Empowering Patients to Prevent Healthcare-Associated Infections

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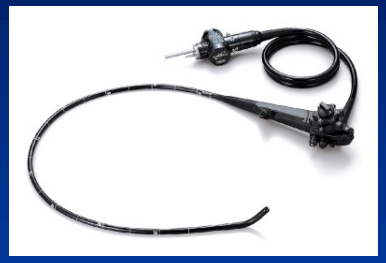
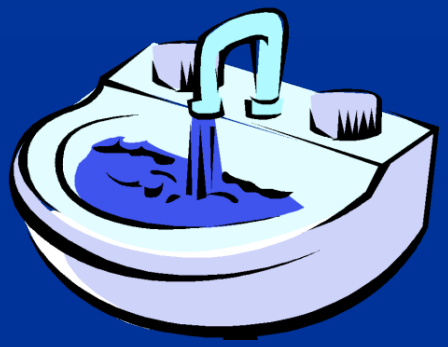
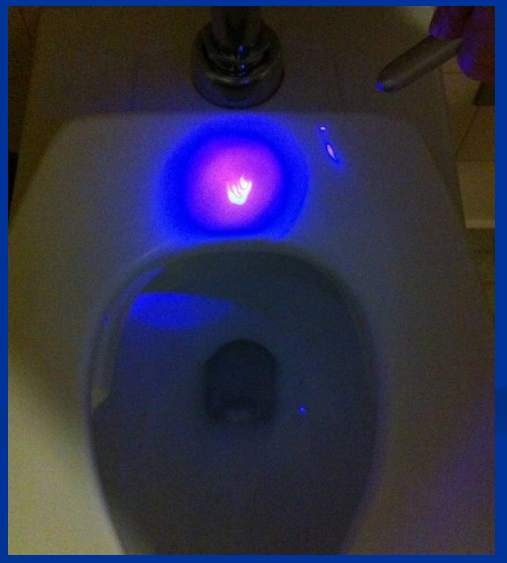
Hosted by Martin Kiernan

Disclosures: Research support from Clorox and Ushio America; Advisory board Ideate Medical

Transmission of healthcare pathogens







Objectives

- 1. To identify areas where empowerment of patients could enhance infection control and antimicrobial stewardship efforts
- 2. To review evidence that patient empowerment interventions can improve infection control practices and reduce healthcare-associated infections (HAIs)
- 3. To implement bundled measures that patients and families can use to reduce the risk for HAIs

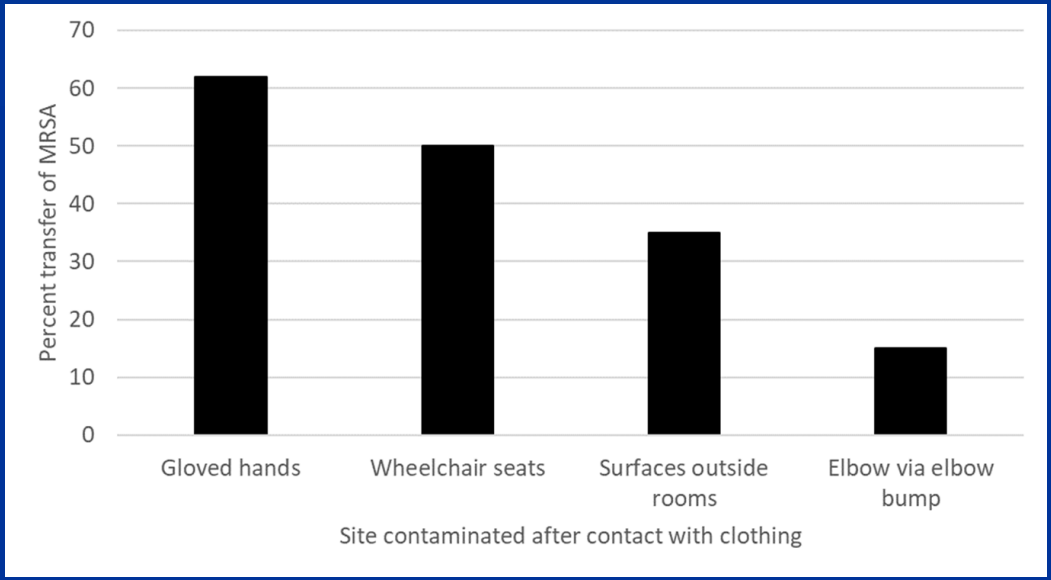
Donskey CJ. Empowering patients to prevent healthcare-associated infections. Am J Infect Control 2023;51(11S):A107-A113. doi: 10.1016/j.ajic.2023.03.008.

Why are patient empowerment initiatives needed?

Patients often do not appreciate the risk for healthcare-associated infections and do not have adequate knowledge of actions they can take to prevent infections.

Hands, skin, and clothing of colonized patients can transfer pathogens

MRSA transfer from clothing of patients[1-4]



1. Kanwar A. Contaminated clothing of MRSA carriers is a potential source of transmission. AJIC 2018;46:1414-16 (frequent transfer from clothing to hands of personnel and surfaces); 2. Pinto-Herrera NC. Transfer of MRSA by fist bump versus handshake. ICHE 2020;41:962-964 (22% vs 16%); 3. Alhmidi H. Transfer of MRSA by fist bump vs elbow bump. ICHE 2023;44:319-321; 4. Li DF. LTCF residents with MRSA carriage disseminate MRSA and viral surrogate markers to surfaces outside their rooms. ICHE 2021;42:1018-19.

Are my family members at risk to acquire MRSA (C. diff, C. auris, VRE) from me?

Patients are often unaware of the risks associated with devices, antibiotics, procedures

Patients not informed that urinary catheters increase risk for UTI

Surveys of patients with short-term urinary catheters

	Cleveland (2012)	U. Wisconsin (2016)
Catheters cause significant discomfort	35%	50%
Informed of increased UTI risk	47%	35%
Aware catheters are overused in hospitals	11%	-

Greer S. Survey of patients' knowledge and opinions regarding the use of indwelling urinary catheters. Infect Control Hosp Epidemiol 2011;32:174-6; Safdar N. Patient perspectives on indwelling urinary catheter use in the hospital. Am J Infect Control. 2016 1;44:e23-4.

An 80-year-old woman develops bacteremia due to a PICC line maintained unnecessarily for 3 weeks

Anderson M. Are hospitalized patients aware of the risks and consequences of central line-associated bloodstream infections? AJIC 2013;41:1275-7 (only 22% of patients with central lines recalled that a provider discussed the risk of infection).

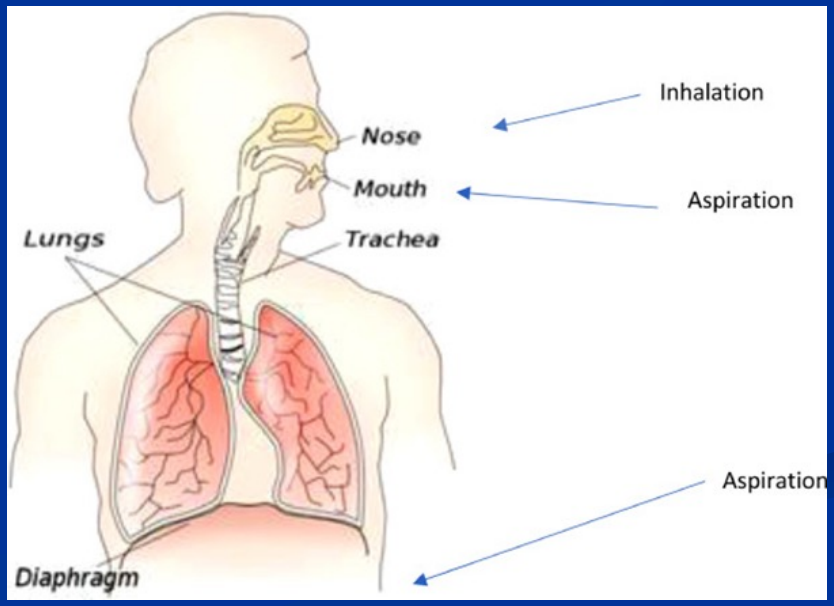
Patients not aware that antibiotics pose a risk for *C. difficile* infection (CDI)

- Healthy 35-year-old developed CDI after receiving clindamycin for a root canal
  - Dental guidelines: Prophylaxis not recommended; clindamycin should be avoided
- "No one told me that I could get C diff from clindamycin"

ADA. Oral health topics: Antibiotic prophylaxis prior to dental procedures. ADA website. 2020. https://www.ada.org/en/ member-center/oral-health-topics/antibiotic-stewardship.
Suda KJ. Use of Antibiotic Prophylaxis for Tooth Extractions, Dental Implants, and Periodontal Surgical Procedures. Open Forum ID 2017; 3. Gross AE. Serious antibiotic-related adverse effects following unnecessary dental prophylaxis in the US. ICHE 2021;42:110-12

Patients not aware that oral hygiene may reduce risk for pneumonia

- Most common HAI (pneumonia)
- Pathogenesis: Oral colonization --> aspiration
- Daily toothbrushing reduces hospital-acquired pneumonia

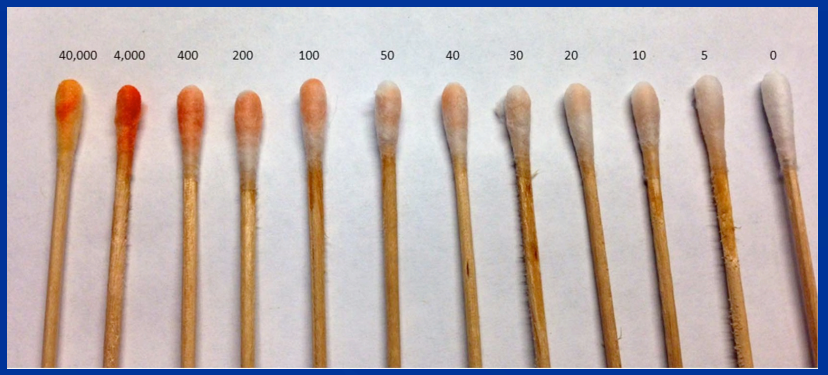


Ehrenzeller S. Association Between Daily Toothbrushing and Hospital-Acquired Pneumonia A Systematic Review and Meta-Analysis. JAMA Intern Med 2025.

Patients often receive inadequate instructions

- 26% of surgical patients did not receive instructions on chlorhexidine (CHG) bathing
- Neck often negative for CHG (Instructions: apply from neck down)
- Instructions modified

Colorimetric assay for CHG



Supple L. Chlorhexidine Only Works If Applied Correctly: Use of a Simple Colorimetric Assay to Provide Monitoring and Feedback on Effectiveness of Chlorhexidine Application. ICHE 201;36:1095-7; Donskey CJ, Deshpande A. Effect of chlorhexidine bathing in preventing infections and reducing skin burden and environmental contamination: A review of the literature. AJIC 2016;44: 5 Suppl:e17-21; Use of a simple colorimetric assay to provide monitoring and feedback on adherence to chlorhexidine bathing protocols. AJIC 2020;48:469-470.

Education of patients with *C. difficile* infection (CDI) is suboptimal

Education topic	% of patients who agree that education was provided	Recommended
How to clean your home	43%	Use bleach or another sporicidal disinfectant
How to clean your hands	62%	Soap and water
What to do if given an antibiotic prescription	13%	Consult primary provider
Whether to take a probiotic	13%	Unclear benefit

DeBenedictus CM. What is the current state of patient education after CDI? Infect Control Hosp Epidemiol 2020;41:1338-40.

Confusion about products

Patients not aware of when C. diff testing is indicated

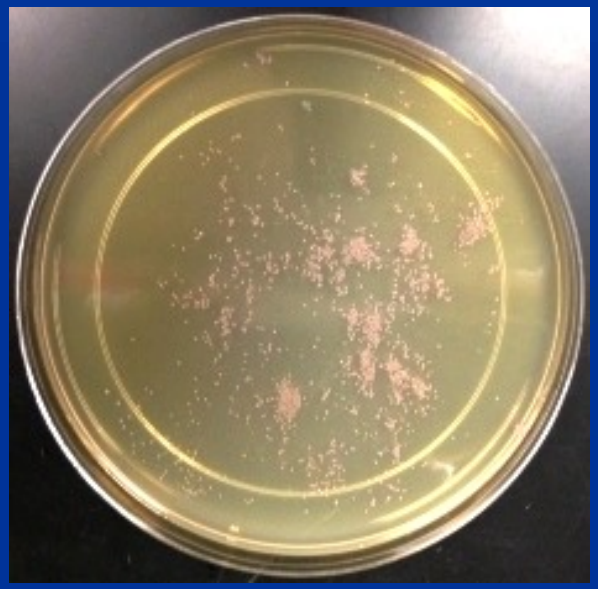
- Interviews of patients tested for *C. difficile*
- Patients often reported diarrhea without meeting criteria for testing (≥3 unformed stools/24 h)
- Education could empower patients to participate in efforts to reduce inappropriate CDI testing

Pora GM, Ng-Wong YK, Donskey CJ. How smart is the chart? Completeness of the medical record in documenting diarrhea in patients tested for *Clostridioides difficile* infection. ICHE 2023;44:1896-7.

Patients not aware that hospital floors pose a risk for acquisition of pathogens

Hospital socks

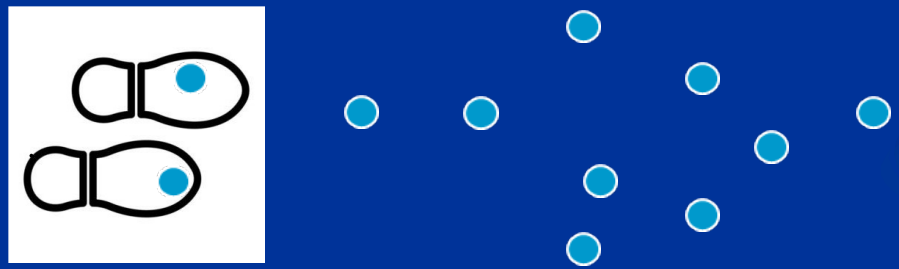
Sock print (MRSA)



Call button on floor

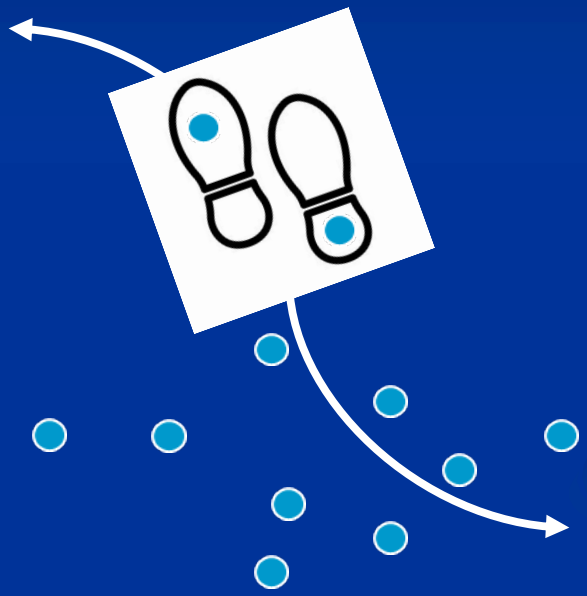
Deshpande A. Are floors an underappreciated reservoir for transmission of health care-associated pathogens? AJIC 2017;45:336-338; Galvin J. Patient shoe covers: transferring bacteria from the floor onto surgical bedsheets. AJIC 2016;44:1430-2; Mahida N, Boswell T. Non-slip socks: a potential reservoir for transmitting multidrug resistant organisms in hospitals? J Hosp Infect 2016;94:273-5 (VRE recovered from 85% of socks and MRSA from 9%).

Hospital floors rapidly become contaminated when personnel enter the room



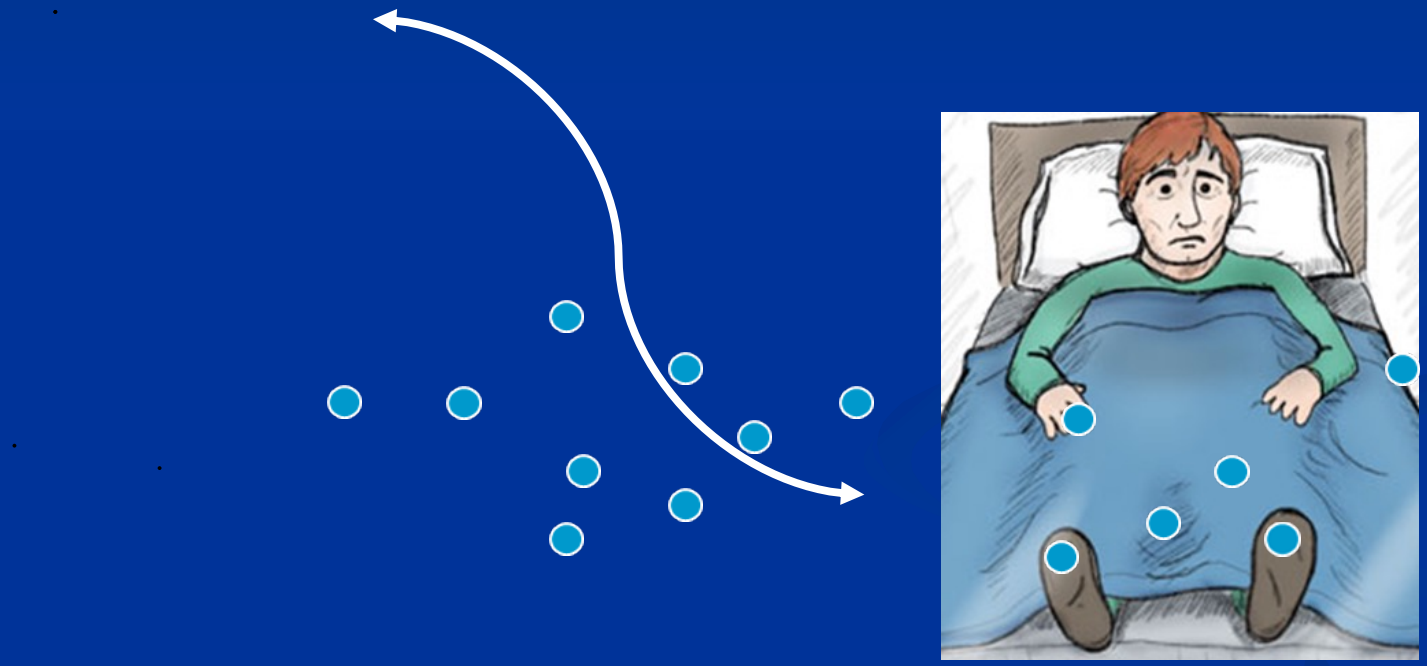
Redmond SN. Timing and route of contamination of hospitalized patient rooms with healthcare-associated pathogens. Infect Control Hosp Epidemiol 2021:1-6.

Hospital socks acquire pathogens when patients walk on the floor



Redmond SN. Timing and route of contamination of hospitalized patient rooms with healthcare-associated pathogens. Infect Control Hosp Epidemiol 2021:1-6.

Pathogens are transferred from socks to bedding, hands, high-touch surfaces

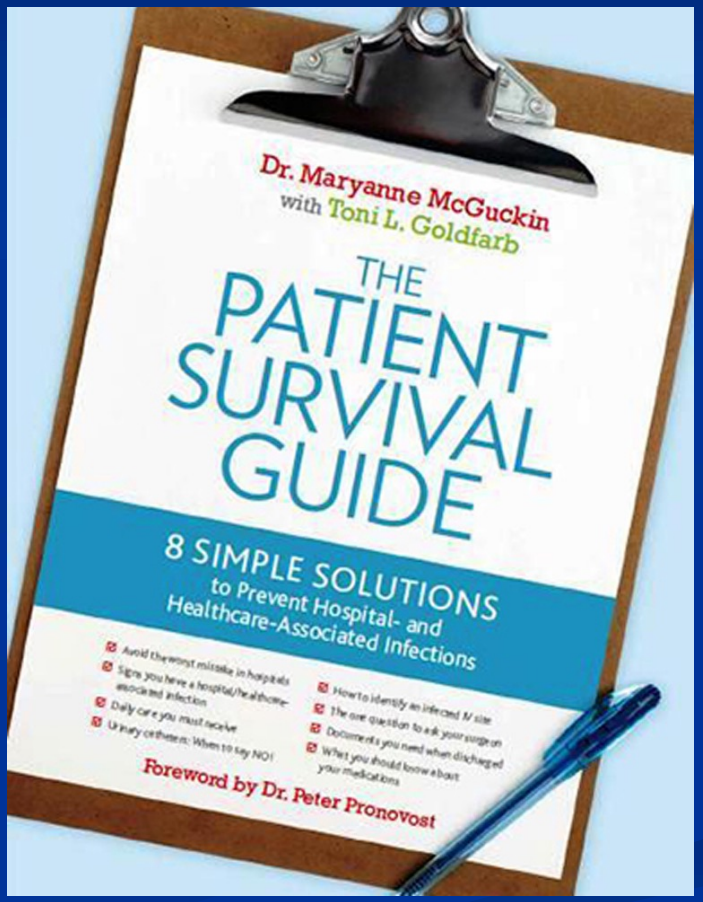


Redmond SN. Timing and route of contamination of hospitalized patient rooms with healthcare-associated pathogens. Infect Control Hosp Epidemiol 2021:1-6.

Evidence that patient empowerment interventions can improve infection control practices and reduce HAIs

Empowering patients to improve personnel hand hygiene

- "Partners in Your Care"[1]
  - Patients ask personnel if they have washed their hands
- Evaluation at Cleveland VA[2]
  - Only 3% reminded personnel
  - 100% displayed a sign
- Healthcare system[3]
  - Anonymous monitoring by patients and visitors



McGuckin M. Patient education model for increasing handwashing compliance. AJIC 1999;27:309-14; Lent V. Evaluation of patient participation in a patient empowerment initiative to improve hand hygiene practices in a VA medical center. AJIC 2009;37:117-20; Auld D. Patient and Visitor Engagement in Improving Healthcare Personnel Hand Hygiene: A Multihospital Pilot Program. Am J Infect Control 2025 Dec 8:S0196-6553(25)00741-2.

Patient hand hygiene

Editorials

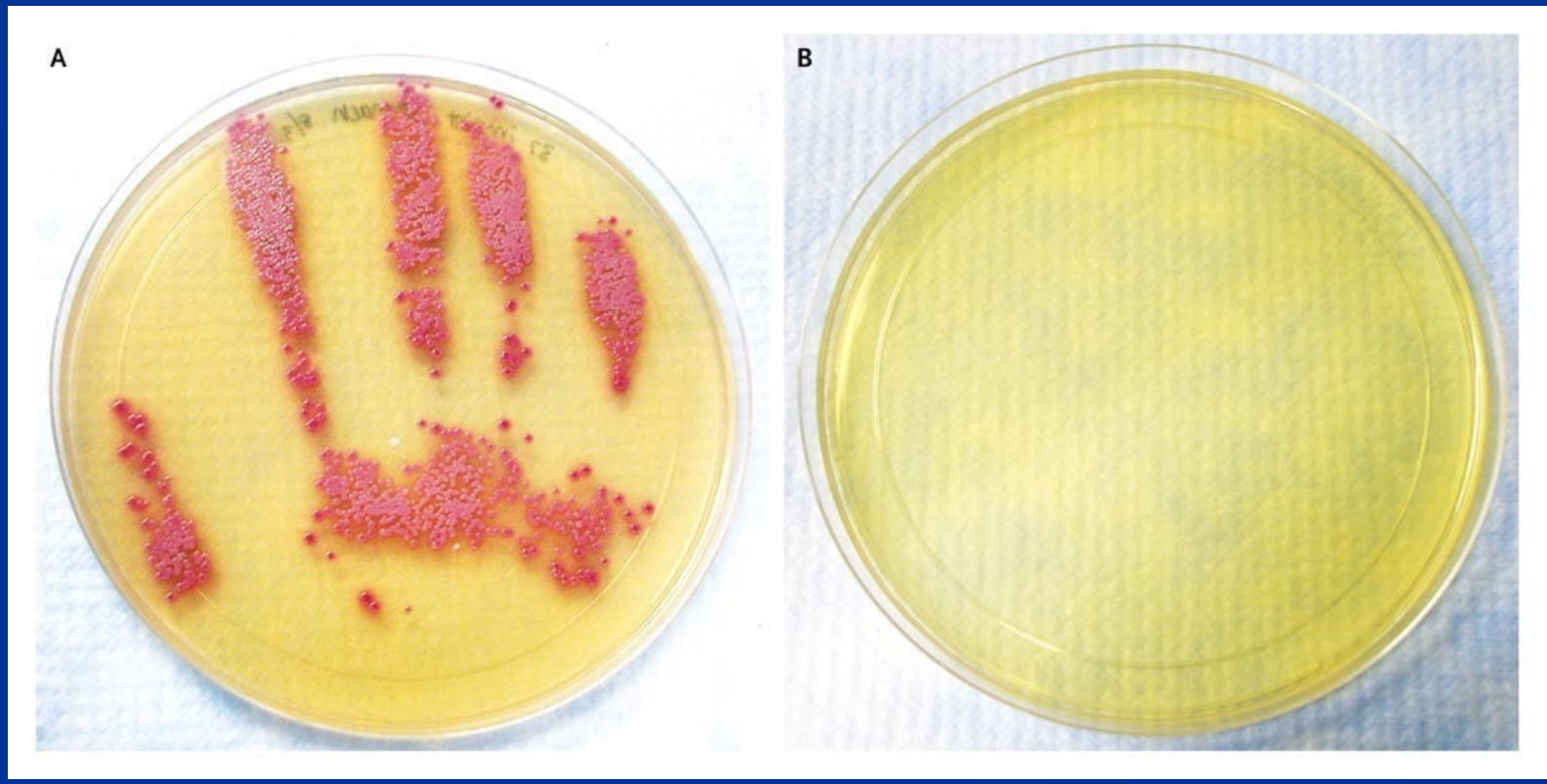
- Lawrence M. Patient hand hygiene: a clinical inquiry. Nurs Times **1983**.
- Ward D. Improving patient hand hygiene. Nurs Stand **2003**.
- Banfield KR. Could hospital patients' hands constitute a missing link? J Hosp Infect **2005**.
- Burnett E. Hand hygiene: What about our patients? Br J Infect Control **2008**.
- Landers T. Patient-centered hand hygiene: the next step in infection prevention. AJIC **2012**.

Interventions

- Cheng VC. Outbreak of human metapneumovirus infection in psychiatric inpatients: implications for directly observed use of alcohol hand rub in prevention of nosocomial outbreaks. J Hosp Infect **2007**.
- Gagné D. Systematic patients' hand disinfection: impact on MRSA infection rates in a community hospital. J Hosp Infect **2010**.

Patient hand hygiene is effective

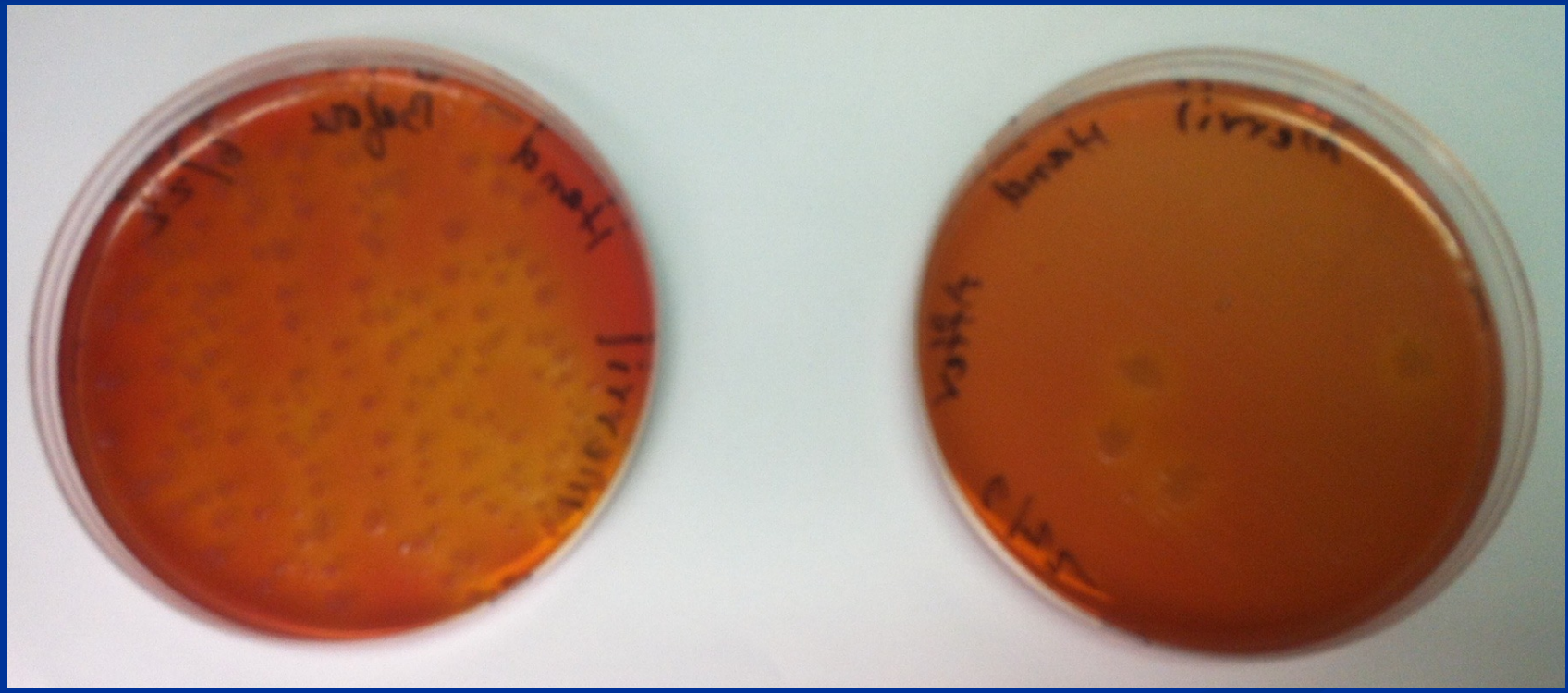
Before hand sanitizer After hand sanitizer



Donskey CJ, Eckstein B. N Engl J Med 2009; Sunkesula V. Efficacy of alcohol gel for removal of MRSA from hands of colonized patients. ICHE 2015;36:229-31 (MRSA patients: hand contamination decreased 82% to 40% with 1 application of hand sanitizer).

Patient hand washing reduces *C. difficile* spores

Before **After**



Kundrapu S. A Randomized Trial of Soap and Water Hand Wash Versus Alcohol Hand Rub for Removal of *C. difficile* Spores from Hands of Patients. ICHE 2014;35:204-6.

Patient hand hygiene may be beneficial in healthcare settings

Ref	Setting	Intervention	Outcome
1	Psychiatry ward	Employee assisted patient hand hygiene	Reduced respiratory virus outbreaks
2	Canadian hospital	Patient and visitor hand hygiene	51% reduction in healthcare-associated MRSA infections
3	VA Hospital	Patient hand hygiene – randomized trial	Reduced acquisition of pathogens on hands (2% versus 35%)
4	VA Hospital	Patient hand hygiene – randomized trial	No decrease in acquisition of pathogen colonization (10% vs 10%)

1). Cheng VC. Outbreak of human metapneumovirus infection in psychiatric inpatients: implications for directly observed use of alcohol hand rub in prevention of nosocomial outbreaks. J Hosp Infect 2007;67:336–43.
2). Gagne D. Systematic patients' hand disinfection: impact on MRSA infection rates in a community hospital. J Hosp Infect 2010;75:269–72.
3). Sunkesula V. A randomized trial to determine the impact of an educational patient hand-hygiene intervention on contamination of hospitalized patient's hands with healthcare-associated pathogens. ICHE 2017;38:595–7.
4). Rai H. A pilot study to assess the impact of an educational patient hand hygiene intervention on acquisition of colonization with health care-associated pathogens. AJIC 2019;47:334-336.

Patient hand hygiene may be beneficial in healthcare settings

Ref	Setting	Intervention	Outcome
5	7 hospital networks	Patient hand hygiene	Control of VRE outbreak
6	Hospital	Patient hand hygiene	Decreased healthcare-associated CDI
7	Children's hospital	Patient and visitor hand hygiene – cluster randomized trial	Increased patient/visitor hand hygiene when front-line staff involved in the intervention

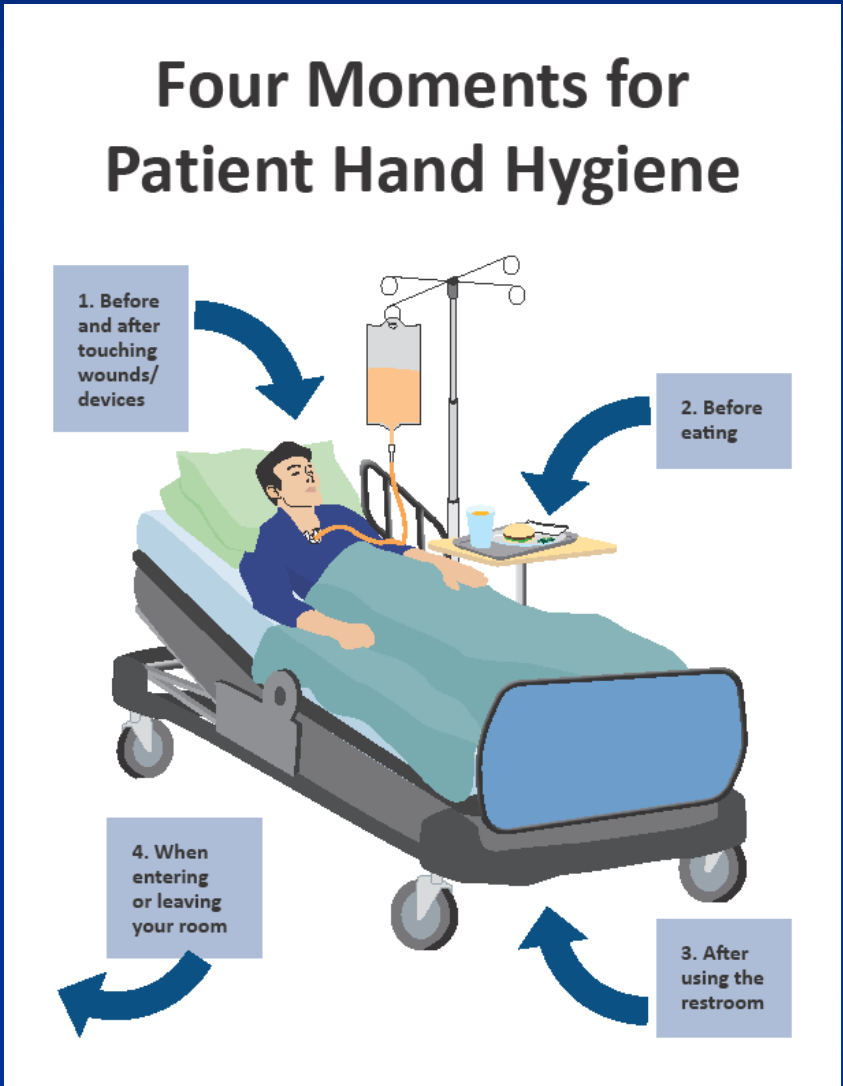
5. Cheng VC. Successful control of emerging VRE by territory-wide implementation of directly observed hand hygiene in patients in Hong Kong. AJIC 2016.
6. Pokrywka M. Can improving patient hand hygiene reduce CDI events at an academic medical center? AJIC 2017;45:959–63.
7. Wong MWH. Impact of patient and visitor hand hygiene interventions at a pediatric hospital: A stepped wedge cluster randomized controlled trial. AJIC 2020;48:511-6.

Simple interventions can increase patient hand hygiene

	Pre-intervention	Post-intervention
Before meals	10%	79%
Exiting/ entering room	0%	51%

Sunkesula V. Four moments for patient hand hygiene: a patient-centered, provider-facilitated model to improve patient hand hygiene. ICHE 2015;36:986-9.

Simple interventions can increase patient hand hygiene



	Pre-intervention	Post-intervention
Before meals	10%	79%
Exiting/ entering room	0%	51%

Sunkesula V. Four moments for patient hand hygiene: a patient-centered, provider-facilitated model to improve patient hand hygiene. ICHE 2015;36:986-9.

Healthcare staff can facilitate patient hand hygiene

Transport personnel

Food delivery personnel

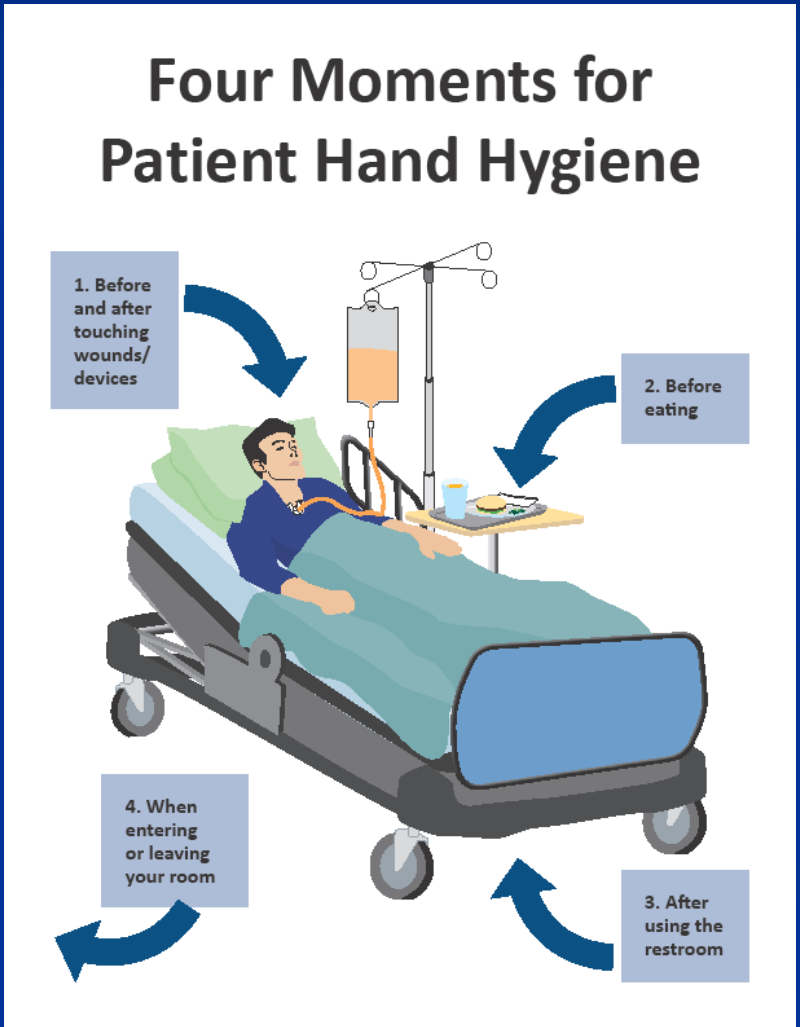
Healthcare staff can facilitate patient hand hygiene

Transport personnel

Food delivery personnel

Healthcare staff can facilitate patient hand hygiene

Transport personnel



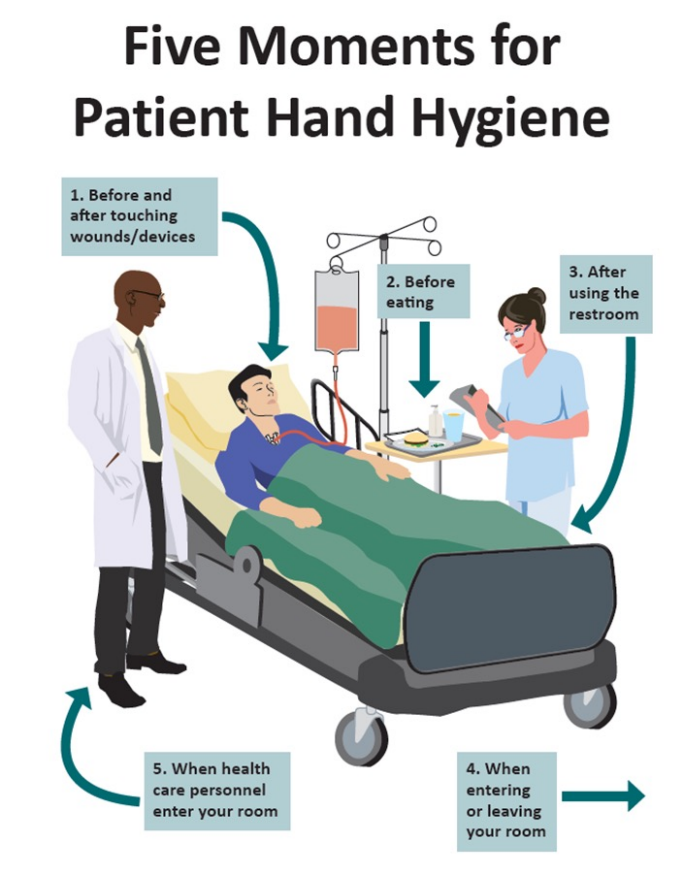
Food delivery personnel

Healthcare staff can facilitate patient hand hygiene

Transport personnel

Food delivery personnel

Patients can model hand hygiene for personnel



5th moment: hand hygiene when personnel enter the room

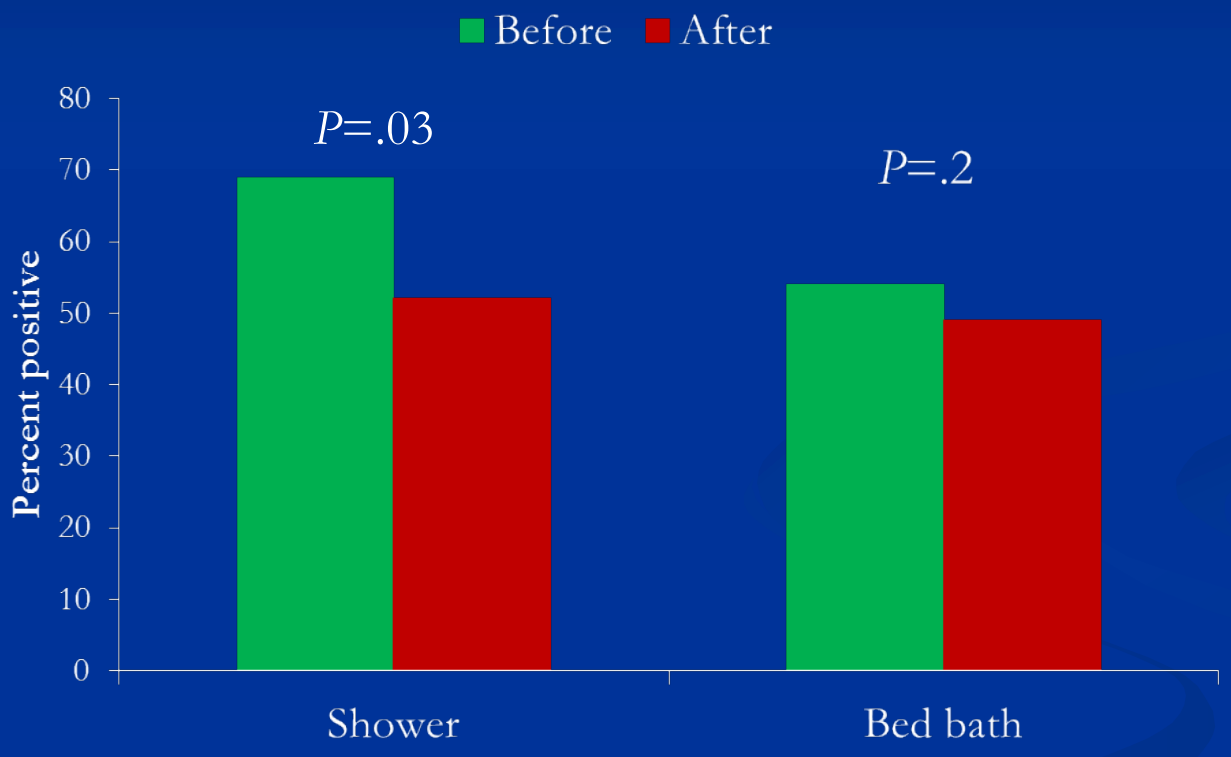
Rai H. A randomized trial to determine the impact of a 5 moments for patient hand hygiene educational intervention on patient hand hygiene. AJIC 2017;45:551-3.

An intervention to improve mealtime hand hygiene among LTCF residents

O'Donnell M. Sustained increase in resident mealtime hand hygiene through an interdisciplinary intervention engaging LTCF residents and staff. AJIC 2015;43:162-4; Rai H. Comparison of ethanol hand sanitizer (single use packets) versus moist towelette packets for mealtime patient hand hygiene. AJIC 2017;45:1033-34.

Knighton SC, Zabarsky TF, Donskey CJ. Four moments for healthcare facility visitor hand hygiene. Am J Infect Control 2020;48:1412-1413. doi: 10.1016/j.ajic.2020.08.017.

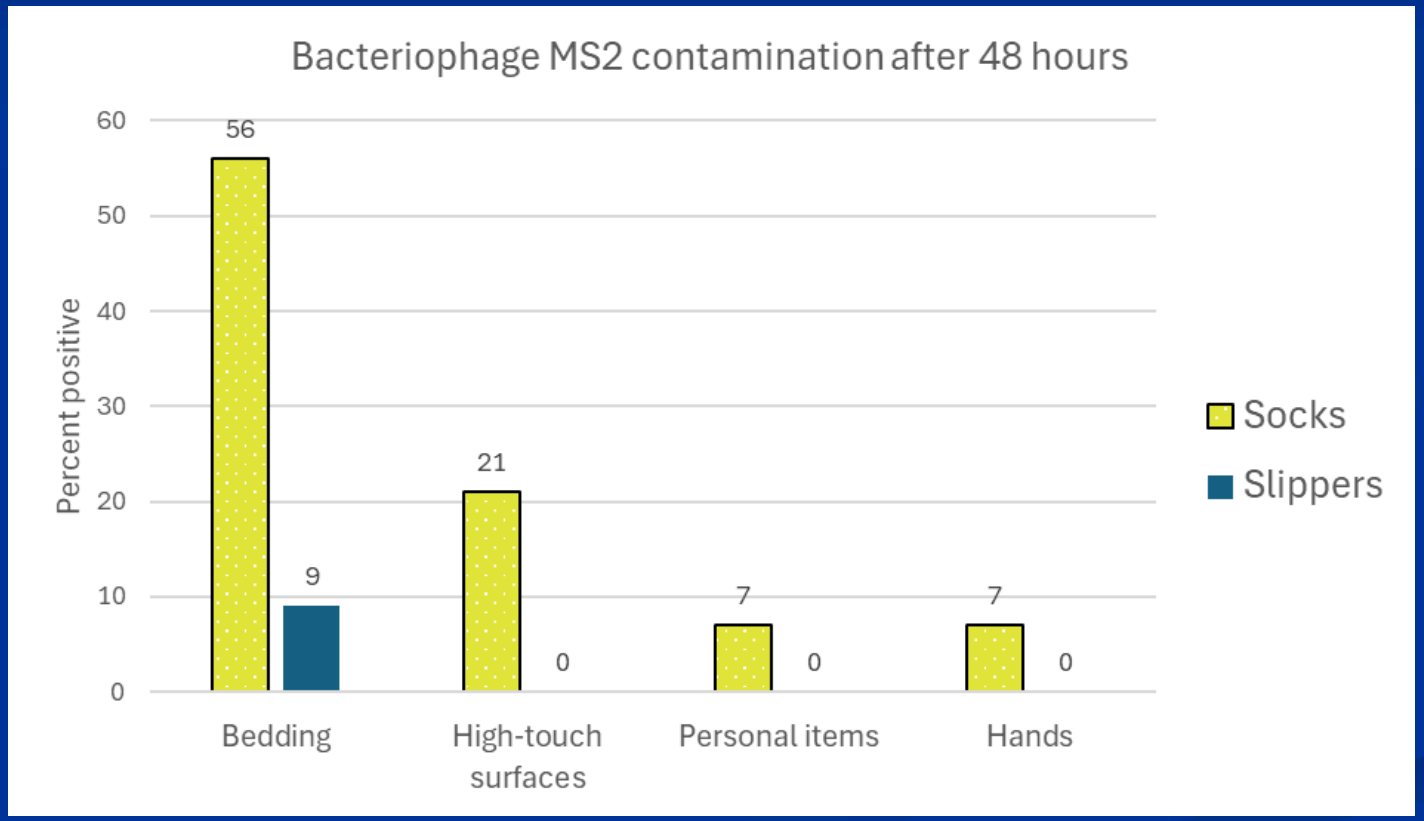
Patient showering reduces *C. difficile* spores on skin



Jury LA, et al. Effectiveness of routine patient bathing to reduce the burden of spores on skin of patients with CDI. ICHE 2011;32:181-4

Wearing slippers reduced dissemination of bacteriophage MS2 from floors

versus



Haq MF. A randomized trial to determine if wearing slippers reduces transfer of bacteriophage MS2 from floors to patients and surfaces in hospital rooms. ICHE 2023;44:670-3.

Interventions to improve oral hygiene by patients

Assisting Veterans with oral care during hospital stays to prevent pneumonia

With a proactive approach, HAPPEN modernizes care systems to focus on the prevention of pneumonia

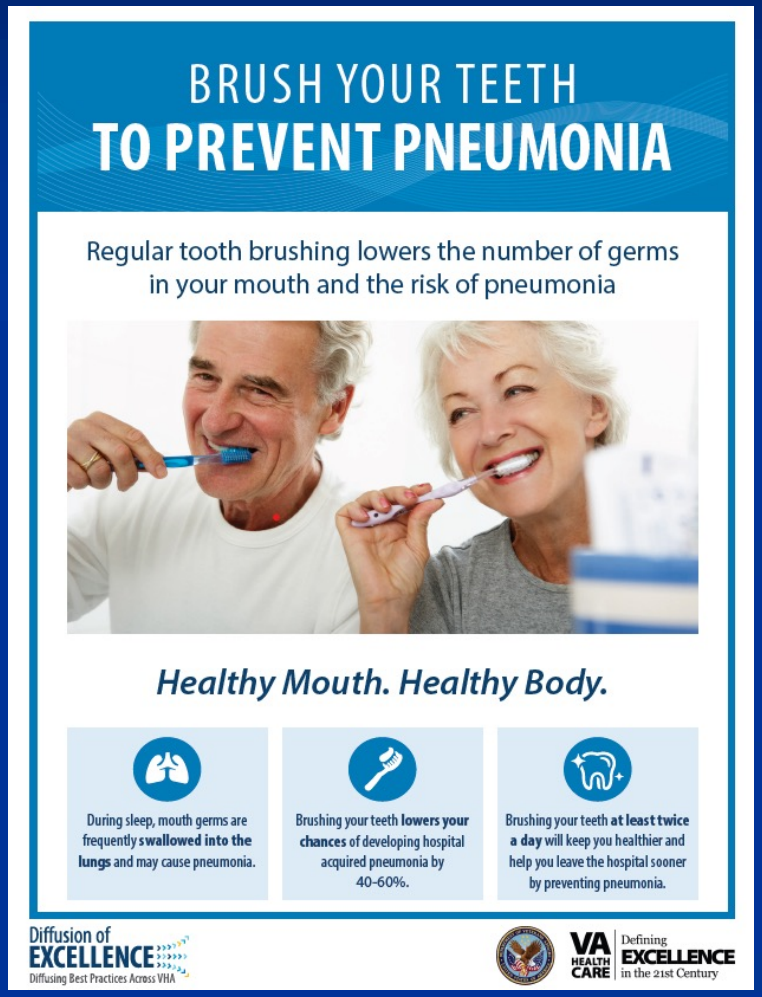
December 16, 2024

Madison Coffey
Communications Officer for VHA Innovation Ecosystem

Survey: only 30% of patients reported oral hygiene education

Baumgard Z. Intervention to improve oral hygiene in hospitalized patients. In preparation.

Poster placed in patient bathrooms



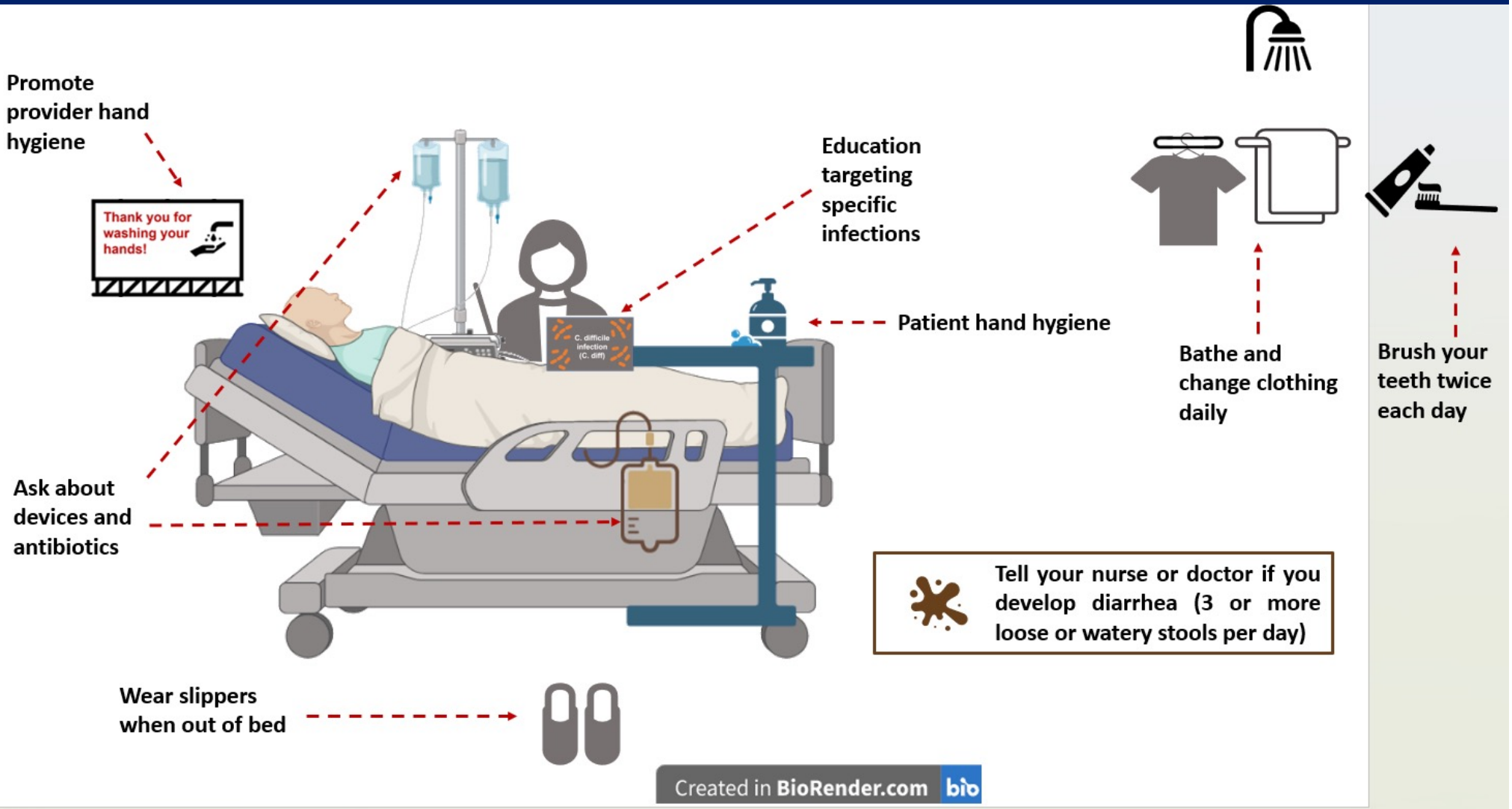
Baumgard Z. Intervention to improve oral hygiene in hospitalized patients. In preparation.

Engaging patients in stewardship can reduce inappropriate antibiotic use

- Of 73 patients receiving fecal microbiota transplantation (FMT), 25 (34%) consulted their FMT physicians regarding 43 antibiotic prescriptions
  - 26 (60%) deemed unnecessary
  - 7 (16%) necessary but alternative suggested
- 95% of recommendations followed

Hecker MT, et al. Fear of failure: Engaging patients in antimicrobial stewardship after fecal microbiota transplantation for recurrent CDI. ICHE 2017;38:127-129

Empowering patients to prevent HAIs



Donskey CJ. Empowering patients to prevent healthcare-associated infections. Am J Infect Control 2023;51(11S):A107-A113. doi: 10.1016/j.ajic.2023.03.008.

Surgical patient engagement to reduce surgical site infections

- Expert panel recommendations [1]
  - Pre-op - S. aureus screening, pre-op bathing, hair removal, smoking, diabetes management
  - Intra-op – body temperature, diabetes
  - Post-op - hand hygiene, wound care
- Patient engagement improves chlorhexidine bathing [2-3]

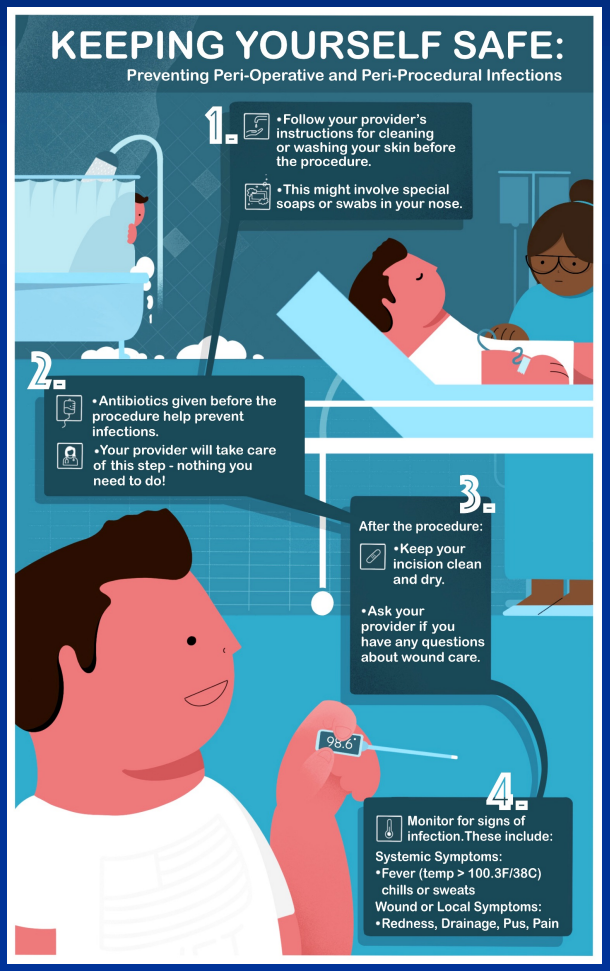
1. Tartari E. Patient engagement with surgical site infection prevention: an expert panel perspective. Antimicrob Resist Infect Control 2017;6:45; 2. Nikolic V. Empowering patients through a perioperative prevention bundle to reduce surgical site infections in colorectal surgery. AJIC 2025; 3. Cox J. The Role of Patient Engagement in Surgical Site Infection Reduction: A Process Improvement Project. Adv Skin Wound Care 2023;36:599-603. doi: 10.1097/ASW.0000000000000055;

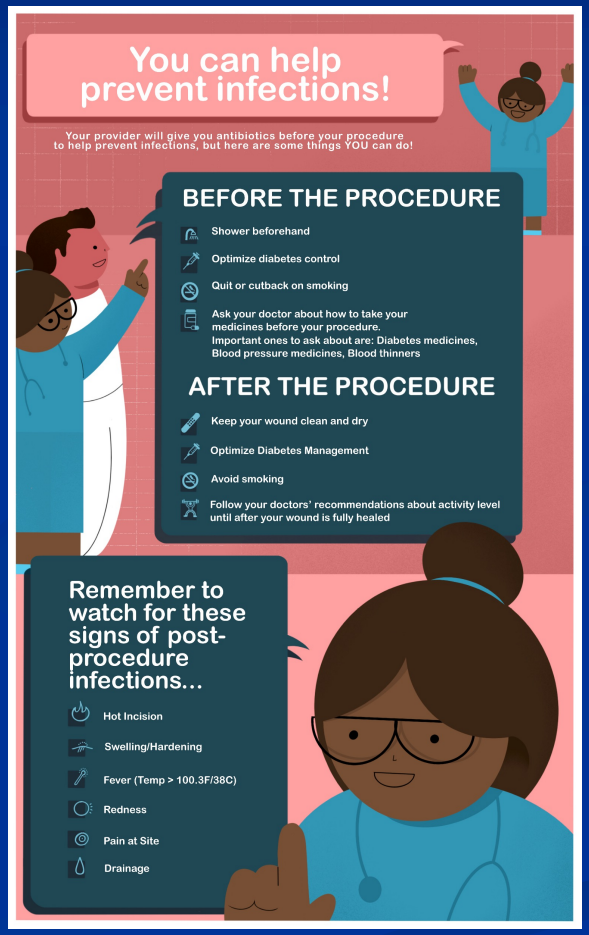
SHEA/IDSA/APIC Practice Recommendations to prevent SSI

- Educate patients & families about SSI prevention. Evidence quality: LOW
  - Information describing strategies for reducing risk
  - Preprinted materials
    - JAMA patient page: Wound Infections
    - Surgical Care Improvement Project Tips for Safer Surgery
    - CDC Frequently Asked Questions About Surgical-Site Infections
    - SHEA Infection Prevention Handout for Patients and Visitors

Calderwood MS. Strategies to prevent surgical site infections in acute-care hospitals: 2022 Update. Infect Control Hosp Epidemiol 2023;44:695-720.

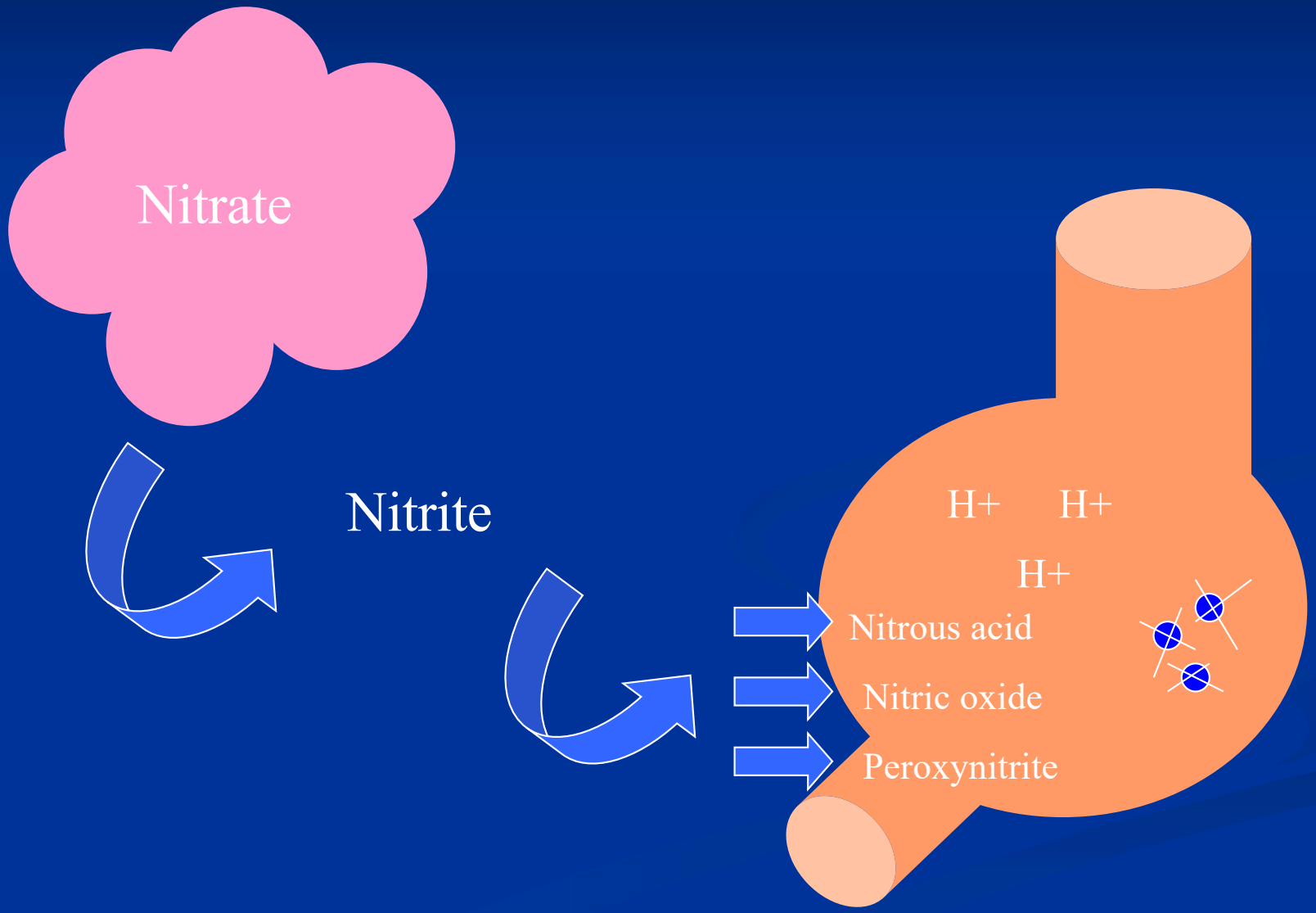
Engaging patients in SSI prevention





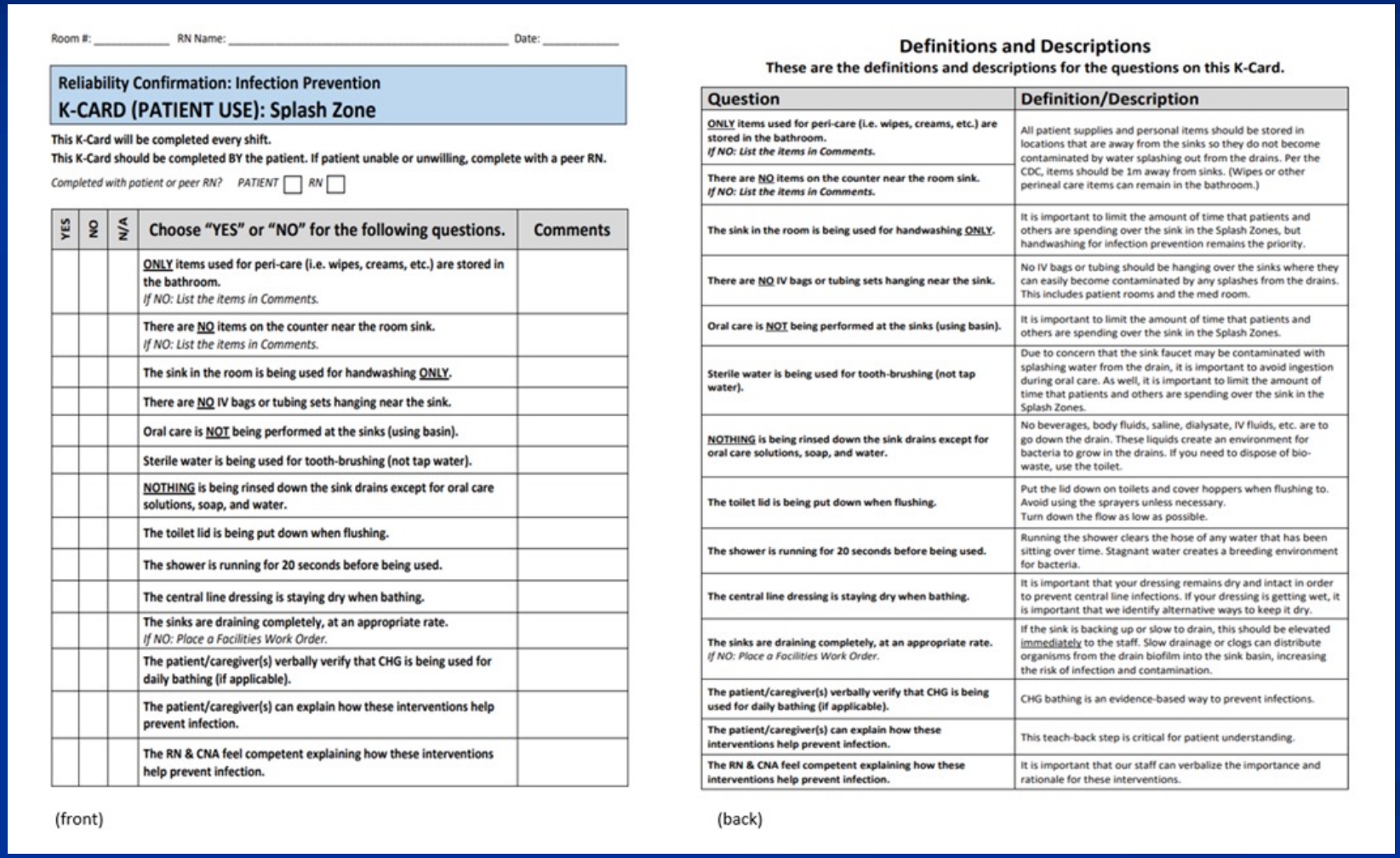
Al Lawati H. Engaging patients in antimicrobial stewardship: co-designed educational tool to improve periprocedural care through de-implementation of guideline-discordant antimicrobial use. Antimicrob Steward Healthc Epidemiol 2023;3:e163. doi: 10.1017/ash.2023.420.

Avoid PPIs: gastric acid provides an important host defense



Stiefel U. Suppression of gastric acid production by PPI treatment facilitates colonization by VRE and *K. pneumoniae* in mice. AAC 2006;50:3905-7; Nardino RJ. Overuse of acid-suppressive therapy in hospitalized patients. Am J Gastr 2000;95:3118-22.

Engaging high-risk patients to prevent sink drain and other water-associated infections



Room #: _____ RN Name: _____ Date: _____

Reliability Confirmation: Infection Prevention
K-CARD (PATIENT USE): Splash Zone

This K-Card will be completed every shift.
This K-Card should be completed BY the patient. If patient unable or unwilling, complete with a peer RN.

Completed with patient or peer RN? PATIENT ☐ RN ☐

YES	NO	N/A	Choose "YES" or "NO" for the following questions.	Comments
			ONLY items used for peri-care (i.e. wipes, creams, etc.) are stored in the bathroom. *If NO: List the items in Comments.*	
			There are NO items on the counter near the room sink. *If NO: List the items in Comments.*	
			The sink in the room is being used for handwashing ONLY.	
			There are NO IV bags or tubing sets hanging near the sink.	
			Oral care is NOT being performed at the sinks (using basin).	
			Sterile water is being used for tooth-brushing (not tap water).	
			NOTHING is being rinsed down the sink drains except for oral care solutions, soap, and water.	
			The toilet lid is being put down when flushing.	
			The shower is running for 20 seconds before being used.	
			The central line dressing is staying dry when bathing.	
			The sinks are draining completely, at an appropriate rate. *If NO: Place a Facilities Work Order.*	
			The patient/caregiver(s) verbally verify that CHG is being used for daily bathing (if applicable).	
			The patient/caregiver(s) can explain how these interventions help prevent infection.	
			The RN & CNA feel competent explaining how these interventions help prevent infection.	

(front)

Definitions and Descriptions

These are the definitions and descriptions for the questions on this K-Card.

Question	Definition/Description
ONLY items used for peri-care (i.e. wipes, creams, etc.) are stored in the bathroom. *If NO: List the items in Comments.*	All patient supplies and personal items should be stored in locations that are away from the sinks so they do not become contaminated by water splashing out from the drains. Per the CDC, items should be 1m away from sinks. (Wipes or other perineal care items can remain in the bathroom.)
There are NO items on the counter near the room sink. *If NO: List the items in Comments.*	
The sink in the room is being used for handwashing ONLY.	It is important to limit the amount of time that patients and others are spending over the sink in the Splash Zones, but handwashing for infection prevention remains the priority.
There are NO IV bags or tubing sets hanging near the sink.	No IV bags or tubing should be hanging over the sinks where they can easily become contaminated by any splashes from the drains. This includes patient rooms and the med room.
Oral care is NOT being performed at the sinks (using basin).	It is important to limit the amount of time that patients and others are spending over the sink in the Splash Zones.
Sterile water is being used for tooth-brushing (not tap water).	Due to concern that the sink faucet may be contaminated with splashing water from the drain, it is important to avoid ingestion during oral care. As well, it is important to limit the amount of time that patients and others are spending over the sink in the Splash Zones.
NOTHING is being rinsed down the sink drains except for oral care solutions, soap, and water.	No beverages, body fluids, saline, dialysate, IV fluids, etc. are to go down the drain. These liquids create an environment for bacteria to grow in the drains. If you need to dispose of bio-waste, use the toilet.
The toilet lid is being put down when flushing.	Put the lid down on toilets and cover hoppers when flushing to. Avoid using the sprayers unless necessary. Turn down the flow as low as possible.
The shower is running for 20 seconds before being used.	Running the shower clears the hose of any water that has been sitting over time. Stagnant water creates a breeding environment for bacteria.
The central line dressing is staying dry when bathing.	It is important that your dressing remains dry and intact in order to prevent central line infections. If your dressing is getting wet, it is important that we identify alternative ways to keep it dry.
The sinks are draining completely, at an appropriate rate. *If NO: Place a Facilities Work Order.*	If the sink is backing up or slow to drain, this should be elevated immediately to the staff. Slow drainage or clogs can distribute organisms from the drain biofilm into the sink basin, increasing the risk of infection and contamination.
The patient/caregiver(s) verbally verify that CHG is being used for daily bathing (if applicable).	CHG bathing is an evidence-based way to prevent infections.
The patient/caregiver(s) can explain how these interventions help prevent infection.	This teach-back step is critical for patient understanding.
The RN & CNA feel competent explaining how these interventions help prevent infection.	It is important that our staff can verbalize the importance and rationale for these interventions.

(back)

Fontana L. The impact of an intervention to reduce dispersal from wastewater drain sites on carbapenem-resistant *P aeruginosa* colonization and bloodstream infection on a hematopoietic cell transplant and hematologic malignancy unit. Infect Control Hosp Epidemiol 2023.

Identifying and remediating super-splasher sinks

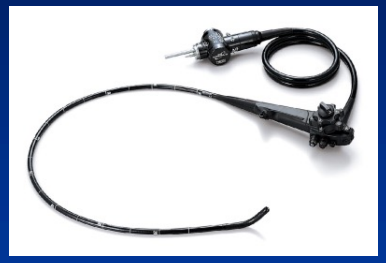
- Dispersal of fluorescent marker from below strainer predicted dispersal of GNB
- Plumbing intervention: reducing the flow rate and/or eliminating obstruction prevented dispersal

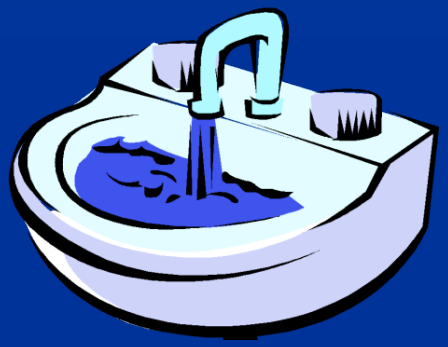
Dispersal of water droplets

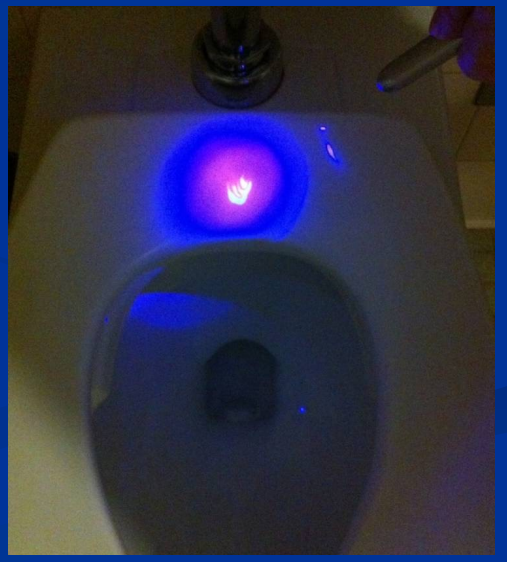
Backup of water

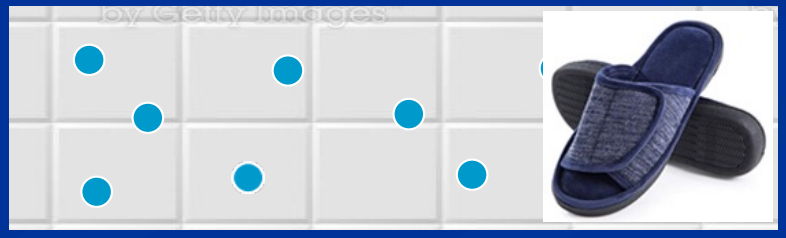
Torres-Teran MM. Identifying and Remediating Super-splasher Sinks to Reduce Dispersal of Pathogens From Sink Drains. Open Forum Infect Dis 2024:ofae293.f.

Conclusions





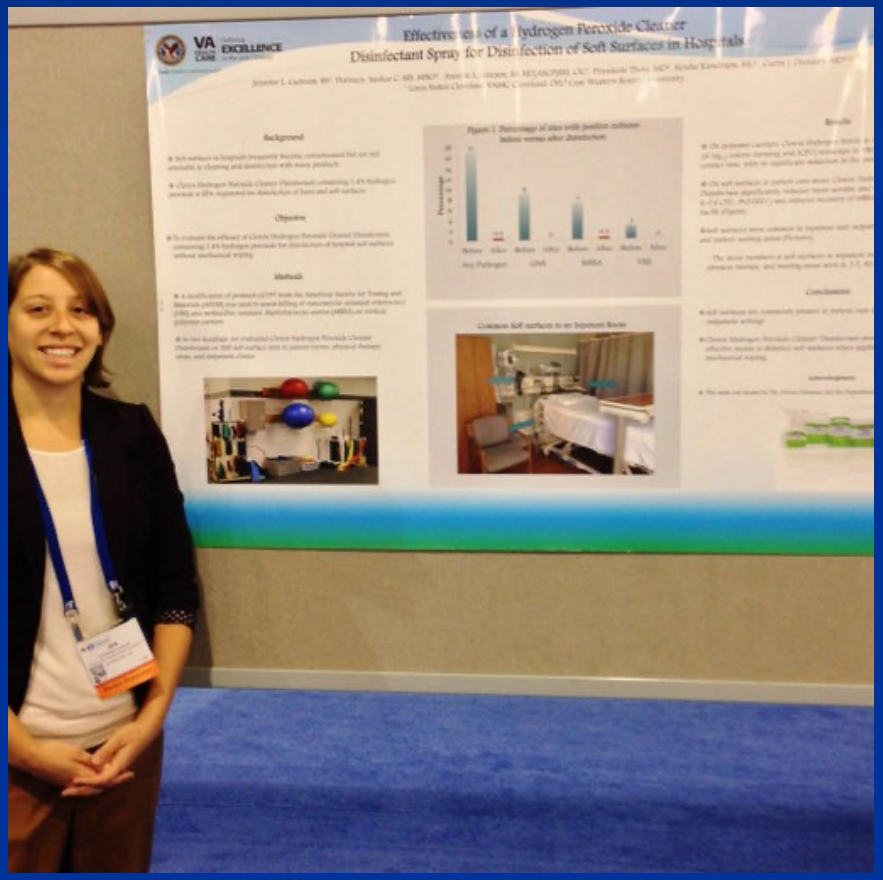




Hospital admission video

Infection Control.mp4 (sharepoint.com)

Acknowledgements



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