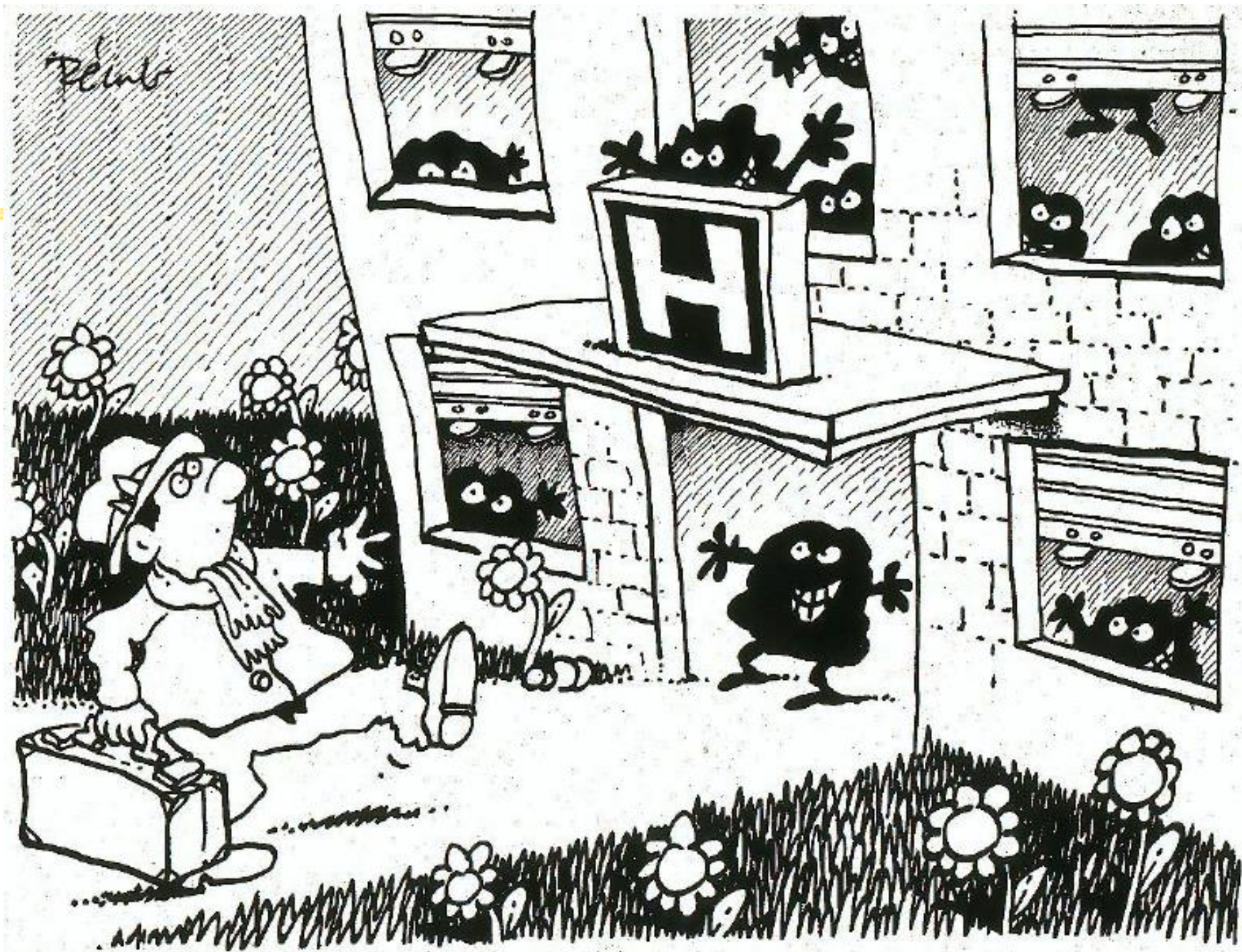


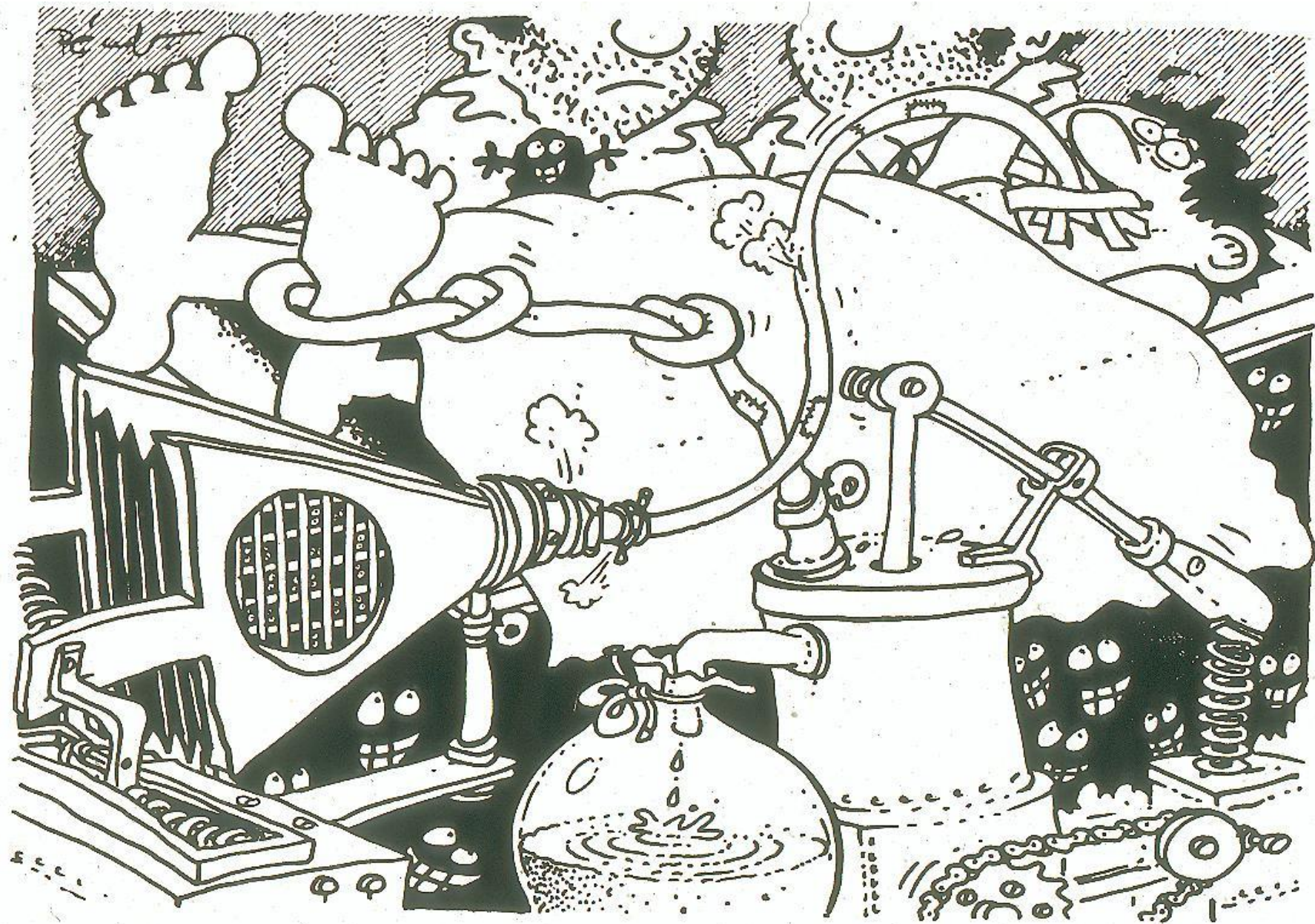


UNIVERSIDADE DE SÃO PAULO FACULDADE DE MEDICINA DE RIBEIRÃO PRETO DISCIPLINA RCG 312

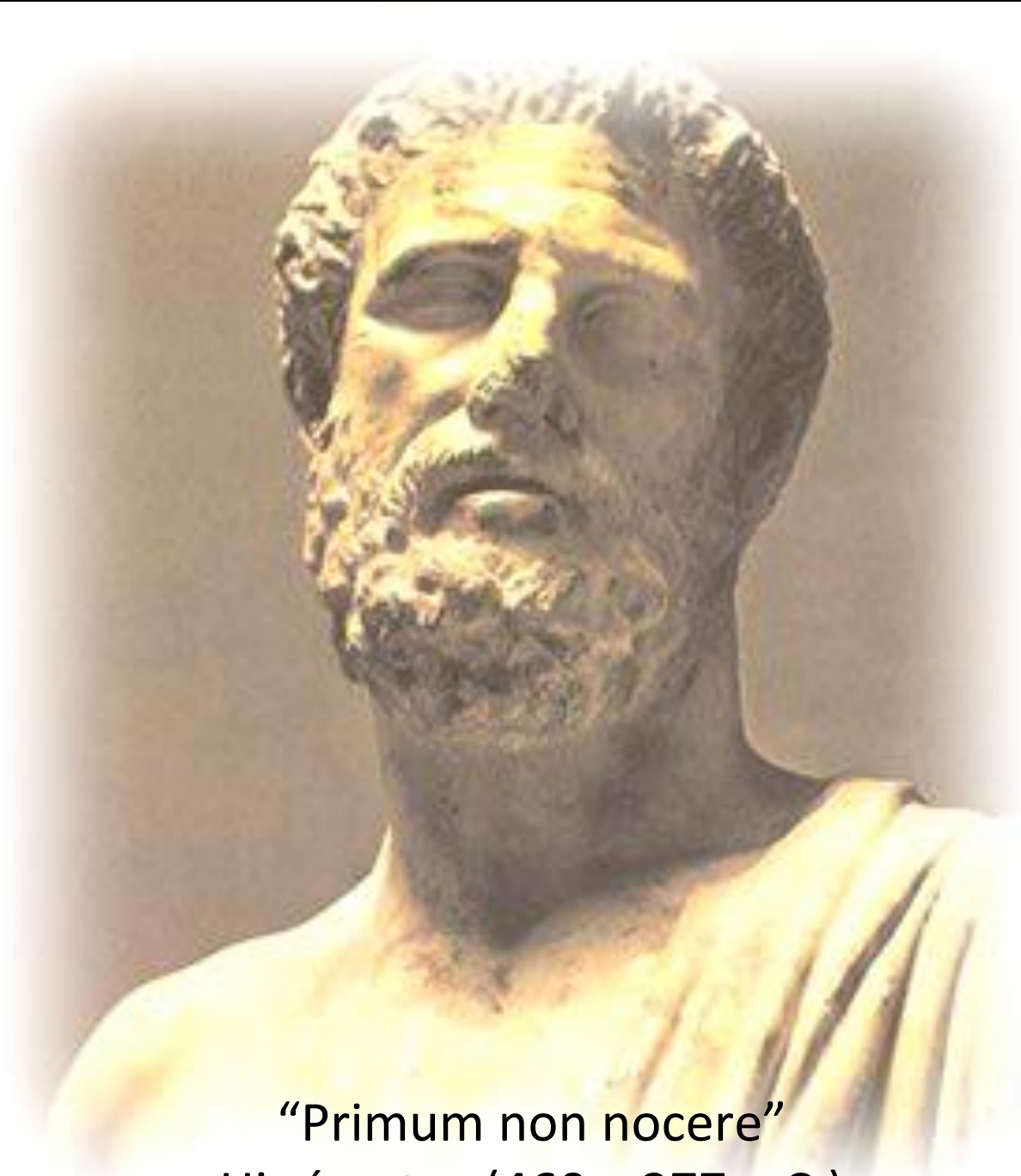


Higienização das mãos
Fernando Bellissimo Rodrigues



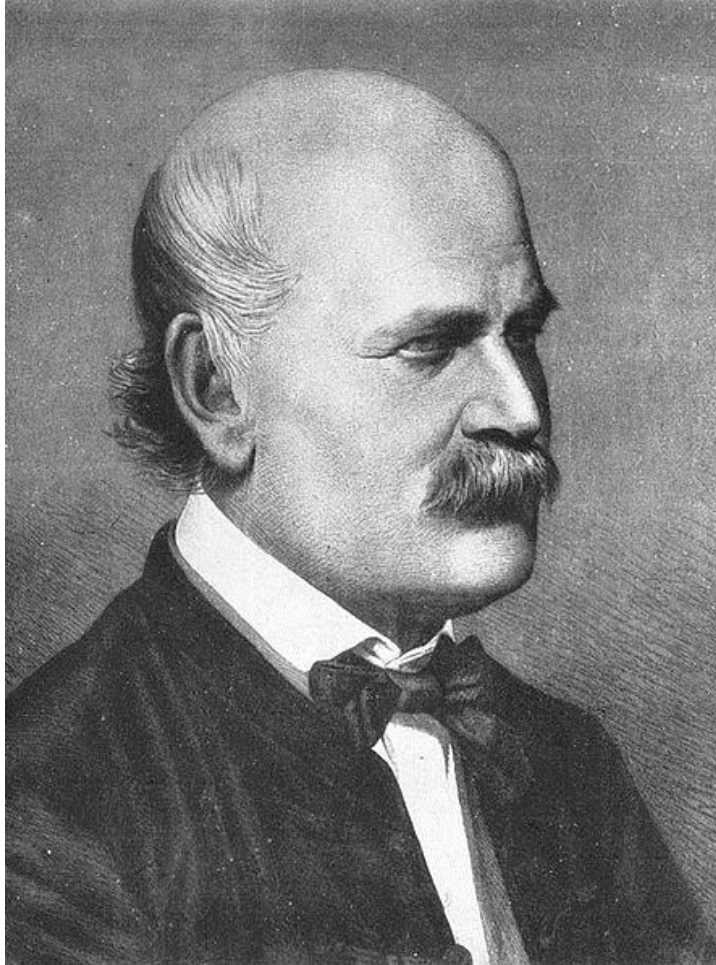


Ils sont PARTOUT ces microbes



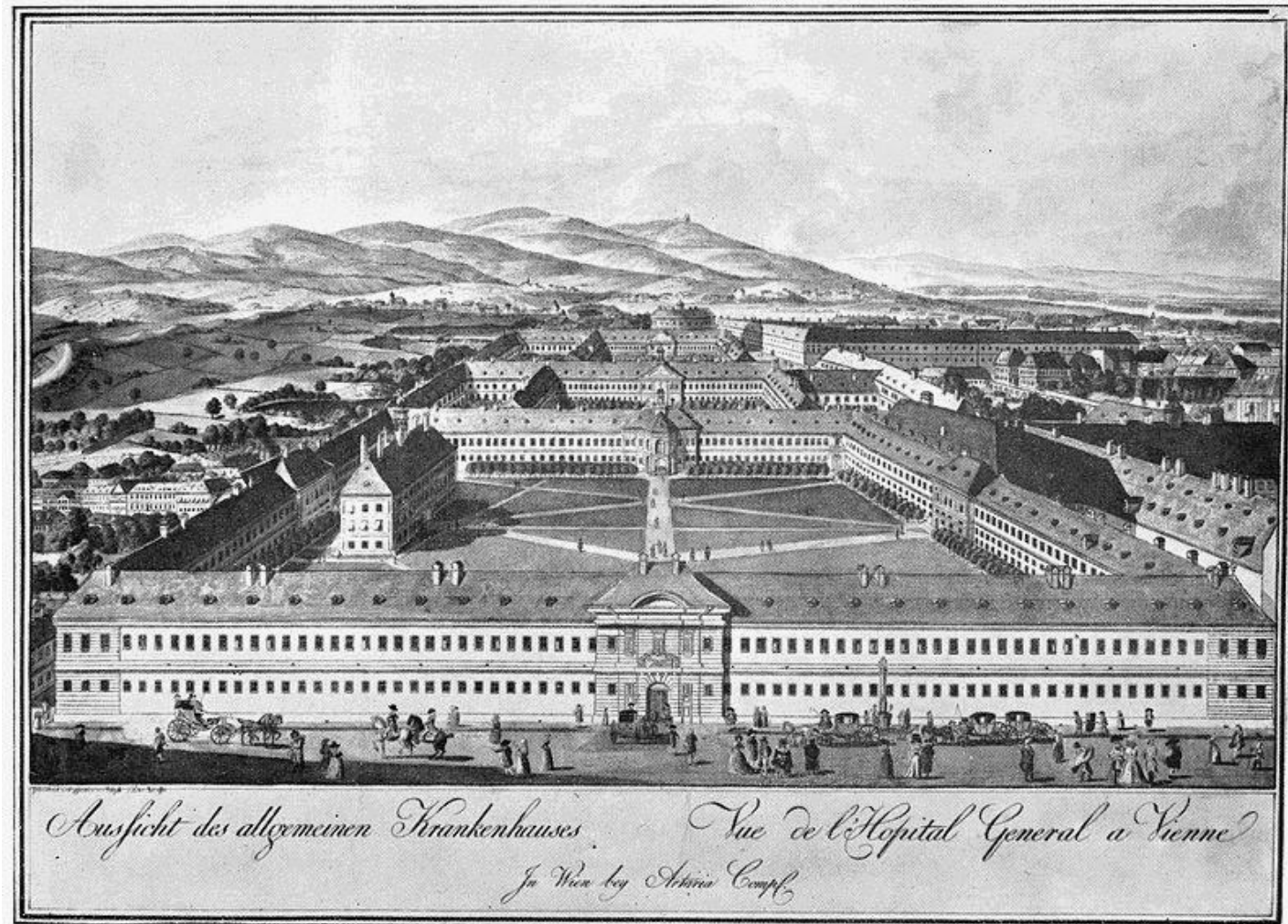
“Primum non nocere”
Hipócrates (460 a 377 a.C.)

HISTÓRICO



Ignaz Philipp Semmelweis
(1815 -1865)

HISTÓRICO





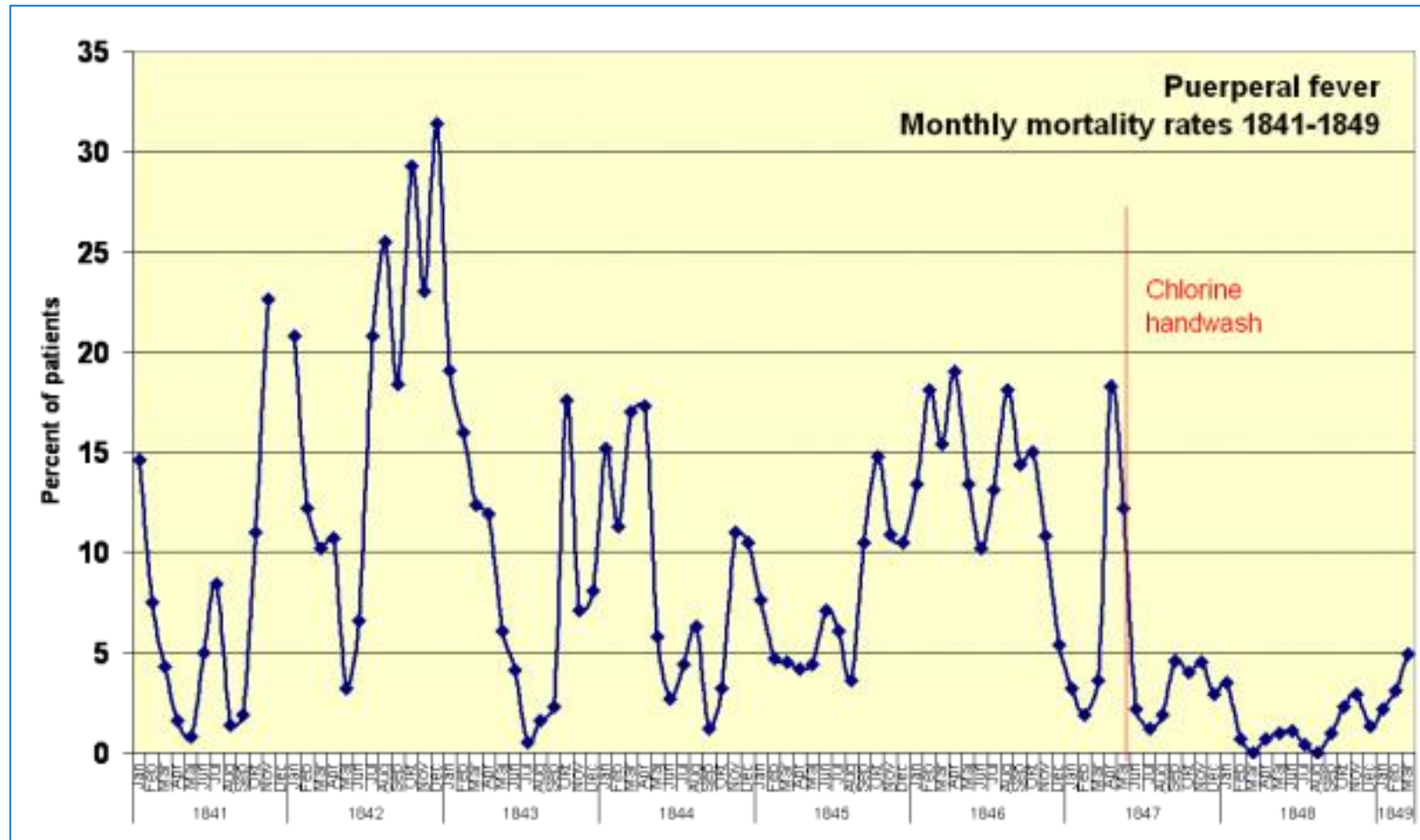
**Hospital Geral de Viena
(1847)**

HISTÓRICO



Figure 3. Hand-hygiene basin at the Lying-In Women's Hospital in Vienna, 1847. Photograph reproduced with permission of Manfred Skopec, Institut für Geschichte der Medizin, Vienna.

HISTÓRICO



Die Aetiologie, der Begriff
und
die Prophylaxis
des
Kindbettfiebers.

Von

Ignaz Philipp Semmelweis,

Dr. der Medicin und Chirurgie, Magister der Geburtshilfe, o. ö. Professor der theoretischen
und practischen Geburtshilfe an der kön. ung. Universität zu Pest
etc. etc.

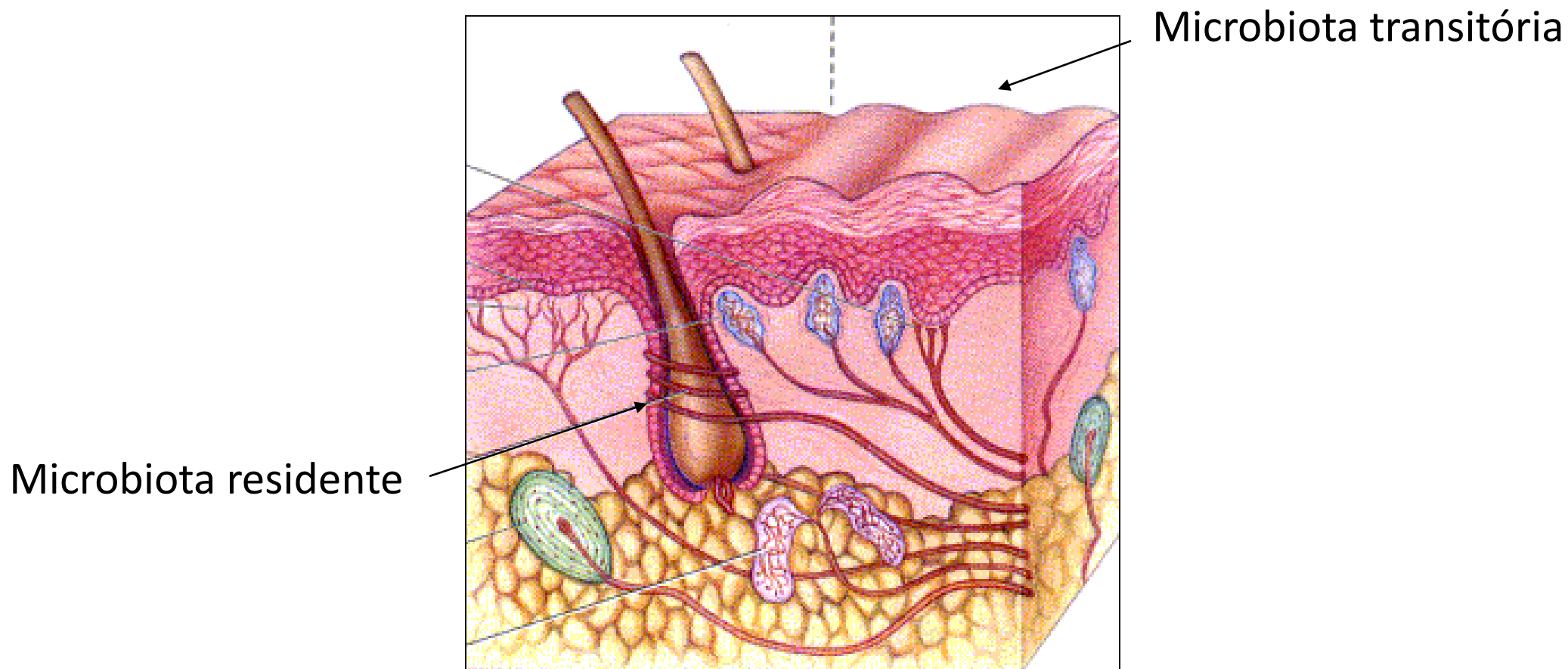


Pest, Wien und Leipzig.

C. A. Hartleben's Verlags-Expedition.

1861.

Microbiota das mãos



Microbiota residente das mãos



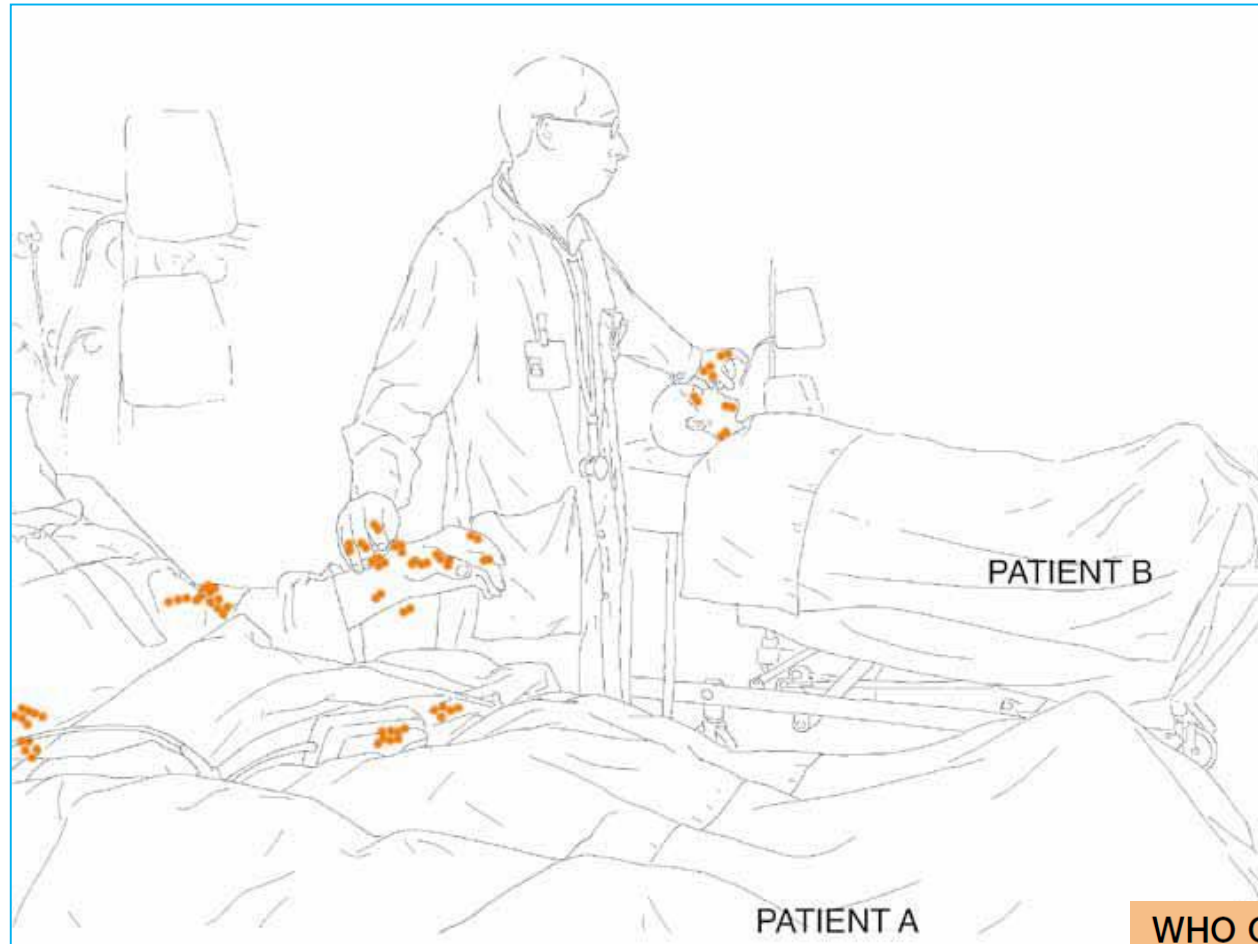
- Composta por microrganismos que vivem e se multiplicam na pele (*Staphylococcus epidermidis*, *Micrococcus* spp.);
- Encontrada nas camadas mais profundas da pele;
- Em geral, exibe baixa virulência, mas pode causar infecção se inoculada através de procedimentos invasivos;
- Não é removida pela lavagem das mãos, mas pode ter sua concentração reduzida por antissépticos (álcool, PVP-I, clorexidina).

Microbiota transitória das mãos



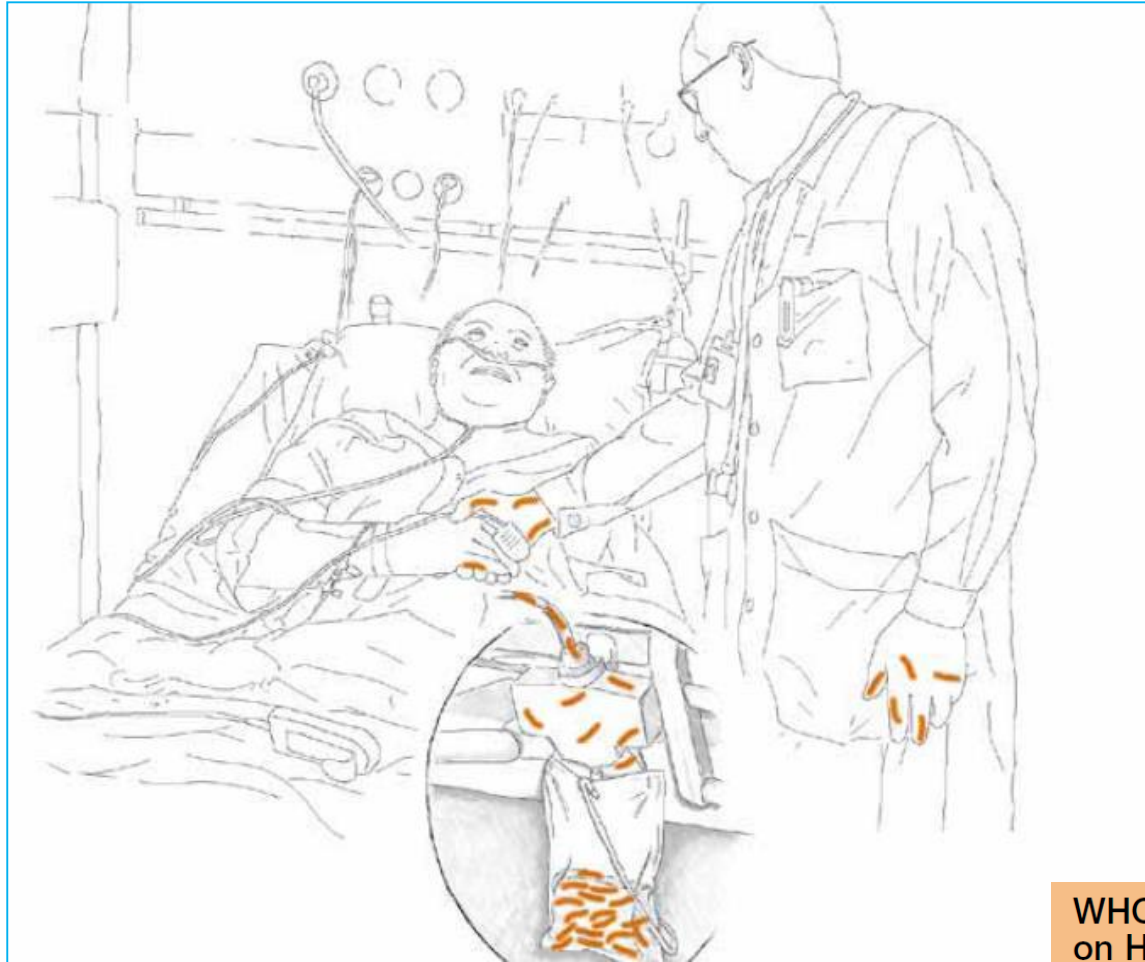
- Encontrada apenas na superfície da pele;
- Viável por curto período de tempo;
- Composta por microrganismos frequentemente envolvidos em infecções hospitalares (*P. aeruginosa*, *S. aureus*, *Acinetobacter* sp, *E.coli*);
- Facilmente removível pela lavagem das mãos;
- Pode também ser inativada por antissépticos.

De que modo as mãos podem transmitir infecções?



WHO Guidelines
on Hand Hygiene in Health Care

De que modo as mãos podem inocular infecções?



WHO Guidelines
on Hand Hygiene in Health Care

ESTUDO DE SURTO



- Surto de infecção por *Klebsiella pneumoniae* produtora de ESBL em uma UTI neonatal de 45 leitos.
- Local: Columbia University, New York (EUA).
- Período: abril a junho de 2001.
- Metodologia: caso-controle + análise molecular das cepas isoladas (PFGE).

ESTUDO DE SURTO



- Resultados: 19 crianças foram colonizadas com a cepa epidêmica, das quais 9 apresentaram doença clínica, incluindo septicemia, endoftalmite e osteomielite.
- Análise epidemiológica revelou como principais fatores de risco para a aquisição da cepa epidêmica:
 - tempo de internação (OR= 1,05 por dia);
 - exposição à enfermeira 53 (OR= 7,87 por dia).

ESTUDO DE SURTO



- Cultura das mãos das enfermeiras 23 e 53 e de um estetoscópio foram positivas para a cepa epidêmica em várias amostras.
- A enfermeira 53 usava unhas artificiais.
- A enfermeira 23 usava unhas longas.
- Removendo as unhas artificiais, cortando as unhas longas e intensificando a higiene das mãos o surto foi controlado.

E NA ROTINA, A HIGIENE DAS MÃOS FUNCIONA?

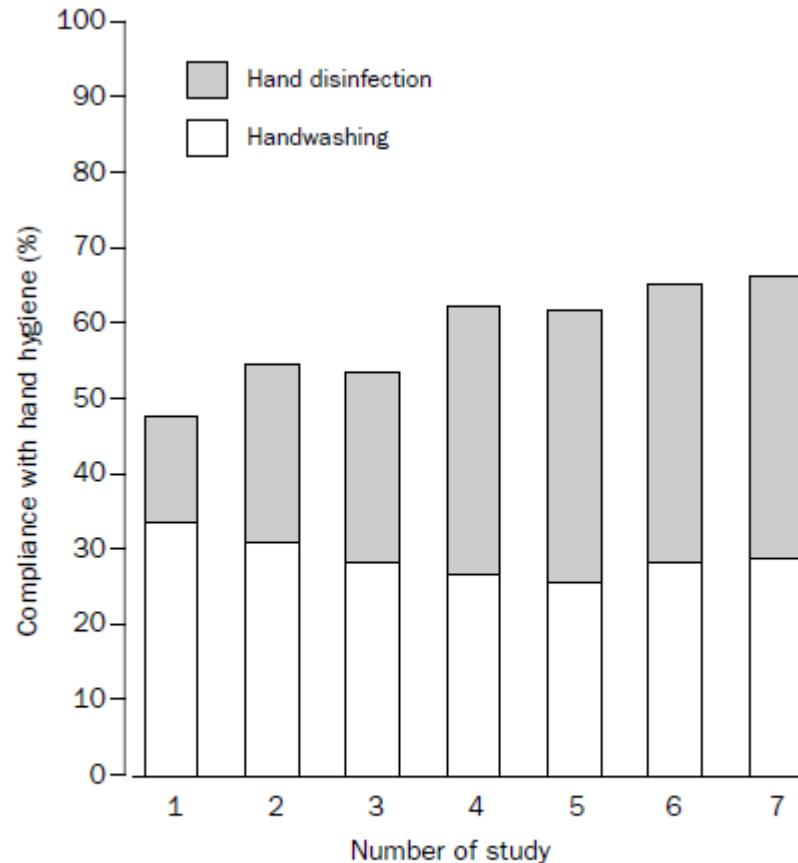


Figure 1: Hand-hygiene compliance trend during seven consecutive hospital-wide surveys, University of Geneva Hospitals, 1994–97

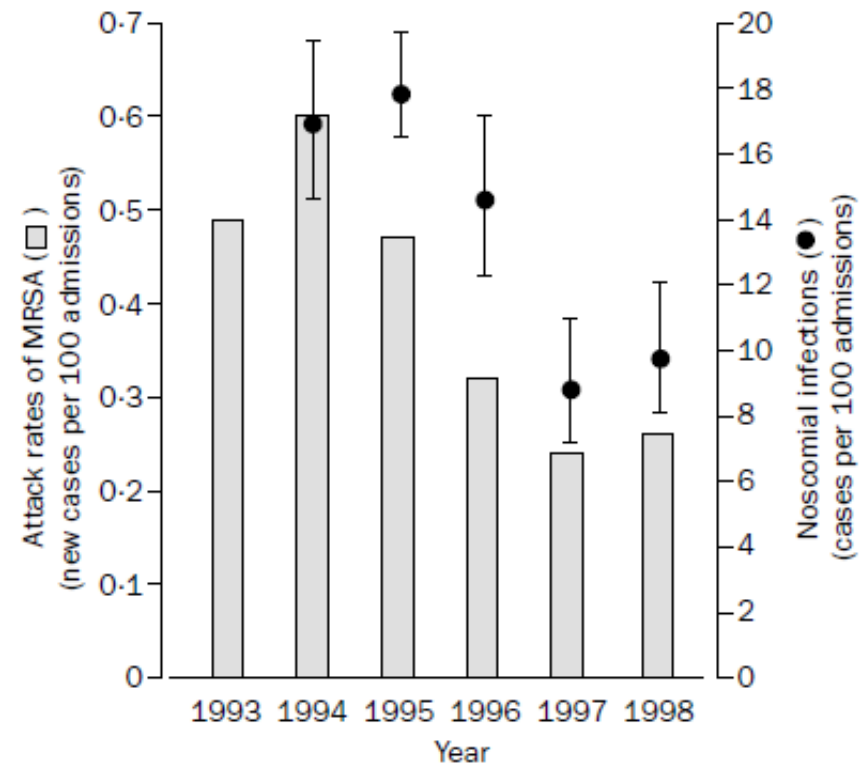


Figure 3: Trends in prevalence of nosocomial infections and annual attack rate of MRSA, 1993–98, University of Geneva Hospitals

ESTUDO DE ADESAO

Adherence to hand hygiene and risk factors for poor adherence in 13 Ontario acute care hospitals

Dominik Mertz, MD,^{a,b} Jennie Johnstone, MD,^{a,b,c} Paul Krueger, PhD,^{a,d} Kevin Brazil, PhD,^{a,e} Stephen D. Walter, PhD,^a and Mark Loeb, MD, MSc^{a,b,c,f}

Hamilton and Toronto, Ontario, Canada

Multicenter studies assessing hand hygiene adherence and risk factors for poor performance are scarce. In an observational study involving 13 hospitals across Ontario, Canada, we found a mean adherence rate of 31.2% and that adherence was positively associated with nurses, single rooms, contact precautions, and the availability of alcohol hand rub dispensers.

Key Words: Hand hygiene; adherence risk factor; Ontario; multicenter.

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ESTUDO DE ADESAO

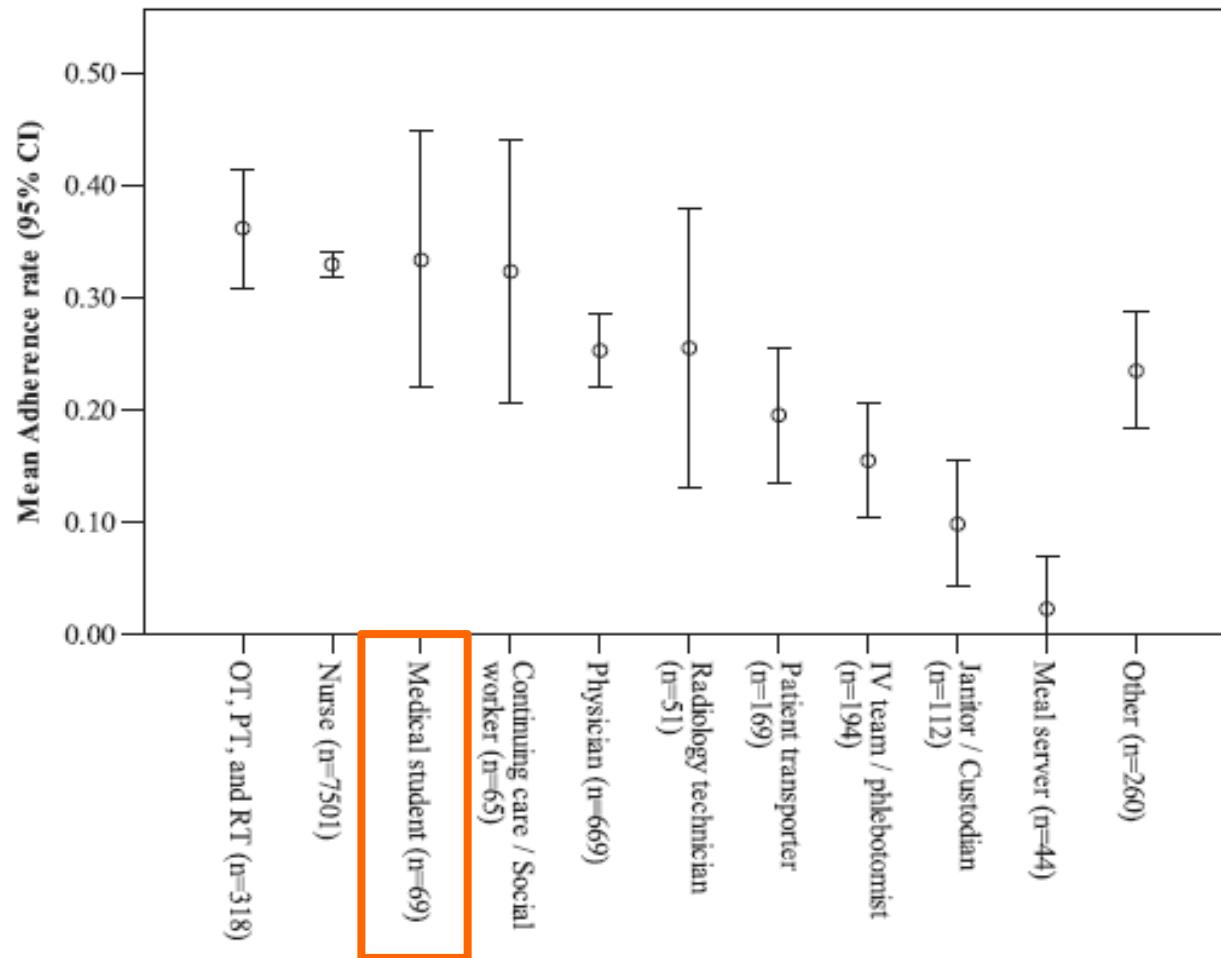
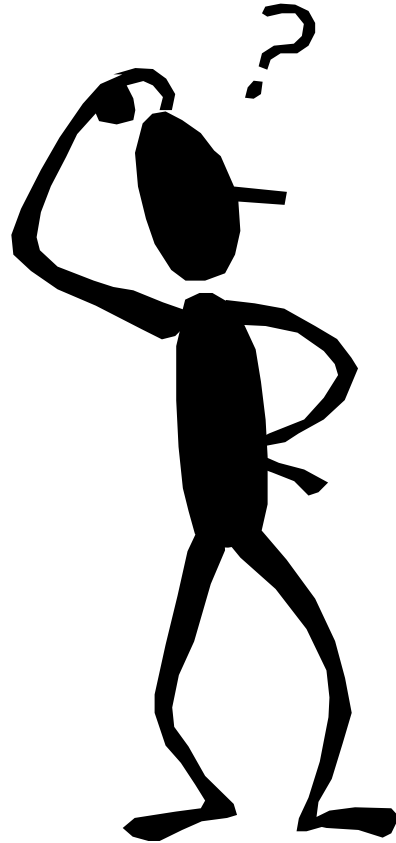
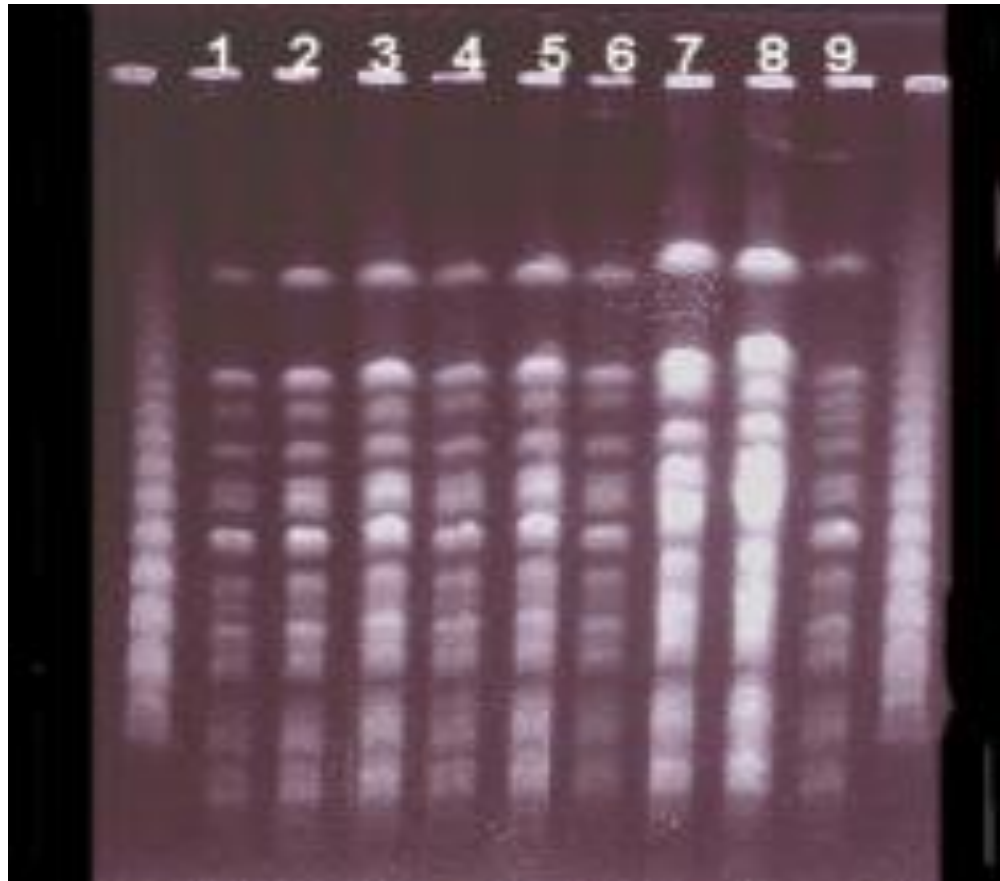


Fig 1. Mean adherence rate of single opportunities for hand hygiene stratified by type of health care worker. OT, occupational therapist; PT, physiotherapist; RT, respiratory therapist; IV, intravenous; CI, confidence interval.

E no HCRP, é diferente?

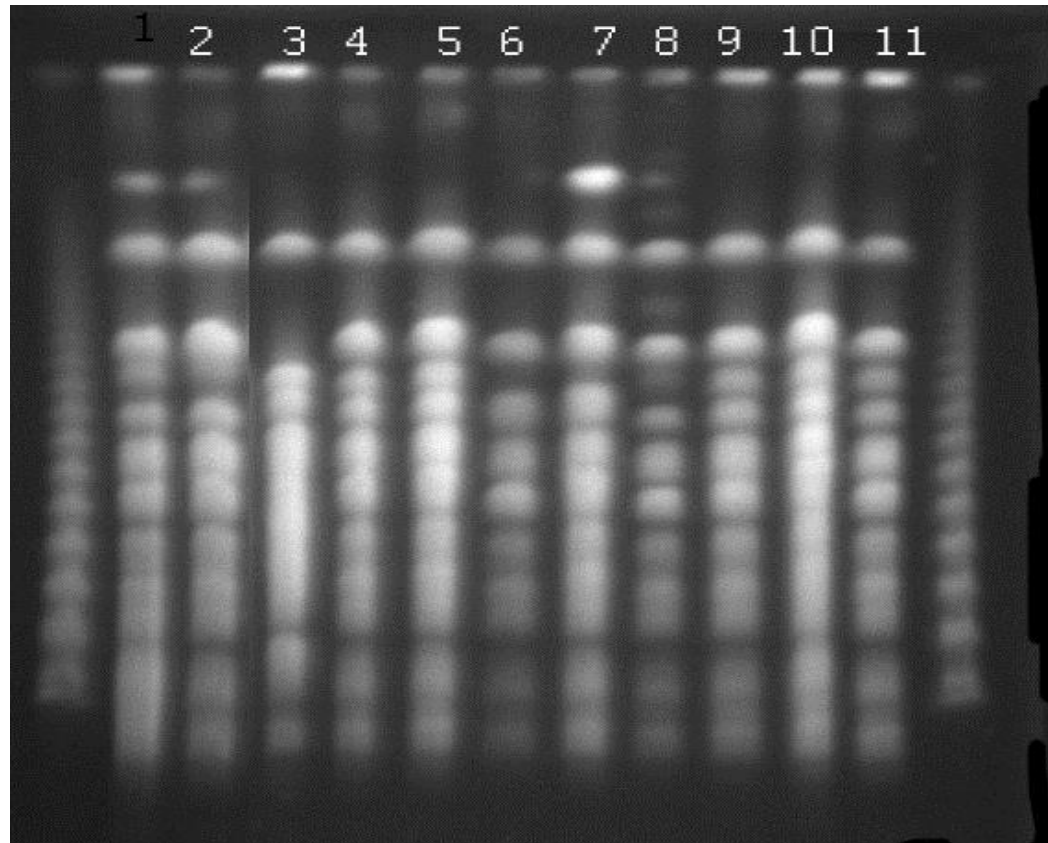


Cepas de *Pseudomonas aeruginosa* multirresistentes, isoladas em 2000 e 2001 de pacientes internados no HC

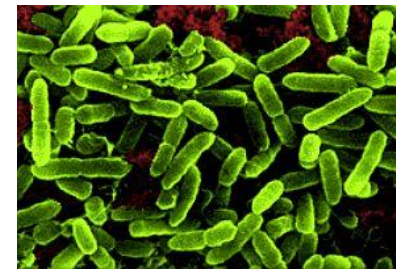


Denissani Lima, Prof. Dr. José Fernando. "*Pseudomonas aeruginosa* resistente a múltiplos antimicrobianos: avaliação do seu mecanismo de disseminação na UE HCFMRP-USP com base na análise de fatores de risco dos pacientes e na genotipagem das amostras", 2006.

Cepas de *Pseudomonas aeruginosa* multirresistentes, isoladas em 2003 e 2004 de pacientes internados no HC



Resistência antimicrobiana em *Pseudomonas aeruginosa* no HC



- Penicilinas: ticarcilina, piperacilina, ticarcilina/clavulanato, piperacilina/tazobactam.
- Cefalosporinas: ceftazidima, cefoperazona, cefepime, cefpiroma.
- Monobactams: aztreonam.
- Quinolonas: norfloxacin, pefloxacin, ciprofloxacin, levofloxacin, gatifloxacin, moxifloxacin.
- Aminoglicosídeos: gentamicina, amikacina, tobramicina.
- Carbapenems: imipenem, meropenem.
- Sensibilidade variável à polimixina B, por enquanto!!!

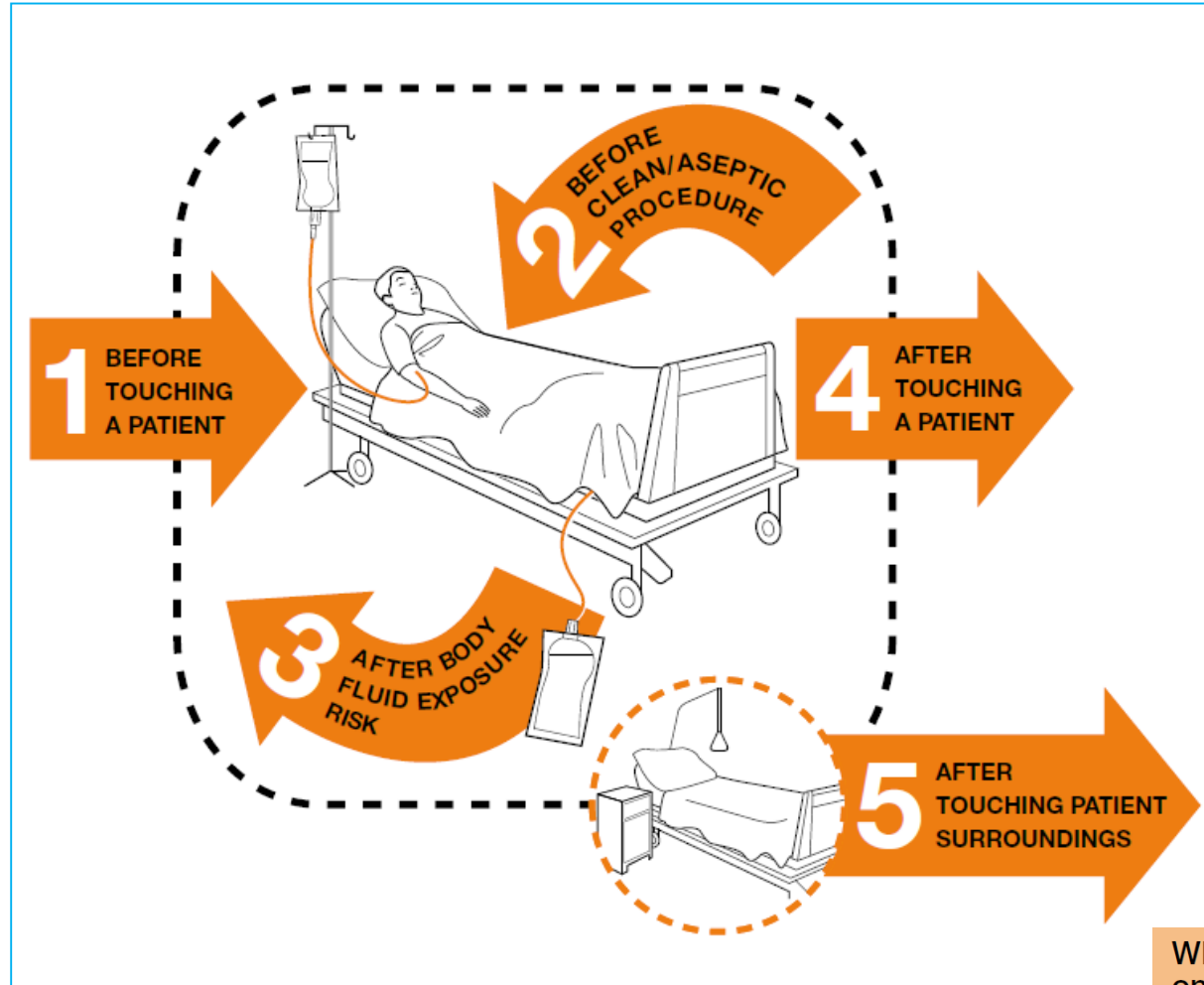
Resistência antimicrobiana em *Klebsiella pneumoniae* KPC no HC



- **Penicilinas:** ampicilina, ampicilina + sulbactam, amoxicilina, amoxicilina + clavulanato, piperacilina, piperacilina + tazobactam.
- **Cefalosporinas:** cefalexina, cefadroxil, cefuroxima, cefoxitina, cefetamet, ceftriaxona, ceftazidima, cefotaxima, cefepime.
- **Monobactams:** aztreonam.
- **Quinolonas:** ácido pipemídico, norfloxacin, ciprofloxacina, levofloxacina, gemifloxacina, moxifloxacina.
- **Aminoglicosídeos:** gentamicina, amicacina, tobramicina.
- **Carbapenens:** ertapenem, imipenem, meropenem.
- Sensibilidade variável às **polimixinas**, por enquanto!



Indicações para higienizar das mãos



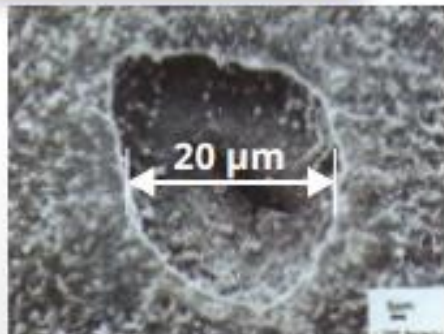
WHO Guidelines
on Hand Hygiene in Health Care

Lavagem simples das mãos

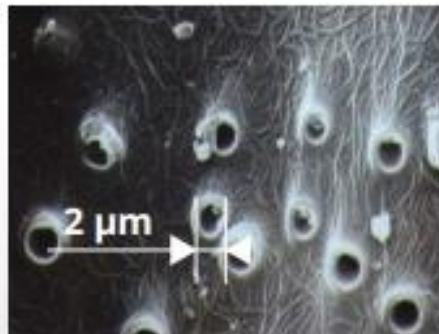


- Conceito: aplicação de água corrente e sabonete líquido, fricção de toda a superfície das mãos, enxague e secagem em papel toalha.
- Objetivo: remover sujidade e microbiota transitória das mãos.
- Evitar o uso de adornos de mão, como anéis, especialmente em UTI.
- As unhas devem ser mantidas curtas e limpas.
- Deve ser feita com técnica adequada.
- O uso de luvas não dispensa a necessidade de lavagem das mãos.

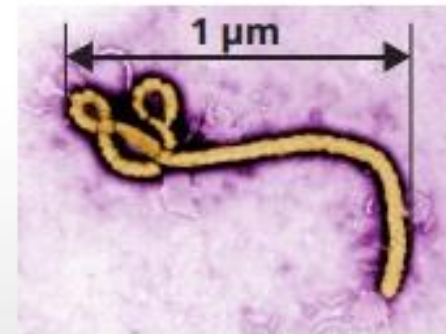
Lavagem das mãos após o uso de luvas



Latex glove micropores



Vinyl glove micropores



Ebola Virus

Contaminação do sabonete

A total of 99 bar soap cakes were swabbed, and 61 (61.6%) of them were found to be contaminated with various organisms. The most common organisms were *Pseudomonas mendocina* (n = 17), *Corynebacterium* spp (n = 12), *P aeruginosa* (n = 11), *Acinetobacter haemolyticus* (n = 6), *Halomonas aquamarina* (n = 5), *Acinetobacter* spp (n = 4), *Citrobacter* spp (n = 3), *Arthrobacter* spp (n = 2), mycelial fungi (n = 2), methicillin-resistant *Staphylococcus aureus* (n = 2), among others (*Vibrio shiloi*, *Alishewanella fetalis*, *Nesterenkonia lacusekhoensis*, *Escherichia coli*, *Bacillus* spp, and nonlactose-fermenting gram-negative bacilli; n = 1 each). Out of 60 liquid soap samples tested, 2 (3.3%) were found to be contaminated with *Citrobacter* spp, *P oleovorans*, and *Klebsiella pneumoniae*. In

Hand Hygiene Technique with Soap and Water

 Duration of the entire procedure: 40-60 seconds



Wet hands with water;



Apply enough soap to cover all hand surfaces;



Rub hands palm to palm;



Right palm over left dorsum with interlaced fingers and vice versa;



Palm to palm with fingers interlaced;



Backs of fingers to opposing palms with fingers interlocked;



Rotational rubbing of left thumb clasped in right palm and vice versa;



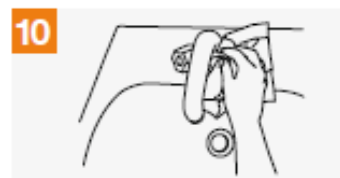
Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



Rinse hands with water;



Dry hands thoroughly with a single use towel;



Use towel to turn off faucet;



Your hands are now safe.

WHO Guidelines
on Hand Hygiene in Health Care

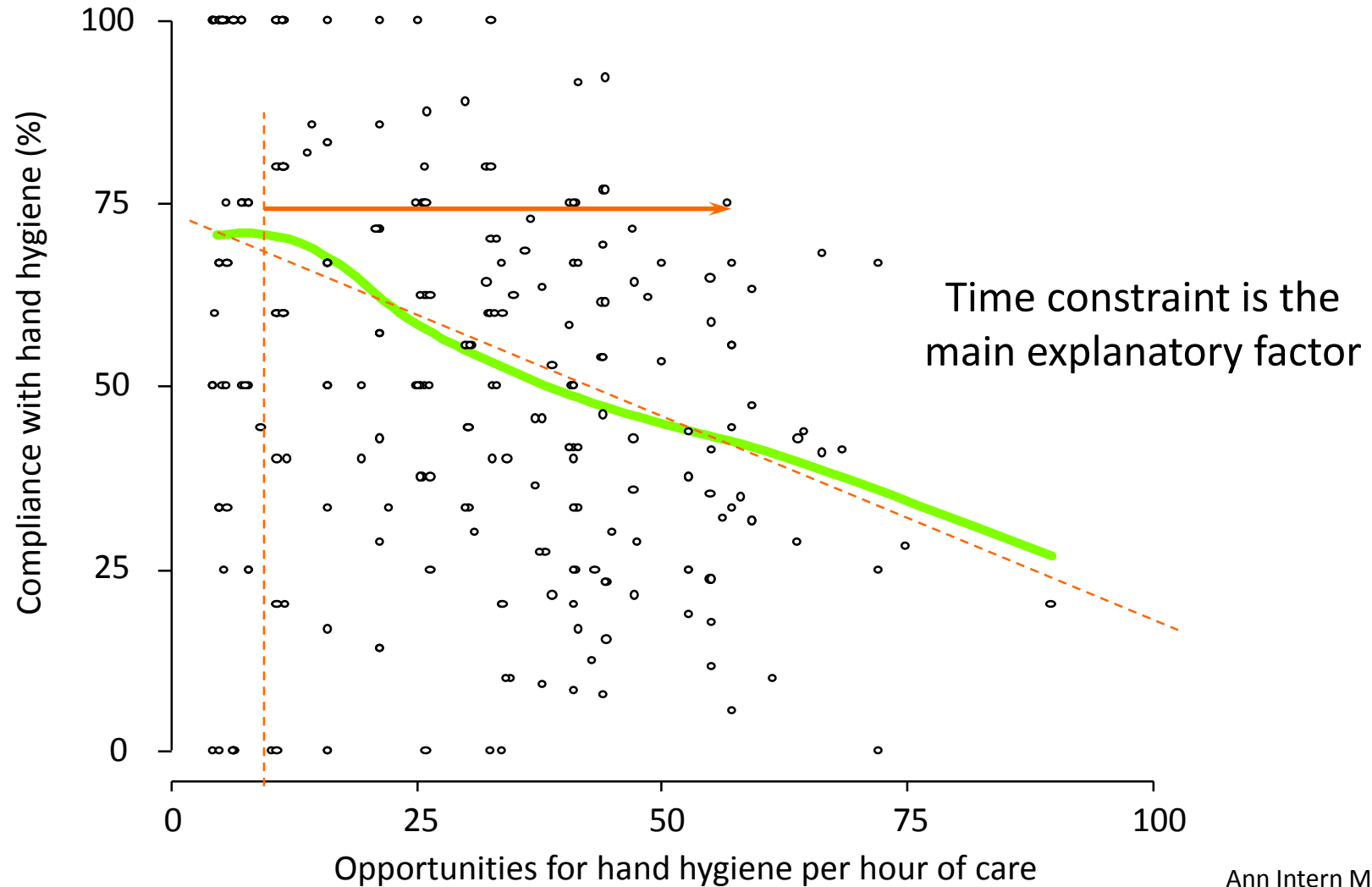
Lavagem das mãos: técnica inadequada



É possível que os profissionais da saúde lavem as mãos todas as vezes em que eles deveriam fazê-lo?



Lavar as mãos: é possível?



Shifting to a new paradigm: from hand washing to hand rubbing with alcohol



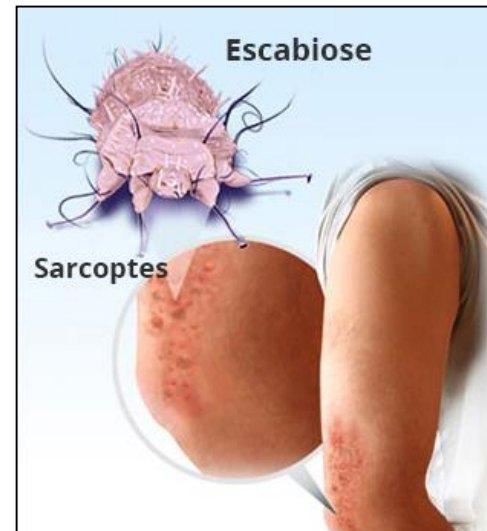
ANTISSEPSE DAS MÃOS COM SOLUÇÃO ALCÓOLICA

A aplicação de álcool substitui a lavagem simples das mãos, exceto:

Quando as mãos apresentarem
sujidade visível
(ex: talco de luva)



Quando as mãos
contiverem ácaros ou
esporos



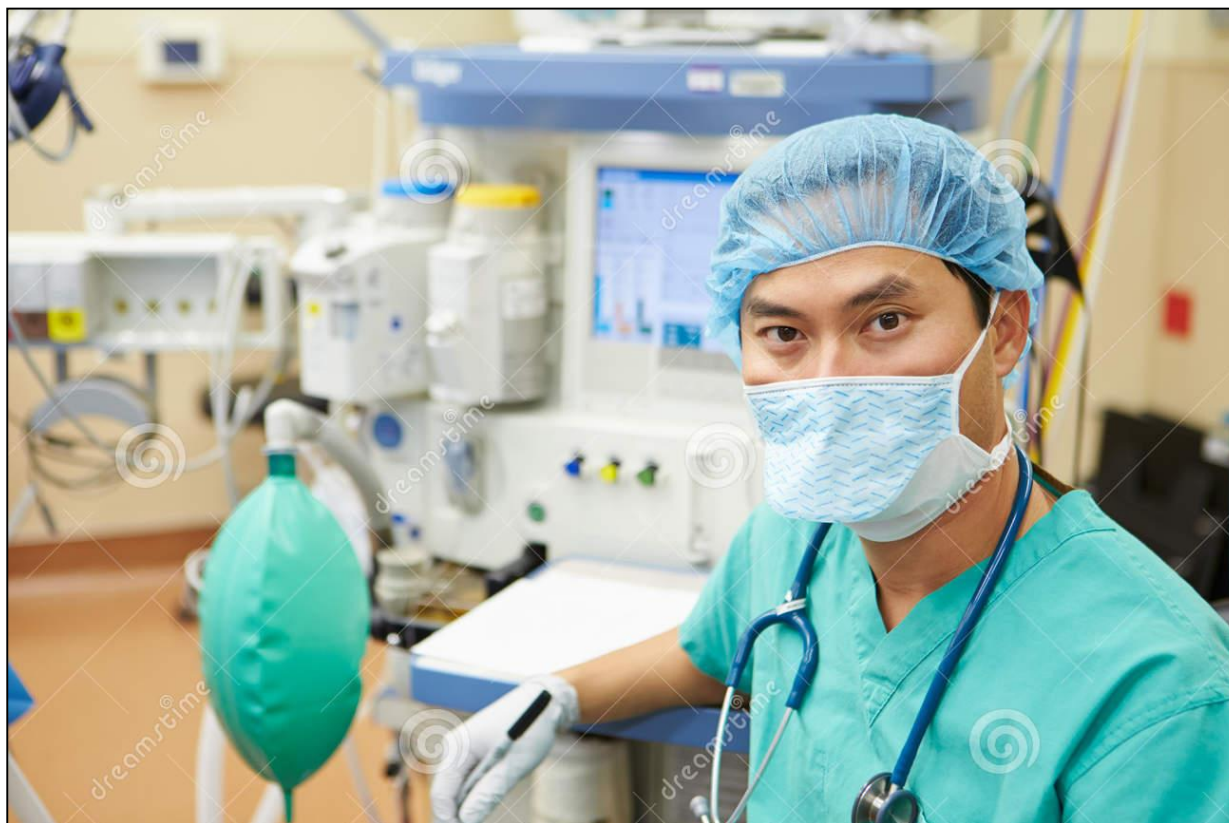
ANTISSEPSE DAS MÃOS COM SOLUÇÃO ALCÓOLICA

Consome menos tempo que a lavagem das mãos (20 segundos x 1 min)



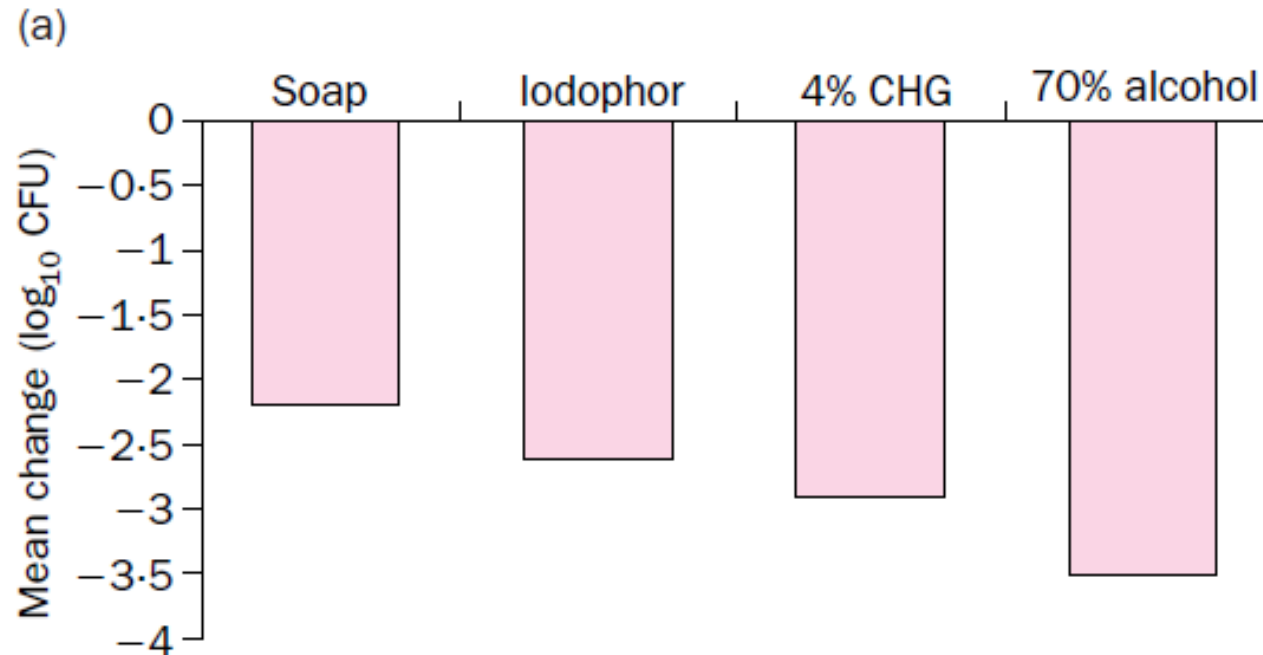
ANTISSEPSE DAS MÃOS COM SOLUÇÃO ALCÓOLICA

Pode ser realizada em locais onde não há pia



ANTISSEPSE DAS MÃOS COM SOLUÇÃO ALCÓOLICA

Apresenta eficácia microbida superior à da lavagem das mãos



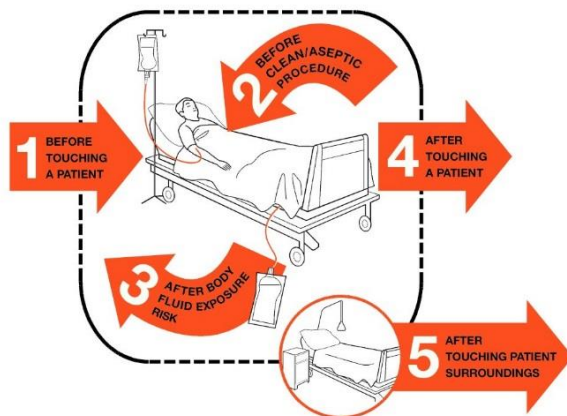
Antissepsia das mãos com solução alcóolica: tolerabilidade



Figure 5. A HCW's hands (a) after 2 weeks of hand hygiene with non-medicated liquid soap and 2% chlorhexidine-containing solution (example of irritant dermatitis with dry, flaky skin with numerous small cracks and evidence of previous bleeding); and (b) after 2 weeks of application of an alcohol hand rinse containing emollients. Panel b shows no cracks or evidence of bleeding, and less scaliness of the skin.

Hand Hygiene: it's all about When and How

Your 5 Moments for Hand Hygiene



1	BEFORE TOUCHING A PATIENT	WHEN?	Clean your hands before touching a patient when approaching her/his.
		WHY?	To protect the patient against harmful germs carried on your hands.
2	BEFORE CLEAN/ASEPTIC PROCEDURE	WHEN?	Clean your hands immediately before performing a clean/aseptic procedure.
		WHY?	To protect the patient against harmful germs, including the patient's own, from entering his/her body.
3	AFTER BODY FLUID EXPOSURE RISK	WHEN?	Clean your hands immediately after an exposure risk to body fluids (and after glove removal).
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
4	AFTER TOUCHING A PATIENT	WHEN?	Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.
5	AFTER TOUCHING PATIENT SURROUNDINGS	WHEN?	Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched.
		WHY?	To protect yourself and the health-care environment from harmful patient germs.



World Health
Organization

Patient Safety
A World Alliance for Safer Health Care

SAVE LIVES
Clean Your Hands

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May 2009

How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

Duration of the entire procedure: 20-30 seconds

1a

Apply a palmful of the product in a cupped hand, covering all surfaces;

1b

Rub hands palm to palm;

2

Right palm over left dorsum with interlaced fingers and vice versa;

3

Palm to palm with fingers interlaced;

4

Backs of fingers to opposing palms with fingers interlocked;

5

Rotational rubbing of left thumb clasped in right palm and vice versa;

6

Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

7

Once dry, your hands are safe.



World Health
Organization

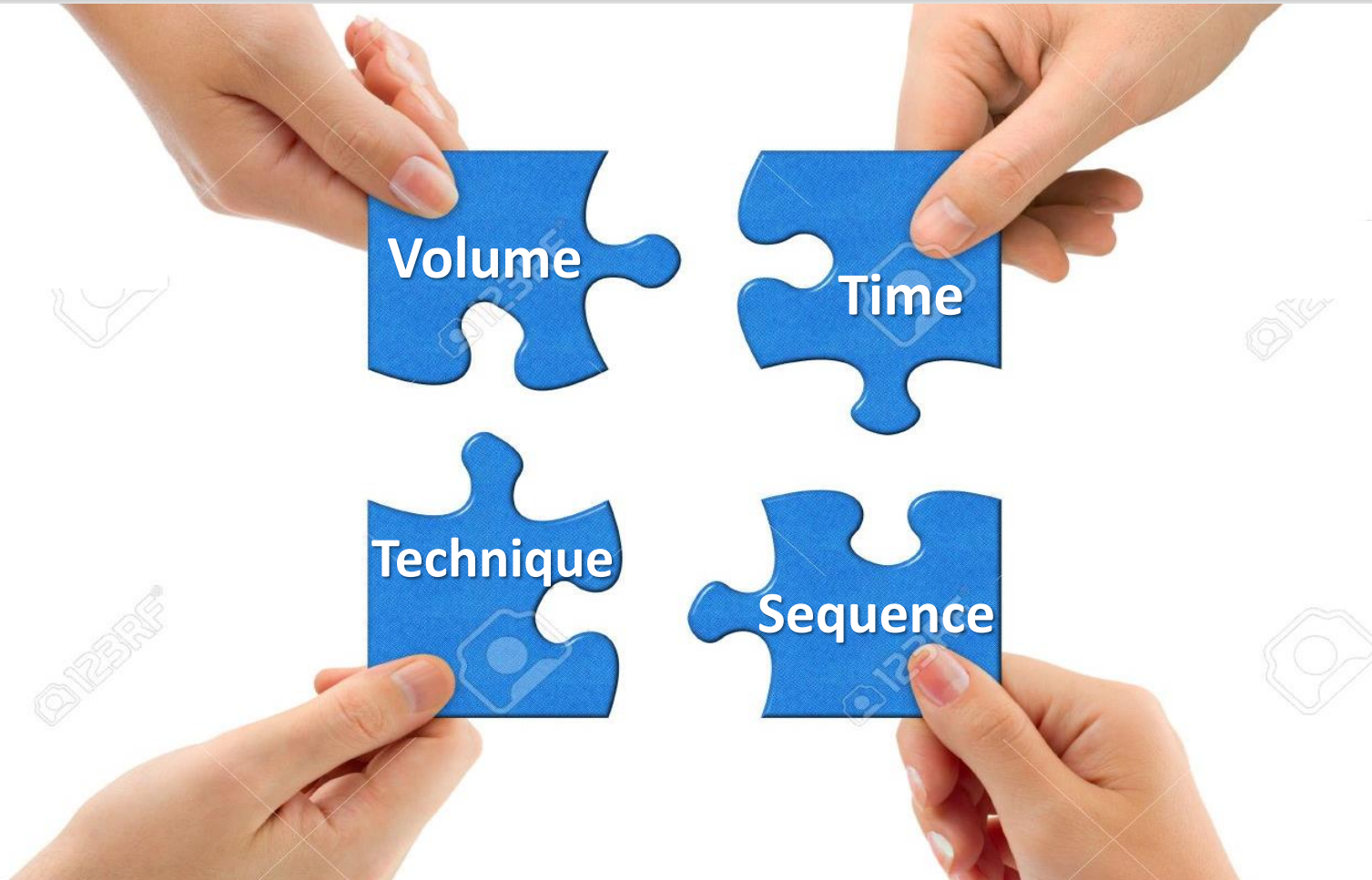
Patient Safety
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SAVE LIVES
Clean Your Hands

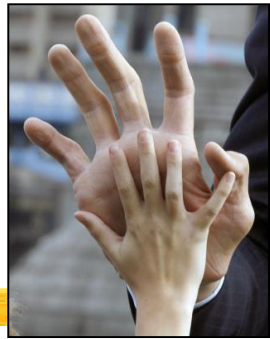
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May 2009

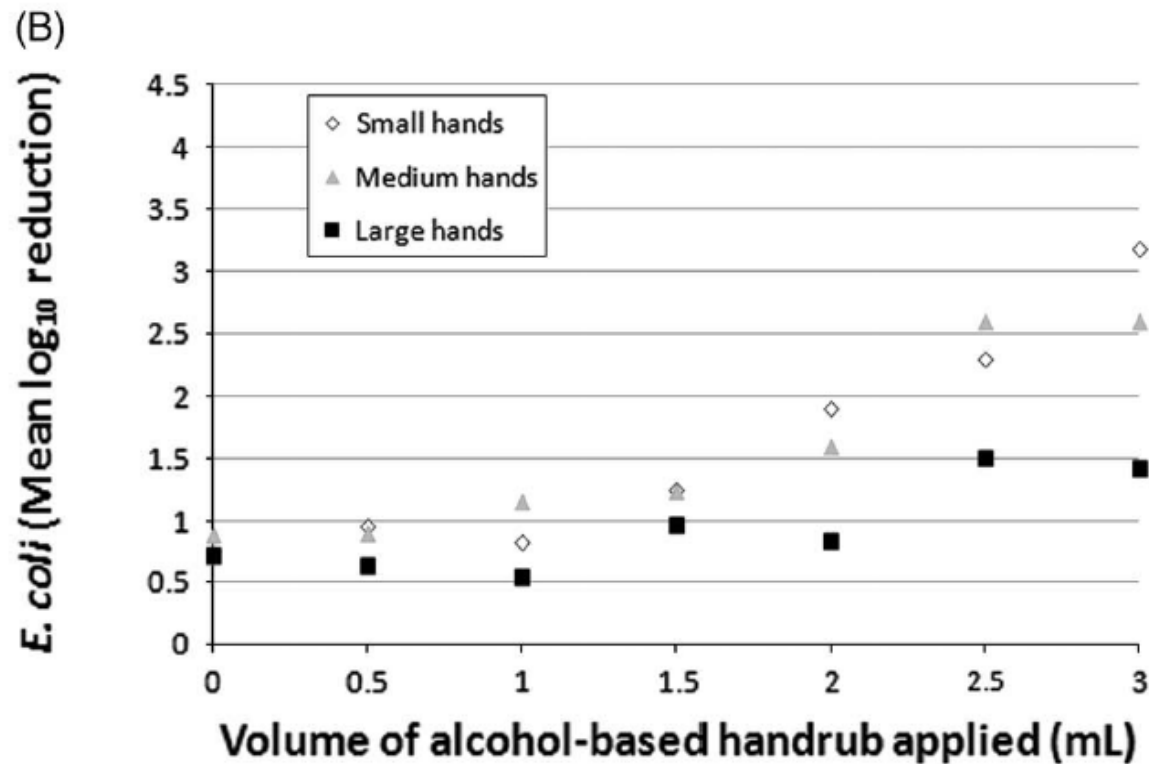
Which are the main components of a good hand hygiene performance?



ANTISSEPSE DAS MÃOS COM SOLUÇÃO ALCÓOLICA



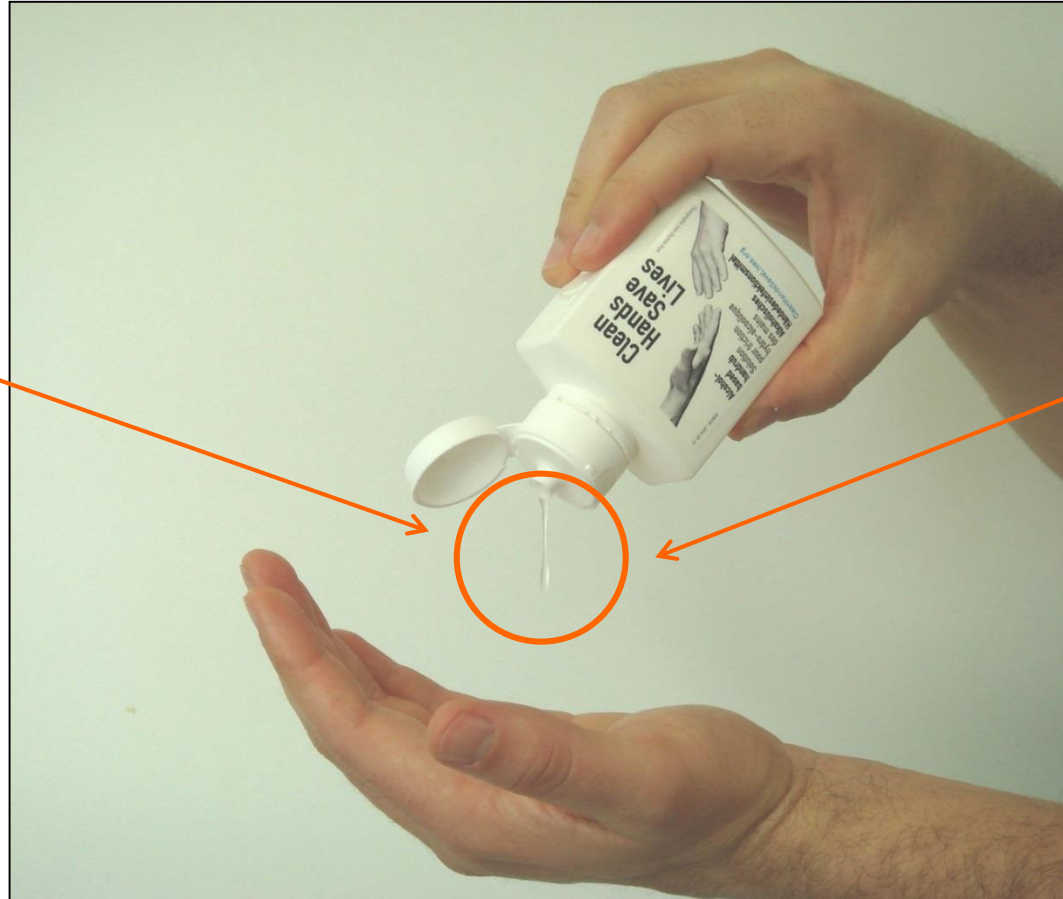
Importância do volume de solução alcóolica utilizado



What is the average volume of ABHR taken by healthcare workers in clinical practice?

0.73 mL
(0.27-1.61 mL)

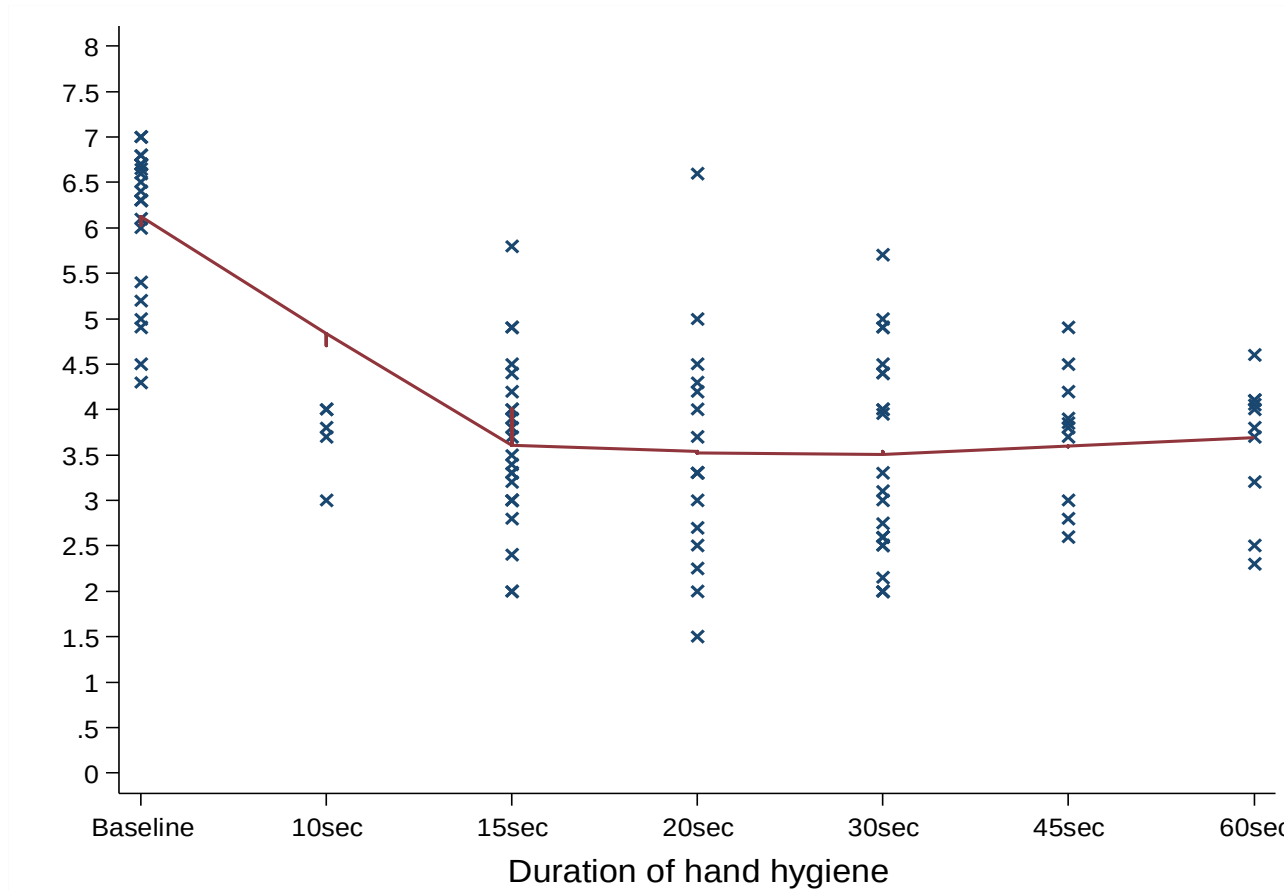
Antimicrobial Resistance
and Infection Control 2015
4(Suppl 1):P295.



1.17 mL

American Journal of Infection
Control 2013
41(11): 997-1000

Hand Hygiene With Alcohol-Based Hand Rub: How Long Is Long Enough?



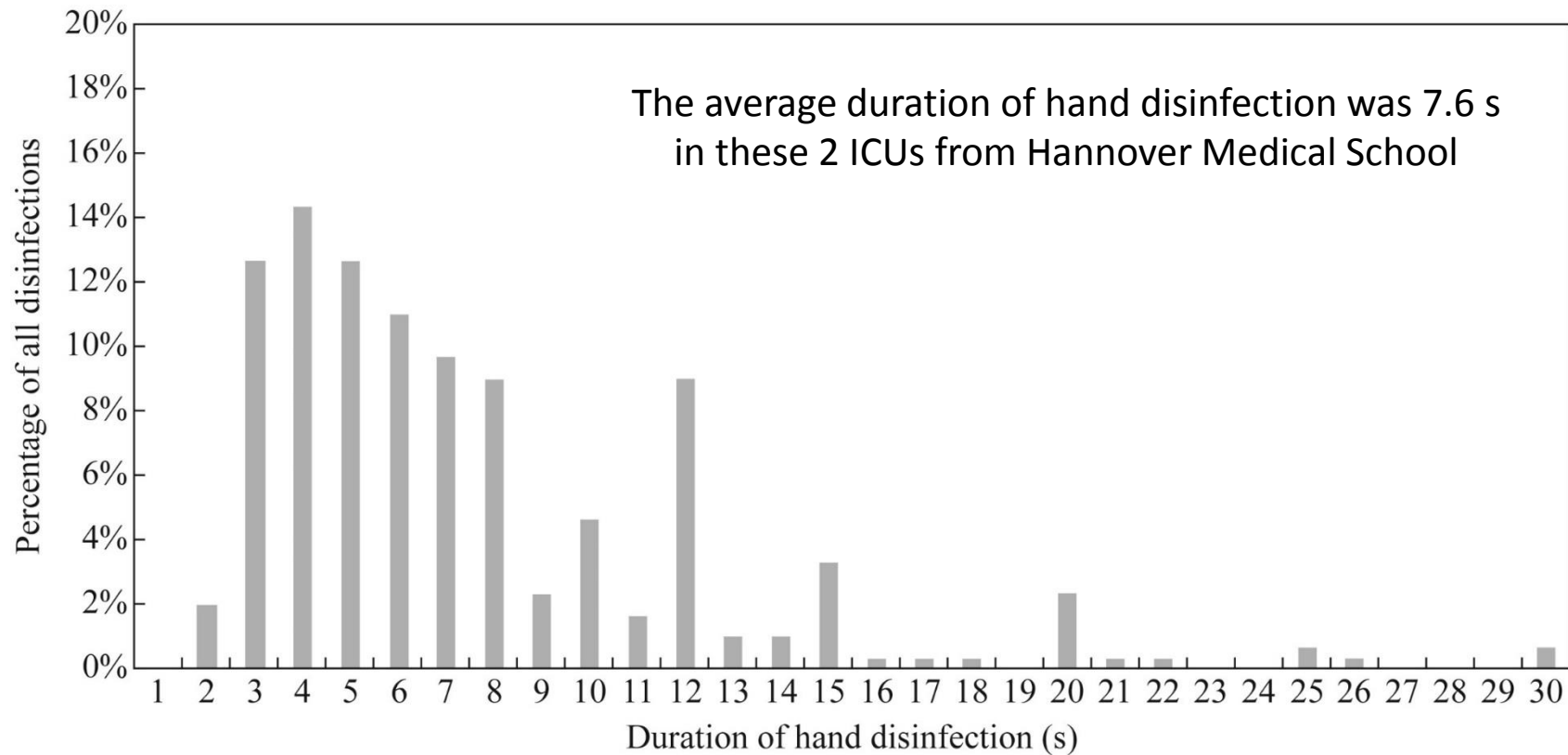
Do we really need 20-30 seconds of handrubbing?

Table 1: Activity of Sterillium® Comfort Gel against 11 Gram-positive ATCC strains and clinical isolates (15 s exposure time).

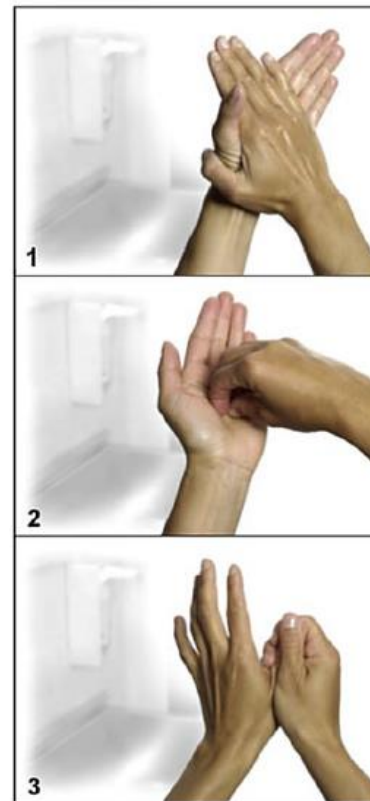
Bacterial species	Lowest RF (ATCC strain)	Lowest RF (clinical isolate)
<i>Enterococcus faecalis</i>	7.06	7.34
<i>Enterococcus faecium</i>	7.29	6.90
<i>Listeria monocytogenes</i>	6.34	6.23
<i>Micrococcus luteus</i>	5.48	5.38
<i>Staphylococcus aureus</i> including MRSA	6.29	6.58
<i>Staphylococcus epidermidis</i>	5.82	5.60
<i>Staphylococcus haemolyticus</i>	5.34	6.16
<i>Staphylococcus hominis</i>	5.38	5.41
<i>Staphylococcus saprophyticus</i>	6.60	5.41
<i>Streptococcus pneumoniae</i>	5.34	5.60
<i>Streptococcus pyogenes</i>	6.14	5.48

Experiments were done according to the US tentative final monograph; presentation of the lowest reduction factor (RF) of four replicate experiments for each test strain.

What is the average duration of handrubbing in clinical practice?



What about the technique of handrubbing?

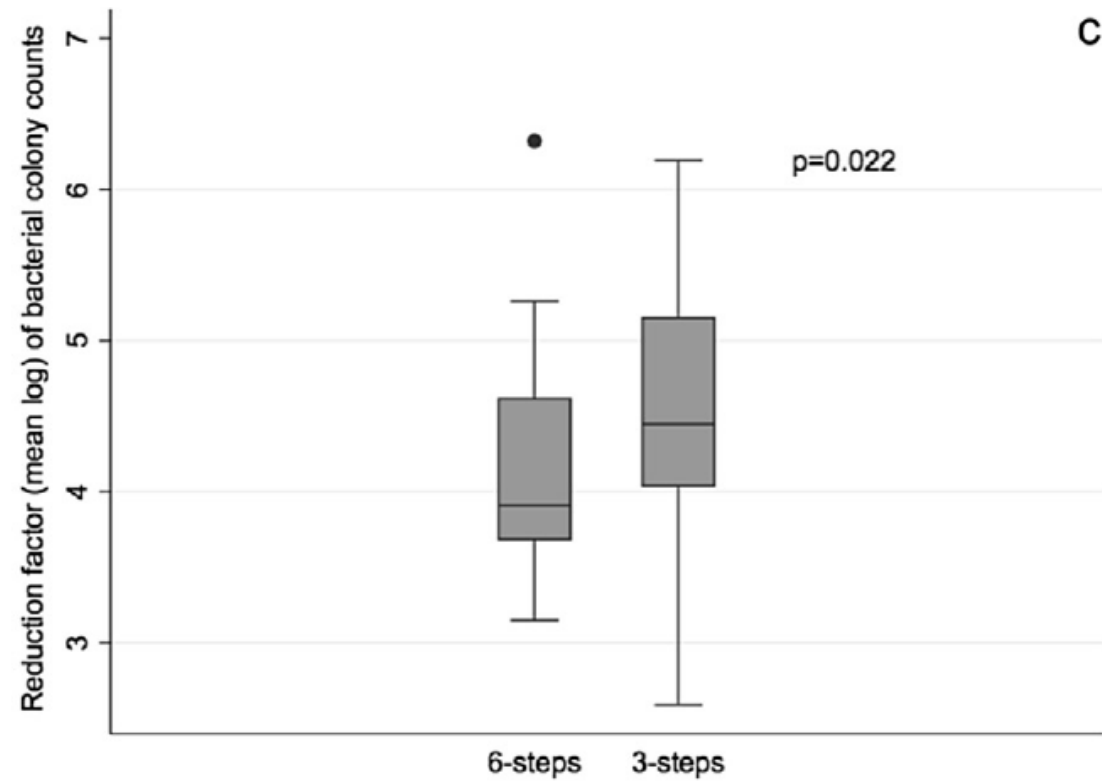


1. Cover all surfaces of the hands

2. Rotational rubbing of fingertips in the palm of the alternate hand

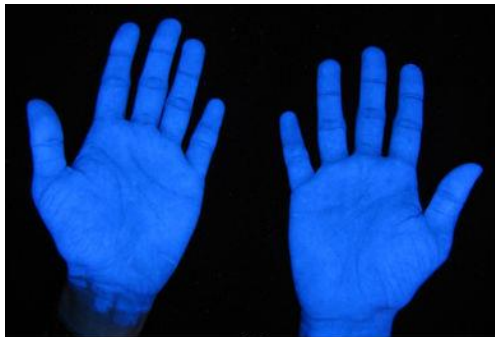
3. Rotational rubbing of both thumbs

6 steps x 3 steps



What is the average compliance with the WHO 6-steps standard technique?

In this observational study in Singapore, 72% of staff achieved satisfactory coverage of hands



(a)



(b)

Adequately decontaminated hands



(e)



(f)

Inadequately decontaminated hands

What is the average compliance with each one of the 6-steps in clinical practice?

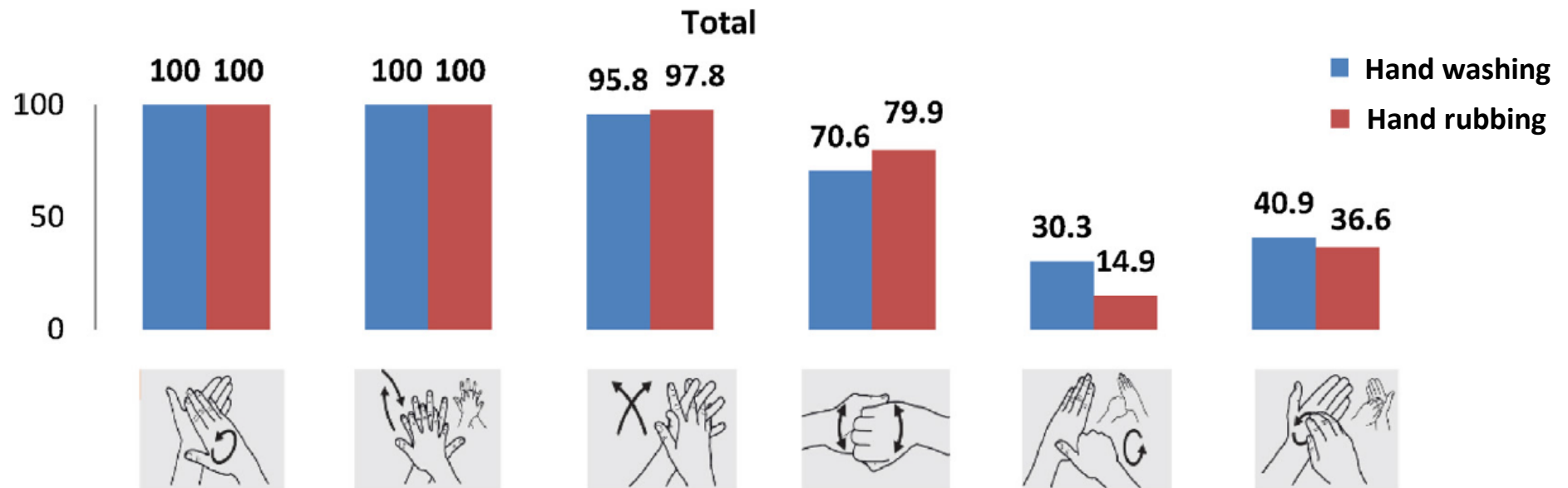
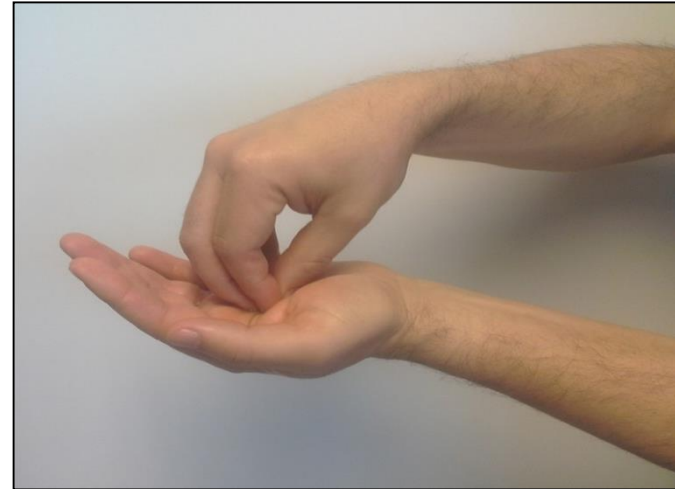


Figure 1 Compliance with hand hygiene according to step and category (per 100 observations).

What about the sequence of the WHO technique of handrubbing?



WHO standard technique



WHO fingertips-first technique

WHO “How to handrub”: standard technique x fingertips first

TABLE 1. Reduction of Bacterial Counts From Mean Baseline Values Depending on the Sequence of the Hand-Rubbing Technique^a

	Mean Baseline Count (n = 16)	Standard WHO Technique (n = 16)	WHO “Fingertips First” Technique (n = 16)	<i>P</i> Value
Globally	6.18 (±0.86, 6.35)	2.68 (±1.48, 2.85)	3.44 (±1.33, 3.20)	<.001 ^b
By hand size				
Small	5.30 (±0.85, 5.3)	3.40 (±1.83, 3.40)	3.95 (±1.84, 4.25)	<.001 ^c
Medium	6.22 (±0.80, 6.4)	2.57 (±1.62, 3.05)	3.10 (±1.59, 2.70)	<.001
Large	6.73 (±0.42, 6.7)	2.30 (±1.17, 2.05)	3.45 (±0.60, 3.35)	.001

^aData are log₁₀ values shown as mean (± SD, median).

^bFrom a mixed linear model with a random effect on the intercept.

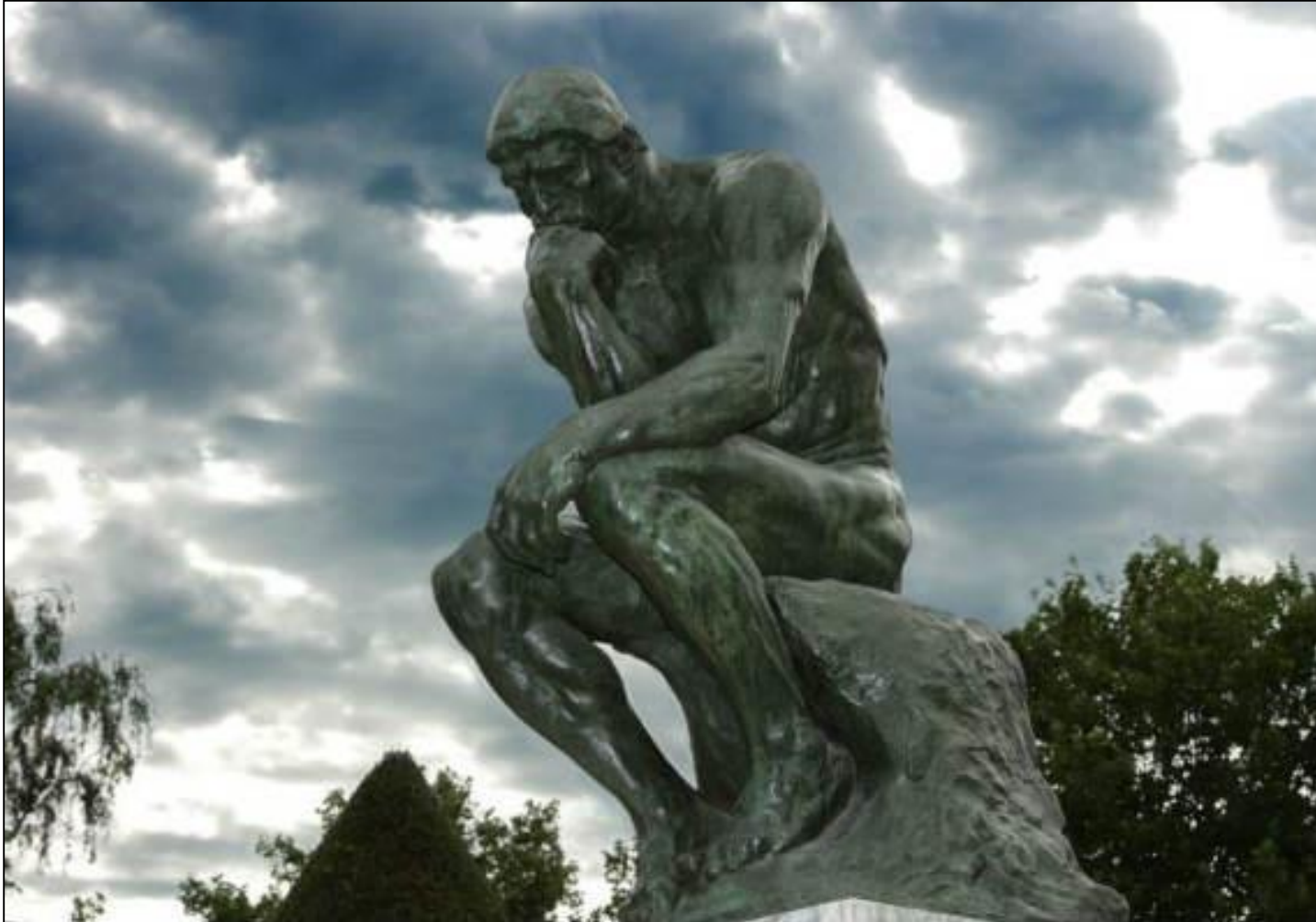
^cFrom a mixed linear model with a random effect on the intercept and an interaction between the sequence and hand size category.

Summarizing the scientific evidence and comparing it with existing Guidelines



	Volume of ABHR	Duration of friction	Technique/Sequence
CDC 2002	As indicated by the Manufacturer	Rub until hands dry	Cover all surfaces of hands and fingers
WHO 2009	A palm full	Rub for 20-30 seconds	6-steps standard technique
ICPIC 2017	Customized volume according to hand surface area (2-4mL or 5μl per cm²)	Rub for 15 seconds	- Unresolved issue, 3 steps? - Special attention to the fingertips

Por quê os profissionais da saúde não higienizam suas mãos
tanto quanto deveriam?



Por condições estruturais ou funcionais
impróprias...



Por falta de conhecimento ou habilidade técnica...



Por falta de comprometimento!





Proteja a vida daqueles que estão em suas mãos...



...aplique álcool nelas antes de tocá-los!

