\* No work items are yet approved but relevant standards may become available in the future

\*\* No intention to develop a test



## Intervention with Different Disinfectants for *Clostridium difficile*-associated diarrhoea



Mayfield J.L. et al.  
Environmental Control to  
reduce transmission of  
*Clostridium difficile*, Clin  
Infect Dis 2000; 31, 995-  
1000



## *C. difficile* – ways of transmission

### ■ faecal-oral:

- non living environment (patient near surfaces, instruments)
- hands (personal, patient)

place (outbreak)	contamination rate	contamination place
surgical ICU (432 examinations)	11,1 % positive (control unit: 2,8%)	toilet seats 33%
		bed-pans 33%
		floor 15%

### ■ persistence of *C. difficile* on surfaces:

- Vegetative forms: ~ 15 min
- spores: ~ 5 – 6 month

→ only spores are relevant on surfaces (sporicidal activity)!



## *C. difficile* – measures of prevention

- Rationale and restrictive use of antibiotics
- Strict and exact application of hygiene measures
  - **Use of sporicidal products!!!**

### Problem:

- No listing of sporicidal products  
(RKI, VAH, SFHH, ÖGHMP, AOAC)
- To find sporicidal products in adequate use concentrations  
– patient friendly



# Sporicidal test - phase 2 / step 1

since

actual

WORKING DRAFT  
prEN (WI 18+32)

EUROPEAN STANDARD

DRAFT

CEN/TC 216/ WG 1 N XX  
March 2009

NORME EUROPÉENNE

prEN 17126

EUROPÄISCHE NORM

May 2017

ICS 11.080.20

English Version

Chemical disinfectants and antiseptics - Quantitative suspension test for the evaluation of sporicidal activity of chemical disinfectants in the medical area - Test method and requirements (phase 2, step 1)

## Bestimmung der sporiziden Wirksamkeit im quantitativen Suspensionsversuch\*

(Methode 18)

18

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### 18.1 Testorganismus

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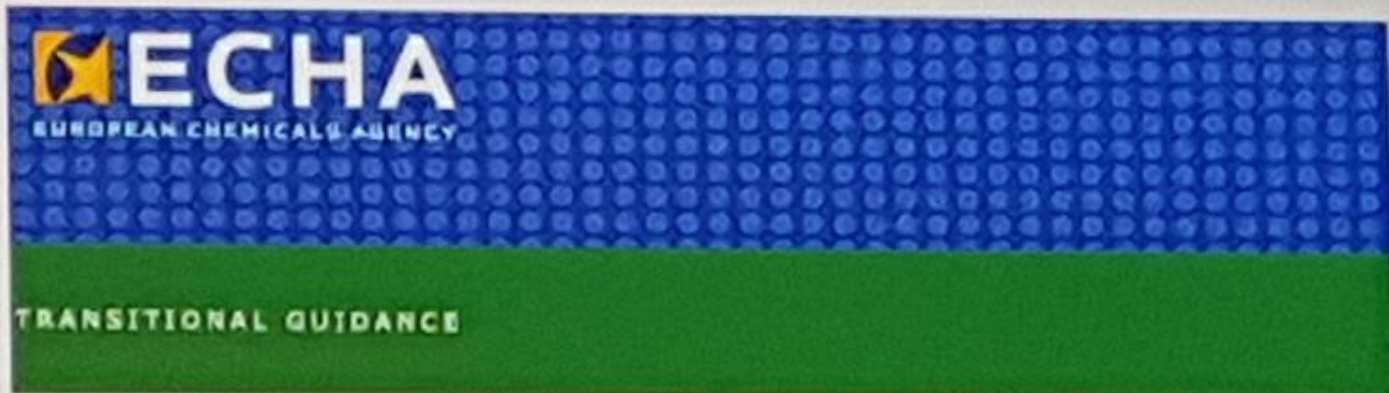
#### 18.1.1 Testorganismen und Ausgangskonzentrationen

*Clostridium difficile*

NCTC 13366 (DSM 27147)

1,5 bis  $5 \times 10^7$  KBE/ml





## Transitional Guidance on the Biocidal Products Regulation

Transitional Guidance on Efficacy Assessment for Product Types 1-5, Disinfectants

May 2016

## Challenges for Disinfection

As a consequence of the European Biocidal Product Directive (to be in effect by 2020), many active ingredients will not be available anymore.

4 of 5 main activity ingredients are under discussion for restriction

- QAC: problems of residues
- Active chlorine: stability
- Aldehydes: stronger classification
- Alcohols (e.g. ethanol): discussion about CRM-classification



## Divergent opinions on surface disinfection: myths or prevention? A review of the literature

Die Auseinandersetzung zur Flächendesinfektion: Mythos oder Prävention? Ein Rückblick auf ein Lehrstück

### Abstract

Virtually no prevention strategy of such frequent contamination. Set against that hygiene and Infection Prevention working group comprising nation as regards the role of a most carefully drafted guideline and also incorporated a new "Cleaning and disinfection protocol" such that there is no of facultatively pathogenic or. Numerous studies have come constitutes a basic infection pathogens can be controlled such a form of control is not into account in future when infection control measures. In simple, norovirus outbreak, insights are of paramount importance of surfaces and of air. This discussion about the need to causing confusion among to accept hygienic practices, nosocomial infections as well



GMS Krankheitsygiene  
Interdisziplinär 2007; 2(1)

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Thank you for your  
attention!

With best regards  
from Prof. Exner