Infection Control in Elderly Care Facilities – Where Should We Go?
Prof. Andreas Voss, Radboud University, The Netherlands
A Webber Training Teleclass

"Infection control in elderly care facilities - where should we go?"

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Hosted by Paul Webber
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www.webberraining.com December 15, 2016

IPC in different settings

- The differences between various countries and their way to do infection control in hospitals is large – the difference for elderly care settings are gigantic.
- Which type of elderly care setting are we talking about?
  - → nursing home (not home care – not ventilation unit)
- What is the background of audience
  - training and profession
  - in setting possibilities

2

IPC nursing home versus hospital

- Structure
  - e.g. Presence of single- and isolation-rooms, bed-pan washers, PPE, …
- Basic IPC practices not (fully) implemented
  - e.g. handhygiene, PPE-use, isolation not fitting with "home image"
- Surveillance
  - no (inter-)national definitions, routinely done?
- Guidelines
  - Who has a full set of IPC nursing home guidelines including MDRO, …
- Training/Education
  - basic training nurses/helpers, elderly-care MDs*, IPC-contact-nurses

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Nursing homes & infection control practices

Zhiqiu et al. Infect Control Hosp Epidemiol 2015;36:759 (Rochester, USA)

4

Nursing homes & infection control practices (n=1002 surveys)

NHs tend to follow voluntary infection control guidelines only if doing so does not require substantial financial investment in new/dedicated staff or infrastructure

Zhiqiu et al. Infect Control Hosp Epidemiol 2015;36:759 (Rochester, USA)

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Just as in the hosiptals …

… it's all about implementing the

6

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Implementing the BASICS

- Surveillance of AMR and HAI
- Antimicrobial stewardship
- Guidelines
- Training/Education
- Audits
- Handhygiene
- Isolation measures including PPE-use
- What do the "customers" want?

The difference between NH and H, and the list of "basics" are nearly identical:
→ **Basic IPC missing in NH**

[i]prevent[i]

Implementing the BASICS

- **Surveillance of AMR and HAI**
- Antimicrobial stewardship
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- Isolation measures including PPE-use
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[i]prevent[i]

ΨουΧαν'τΜαναγε ΩηατΨουΔον'τ Μεασυρε

-ΠετερΔρυχκερ-

[i]prevent[i]

CR-Acinetobacter in LTC

Infect Control Hosp Epidemiol. 2016 Aug;37(8):963-6. doi: 10.1017/ice.2016.84. Epub 2016 Apr 25.

Emergence of Carbapenem-Resistant Acinetobacter baumannii in Nursing Homes With High Background Rates of MRSA Colonization.

Cheng VC[1], Chen JH[2], Ng WC[3], Wong JY[3], Chow DN[3], Law TC[2], So SY[1], Wong SC[1], Chen TC[2], Chen FH[2], Ho PL[1], Yuen KY[1]

- 28 nursing homes in Hong-Kong
- Nasal, axillary and rectal swabs tested for CRAB, CRE, MRSA, and VRE

Cheng al. ICHE 2016;37:983 (Hong-Kong)

CR-Acinetobacter in LTC

- Overall MDRO colonization 35.1%
- MRSA 32.2%
- CRAB 6.5%
- CRE only 1 isolate, no VRE

Cheng al. ICHE 2016;37:983 (Hong-Kong)

Risk-factors in residents with CRAB and MRSA

	CRAB (OR)	MRSA (OR)
Bed-bound	2.70*	2.50*
Incontinence (diaper)	5.01*	1.78*
Nasgastric tube	2.98*	2.64*
Chron cerebral condition	ns	1.55*
Beta-lactam inhibitors	ns	2.34*

Cheng al. ICHE 2016;37:983 (Hong-Kong)

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CRE at hospital admission

Screening of nursing home residents for colonization with carbapenem-resistant Enterobacteriaceae admitted to acute care hospitals: Incidence and risk factors.

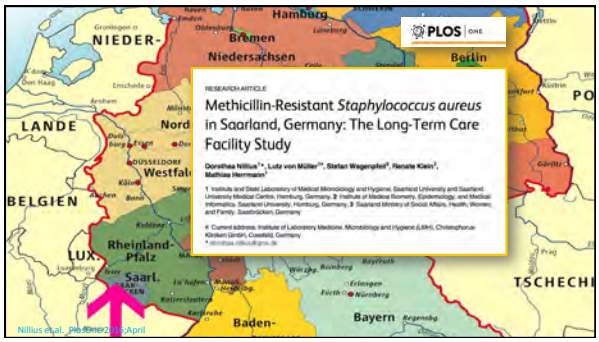
Author Information

[prevent] Cunha et al. AJIC 2016;44:126 13

CRE at hospital admission

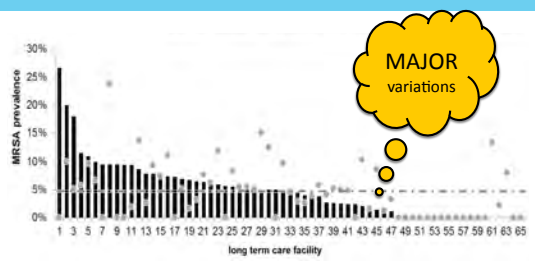
- Point prevalence survey to detect fecal carriage of CRE among 500 consecutive admissions from local nursing homes to 2 hospitals in Providence, Rhode Island.
- We performed a case-control study to identify risk factors associated with carriage of CRE.
- CRE was found in 23 (4.6%) of the 500 hospital admissions
- Use of a gastrostomy tube was associated with CRE carriage (P = .04).

[prevent] Cunha et al. AJIC 2016;44:126 14



Nillius et al. PlosOne 2016;April

MRSA in German LTCF



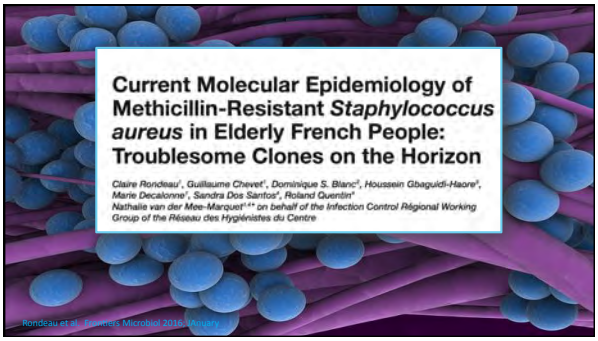
[prevent] Nillius et al. PlosOne 2016;April 16

Multivariate analysis of risk factors associated with MRSA

Risk factor	OR (95% CI); p-value
ulcer / deep soft tissue infection	6.61 (1.14–38.37); 0.035*
urinary tract catheter (UTC)	5.21 (1.84–14.76); 0.002**
multiple MRSA decolonisation cycles	2.79 (1.02–7.64); 0.046*

For multivariate analysis (logistic regression; backward; Wald), all univariate risk factors were used with the exception of 'skin barrier', 'infection', and results of rectal swabs (concomitant intestinal carriage of MDRO). Only significant risk factors depicted (** highly significant with p<0.01, * significant with p<0.05).

[prevent] Nillius et al. PlosOne 2016;April 17



Rondeau et al. Frontiers Microbiol 2016, January 4:16

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Epidemiology of MRSA in Elderly French

- Worryingly high prevalence of the *qacA/B* gene in MRSA isolates.
  - Antisepsis measures being crucial to prevent healthcare-associated infections, our findings raise questions about the potential risk associated with chlorhexidine use in *qacA*/B+ MRSA carriers
- NHs are a weak link in MRSA control.
- NHs to serve as reservoirs of USA300 clone for local HCFs

Rondeau et al. Frontiers Microbiol 2016; JAnuary

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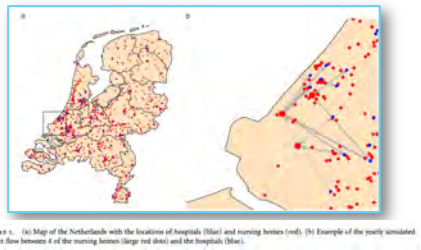
Role of NH in the spread of AMR



Van den Dool et al. ICHE 2016;37:761

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Role of NH in the spread of AMR

- Nursing homes are sufficiently connected to the hospital network to drive national epidemics
- Emerging pathogens can, in the absence of control measures, sustain or initiate nationwide outbreaks
- Negative surveillance data, which are often based on clinical infections and usually do not cover the entire healthcare system, should be interpreted with care and should not lead us to conclude prematurely that the healthcare network is well protected against outbreaks !

Van den Dool et al. ICHE 2016;37:761

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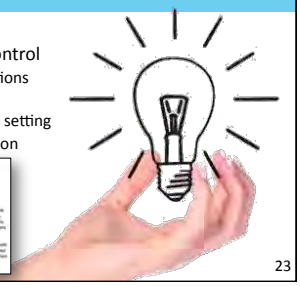
Surveillance of HAIs in nursing homes

- HAI data as the first step to control
  - At start (2007) no Dutch definitions
    - → first Dutch definitions made
  - Surveillance totally new for the setting
  - No "system" to support collection



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Prevalence App to support standardized collection

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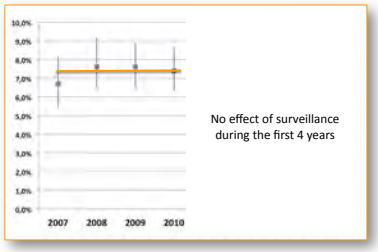
Prevalence of HAI's in nursing homes



No effect of surveillance during the first 4 years

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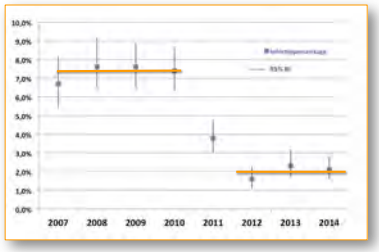
Prevalence of HAI's in nursing homes



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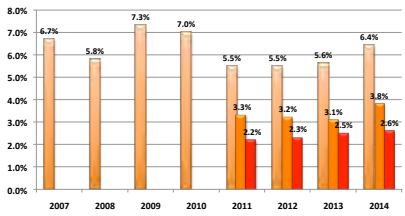
Add antimicrobial-use to prevalence surveillance

First step into AMS



Rx for HAIs

No HAIS

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Implementing the BASICS

- Surveillance of AMR and HAI
- **Antimicrobial stewardship**
- Guidelines
- Training/Education
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- Handhygiene
- Isolation measures including PPE-use
- What do the "customers" want?

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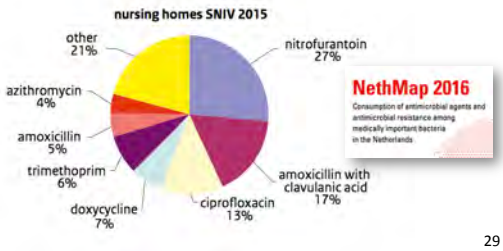
Point-Prevalence Study



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Point-Prevalence Study

NethMap 2016

ATC Group*	Therapeutic group	2011	2012	2013	2014
J01AA	Tetracyclines	5.4	6.8	7.2	4.7
J01CA	Penicillins with extended spectrum	4.9	6.6	5.0	5.0
J01CE	Beta-lactamase sensitive penicillins	0.3	0.2	0.4	0.4
J01CF	Beta-lactamase resistant penicillins	2.5	3.7	1.6	1.3
J01CR	Combinations of penicillins, incl. beta-lactamase-inhibitors	18.6	18.1	18.9	17.7
J01DB-DE	Cephalosporins	0.7	1.3	1.1	0.7
J01DF	Monobactams	0.0	0.0	0.0	0.0
J01DH	Carbapenems	0.1	0.0	0.0	0.0
J01EA	Trimethoprim and derivatives	2.3	2.0	2.7	2.2
J01EC	Intermediate-acting sulfonamides	0.1	0.1	0.0	0.0
J01EE	Combinations of sulfonamides and trimethoprim, including derivatives	3.5	2.7	1.3	1.5

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While the Dutch have AMS programs running in their hospitals for years
AMS in the nursing home setting is unknown (in the NL)

[]prevent[] Chopra et al Clin Infect Dis 2015;60:572 (LA, USA) 32

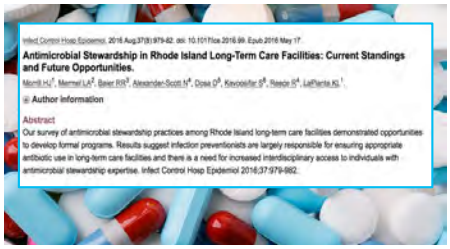
C. difficile in LTC

NEEDED: Bundle approach with a combination of infection control and antimicrobial management strategies

Antibiotic use in the previous 3 mo
History of previous *Clostridium difficile* infection
Fecal incontinence

[]prevent[] Chopra et al Clin Infect Dis 2015;60:572 (LA, USA) 33

AMS in Long-Term Care



[]prevent[] Morrill al. ICHE 2016;37:979 (Rhode-Island, USA) 34

AMS in Long-Term Care

- Formal AMS programs: 28%
- Budget support for AMS: 15%
- FTE for infection control: 74%
- FTE for AMS: 26%

	Facility-wide	AMS-specific
Infection preventionist	0.35	0.15
ID physician	0.03	0.02
Pharmacist	0.26	0.06
ID pharmacist	0.01	0.01

[]prevent[] Morrill al. ICHE 2016;37:979 (Rhode-Island, USA) 35

Van Buul al. J Am Med Dir Assoc 2015;16:229 (NL)

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Antibiotic prescribing in Dutch nursing homes

- Investigate the appropriateness of decisions to prescribe or withhold antibiotics for nursing home residents with infections of the urinary tract, respiratory tract, and skin.
- Prospective study in 10 NH's.
- Physicians completed a registration form for any suspected infection over an 8-month period, including patient characteristics, signs and symptoms, and treatment decisions.
- An algorithm, developed by an expert panel and based on national and international guidelines, was used to evaluate treatment decisions for appropriateness of initiating or withholding antibiotics.

[]prevent[] Van Buul al. J Am Med Dir Assoc 2015;16:229 (NL) 37

Antibiotic prescribing in Dutch nursing homes

- Of 598 treatment decisions 76% were appropriate,
  - 74% with cases that were prescribed antibiotics
  - 90% with cases in which antibiotics were withheld (p = .003).
- Decisions around UTI were least often appropriate (68%).
- The most common situations in which antibiotic prescribing was considered inappropriate were asymptomatic bacteriuria and viral RTI.
- Antibiotic consumption can be reduced by improving appropriateness of treatment decisions, especially for UTI.

[]prevent[] Van Buul al. J Am Med Dir Assoc 2015;16:229 (NL) 38

Implementing the BASICS

- Surveillance of AMR and HAI
- Antimicrobial stewardship
- **Guidelines**
- Training/Education
- Audits
- Handhygiene
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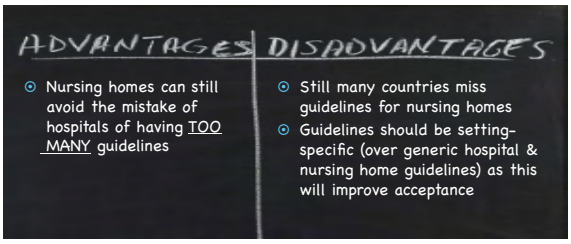
- What do the "customers" want?

[]prevent[] 39

Guidelines



[]prevent[] 40

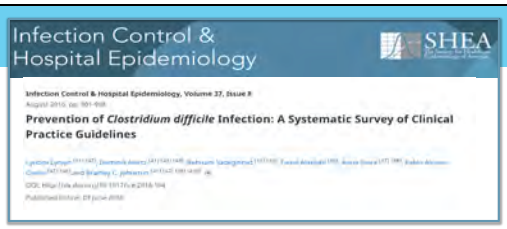
Dutch MDRO guideline

Tabel 2 Infectiepreventiemaatregelen[1] per BRMO bij incidentele cliënten met een BRMO

Micro-organisme	Persoonlijke beschermingsmiddelen				1-persoons kamer/ appartement	Sanitair		Bezoek aan gemeenschappelijke verblijfruimte
	HH	Gloves	Gown	Mask		Toilet/po(stoel)	Badkamer	
Enterobacteriaceae (incl. ESBL, excl. CPE)	Ja[3]	Ja[3]	Ja, halter[3]	Nee[3]	Nee	Cliëntgebonden	Delen mogelijk[3]	Ja[3]
CPE	Ja[3]	Ja[3]	Ja, lange mouw[3]	Nee[3]	Ja[7]	Cliëntgebonden	Cliëntgebonden	Afhankelijk van individuele situatie[3]
Acinetobacter species	Ja[3]	Ja[3]	Ja, lange mouw[3]	Nee[3]	Ja[7]	Cliëntgebonden	Cliëntgebonden	Afhankelijk van individuele situatie[3]
Pseudomonas aeruginosa Stenotrophomonas maltophilia	Ja[3]	Ja[3]	Ja, halter[3]	Nee[3]	Nee	Cliëntgebonden	Delen mogelijk[3]	Ja[3]
Streptococcus pneumoniae (PRP)	Ja[3]	Ja[3]	Ja, halter[3]	Ja, FFP1[10]	Ja[7,11]	Delen mogelijk	Delen mogelijk[3]	Ja, mits[8,10]
Enterococcus faecium (VRE)	Ja[3]	Ja[3]	Ja, halter[3]	Nee[3]	Ja, bij voorkeur[7]	Cliëntgebonden	Cliëntgebonden	Ja[3]
Overname buiten-landse zorginstelling	Ja[3]	Ja[3]	Ja, lange mouw[3]	Nee[9,10]	Ja[7]	Cliëntgebonden	Cliëntgebonden	Afhankelijk van individuele situatie[9,12]

[]prevent[] 41

Infection Control & Hospital Epidemiology



Clinical Practice Guidelines (from APIC, SHEA/ IDSA, ESCMID, …) do not adhere well to AGREE II reporting standards …

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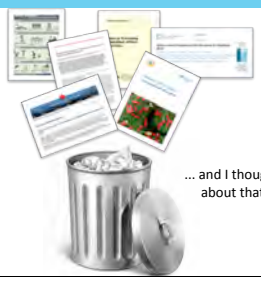
Survey of *C. difficile* guidelines



... and I thought it's all about that they work

[prevent] 43

Implementing the BASICS

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- What do the "customers" want?

[prevent] 44

IPC Training & Education

- Far less offers for IPC T&E in nursing homes
- Many countries have no specially trained IPC-nurses for NH or can't train them on the job
  - NL only training for IPC-nurses in hospital setting recognized
    → Nurses working in NH should be able to get trained as IPC-nurse
- As the chance of enough IPC nurses is very low, a network of "IPC link nurses" including T&E should be established
  - Basic course and yearly booster course
  - Continuous contact with coordinating ICP-nurse (questions, tasks, …)

[prevent] 45

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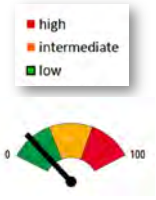
[prevent] 46

Willemsen et al (provisional PDF online, ARIC 2014

Quality of IC in Dutch Nursing Homes

A. Availability of local guidelines
B. Shortcomings in constraints
   HH and dress-code compliance, separation clean/dirty, storage sterile materials, needle container, waste containers, PPE, …
C. HAIs
D. Use of medical devices
E. Environmental contamination
F. Antimicrobial use
G. ESBL carriage



[prevent] Willemsen et al (provisional PDF online, ARIC 2014 48

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Quality of IC in Dutch Nursing Homes

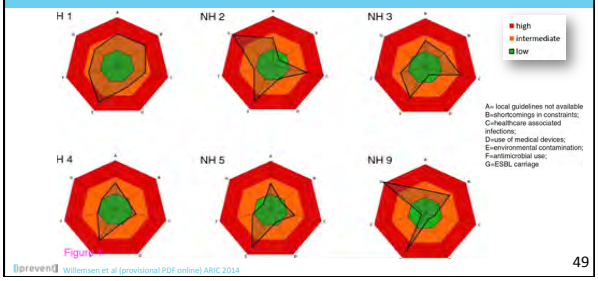

Figure 1
Willemsen et al (provisional PDF online) ARIC 2014

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IPC Certificate

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IPC Certificate

- Presence of Infection Control Committee
- MUO with Public-health Service
- Trained Link nurses and/or IPC-nurse present
- Guidelines
  - MRSA, personal hygiene, hand hygiene, Flu, UTI prevention, Norovirus
- Prevalence of HAIs
- Incidence of UTIs

Per bullet different "checkable" itmes and points. Certificate given at certain amount of points.
e.g. ICC – code of conduct, meeting minutes, minimum number of meetings

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IPC Certificate

- Aim of the certificate was to introduce basic Infection Control into the regional nursing homes
- The content of the certificate should be agreed on locally (together with MDs from nursing homes)
- Nursing homes were allowed to go on their own speed and got the certificate when reaching 80% of the goals
- The idea is to continue step-wise with new certificates, alsways taking the content of the earlier certificate along

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Audits

- Whether it is the "IRIS-scan" or "a Certificate", or any other standardized audit tool, audits allows insights into the standing of an institution and thus motivation and guidance to improve
  - only for internal use and anonymous comparison (no external use)

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How many moments?

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The moments

Some examples may be:

- shaking hands, stroking an arm
- helping a resident to move around, get washed, giving a massage
- taking pulse, blood pressure, chest auscultation, abdominal palpation

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The moments

Some examples may be:

- oral/dental care, giving eye drops, secretion aspiration
- skin lesion care, wound dressing, subcutaneous injection
- catheter insertion, opening a vascular access system or a draining system
- preparation of medication, dressing sets

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The moments

Some examples may be:

- oral/dental care, giving eye drops, secretion aspiration
- skin lesion care, wound dressing, subcutaneous injection
- drawing and manipulating any fluid sample, opening a draining system, endotracheal tube insertion and removal
- clearing up urine, faeces, vomit, handling waste (bandages, napkin, incontinence pads), cleaning of contaminated and visibly soiled material or areas (bathroom, medical instruments)

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The moments

Some examples may be:

- shaking hands, stroking an arm
- helping a resident to move around, get washed, giving a massage
- taking pulse, blood pressure, chest auscultation, abdominal palpation
- changing bed linen
- monitoring alarm
- holding a bed rail
- clearing the bedside table

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HH in NH: a systematic review

Impact of hand hygiene on the infectious risk in nursing home residents: A systematic review.

Hooine MN[1], Temime L[2].

Author information

[1]Laboratoire Modélisation, Epidémiologie et Surveillance des Risques Sanitaires, Conservatoire national des arts et métiers, Paris, France.
[2]Laboratoire Modélisation, Epidémiologie et Surveillance des Risques Sanitaires, Conservatoire national des arts et métiers, Paris, France. Electronic address: laura.temime@cnam.fr

Hooine & Temime AJIC 2015;43:e47 (France)

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HH in NH: a systematic review

- Systematically review of studies on HH in nursing homes.
- 56 studies met the inclusion criteria.
  - Most were outbreak reports (39%), followed by observational studies (23%), controlled trials (23%), and before-after intervention studies (14%).
- 35 studies (63%) reported results in favor of HH on at least one of their outcome measures; in addition, the infection control success rate was higher when at least one HH-related intervention was included (70% vs 30% for no intervention).

Hooine & Temime AJIC 2015;43:e47 (France)

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More studies and better methods needed

Hooine & Temime AJIC 2015;43:e47 (France)

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Patient Hand Hygiene

- Little emphasis on **patient** hand hygiene
- Systematic review
  - 10 studies, uncontrolled, before-after
  - Multi-modal intervention many including HCWs
- Interventions to improve patient hand hygiene may reduce the incidence of HAIs and improve hand hygiene rate, but the quality of evidence is low.

Srigley et al. J Hosp Infect 2016;94:23-29

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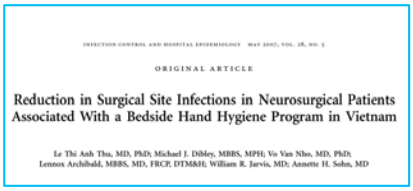
Patient Hand Hygiene
one of the best of the 10 studies



Thuet al. ICHE 2007;28:583

65

Patient Hand Hygiene

Hand sanitizer was provided in 500-mL, wall-mounted and bed-mounted dispensers for use **by staff, patients, and visitors**. Additional bottles of hand sanitizer were available on medication and treatment carts. Portable 100mL bottles also were provided to **nursing staff and doctors** to carry in their pockets.

Best of the 10 studies but is was mainly directed at HCWs and was the change from soap and water to alcohol-based handrub!

Thu et al. ICHE 2007;28:583

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Infection Control in Elderly Care Facilities – Where Should We Go?
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Patient HH participation

Yes, they can (and should) ….
But the evidence that their HH helps is **ZERO !**

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Norovirus and Hand Hygiene

Assab et al. BMC Infect Dis 2016 (France)

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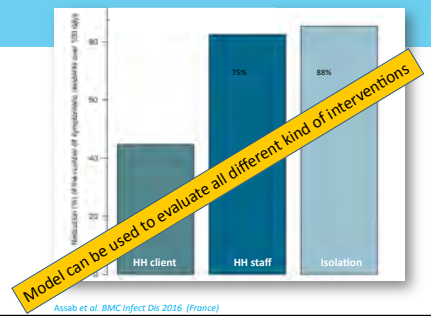
Norovirus and Hand Hygiene

- Stochastic compartmental model of norovirus transmission based on the residents and staff of a 100-bed NH in France.
- Using this model, we investigated how the size of a 100-day norovirus outbreak changed following three interventions:
  - increasing staff hand hygiene (HH)
  - increasing resident HH
  - isolating symptomatic residents

Assab et al. BMC Infect Dis 2016 (France)

69



Assab et al. BMC Infect Dis 2016 (France)

70

Implementing the BASICS

- Surveillance of AMR and HAI
- Antimicrobial stewardship
- Guidelines
- Training/Education
- Audits
- Handhygiene
- **Isolation measures including PPE-use**
- What do the "customers" want?

71

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- Handhygiene
- Isolation measures including PPE-use
- **What do the "customers" want?**

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What do the "customers" want?

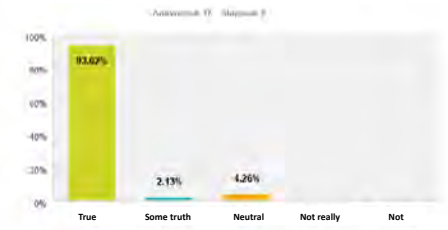
- While HCWs in nursing homes have strong opinions about the wishes of their clients
  - pilot study among nursing home clients in Nijmegen region (n=47)

73

I did hear about IPC and AMR

74

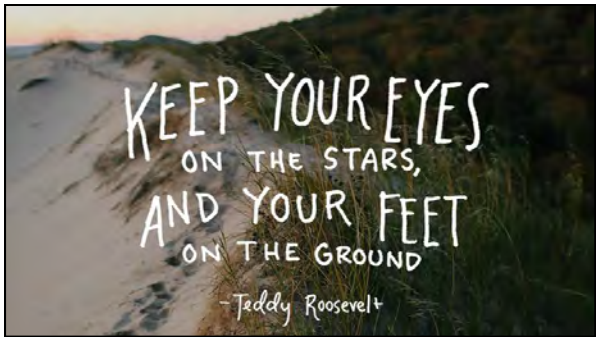
IPC is important for me



75

Next steps …

76



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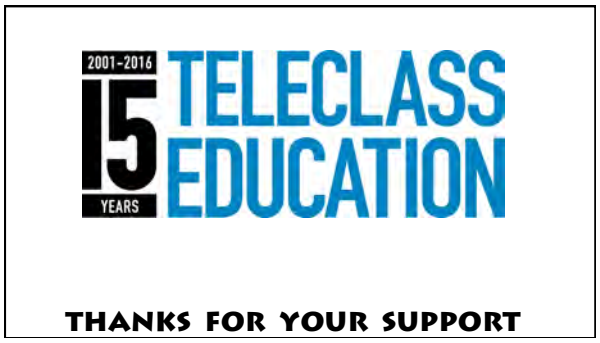

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