



This slide set “Hand Hygiene in Healthcare Settings-Supplemental” provides:

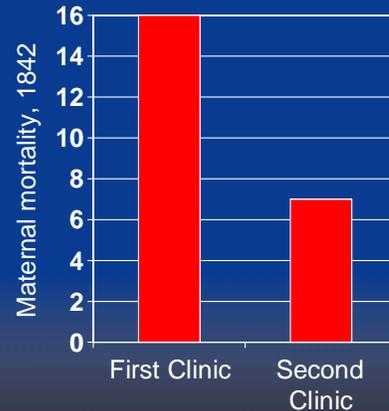
- 1) Slides that may be used in conjunction with the “Hand Hygiene in Healthcare Settings-Core” slide set.
- 2) Question and answer slides to be used in an interactive presentation.
- 3) Slides containing information on topics related to hand hygiene (e.g., antimicrobial resistance).
- 4) Slides that you can customize by inserting data specific to your hospital.

The Hand Hygiene in Healthcare Settings-Supplemental slide set was developed in conjunction with the Chicago Antimicrobial Resistance Project [[www.carp-net.org](http://www.carp-net.org)].

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## Ignaz Semmelweis, 1815-1865

- 1840's: General Hospital of Vienna
- Divided into two clinics, alternating admissions every 24 hours:
  - First Clinic: Doctors and medical students
  - Second Clinic: Midwives



- In 1846 Ignaz Semmelweis observed that women whose babies were delivered by students and physicians in the First Clinic at the General Hospital of Vienna consistently had a higher mortality rate than those whose babies were delivered by midwives in the Second Clinic.
- He noted that physicians who went directly from the autopsy suite to the obstetrics ward had a disagreeable odor on their hands despite washing their hands with soap and water upon entering the obstetrics clinic.
- His theory: puerperal fever, which was causing the deaths, was caused by “cadaverous particles” transmitted from the autopsy suite to the obstetrics ward via the hands of students and physicians.

## The Intervention: Hand scrub with chlorinated lime solution

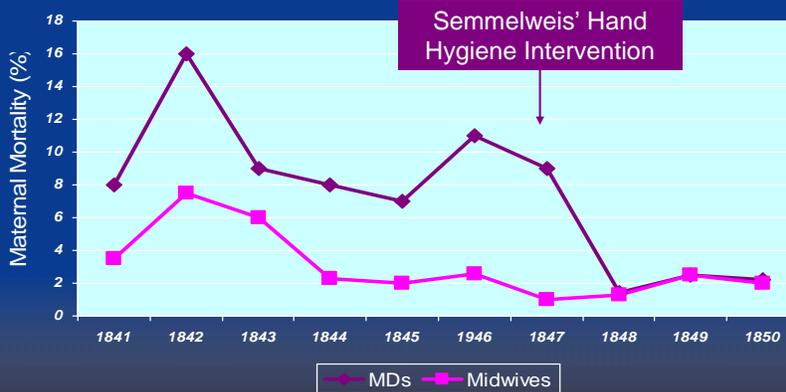


Hand hygiene basin at the Lying-In Women's Hospital in Vienna, 1847.

- In May 1847 Semmelweiss insisted that students and physicians clean their hands with a chlorine solution, similar to the one pictured here, between each patient in the clinic.

# Hand Hygiene: Not a New Concept

Maternal Mortality due to Postpartum Infection  
General Hospital, Vienna, Austria, 1841-1850



~ Hand antisepsis reduces the frequency of patient infections ~

Adapted from: *Hosp Epidemiol Infect Control*, 2<sup>nd</sup> Edition, 1999.

- After Semmelweis insisted that students and physicians clean their hands with a chlorine solution between each patient, the maternal mortality rate in the First Clinic dropped.
- Maternal mortality rate in the First Clinic dropped dramatically and remained low for years.
- This is the first evidence indicating that cleansing heavily contaminated hands with an antiseptic agent between patient contacts may reduce healthcare-associated transmission of contagious diseases more effectively than handwashing with plain soap and water.



## Colonized or Infected: What is the Difference?

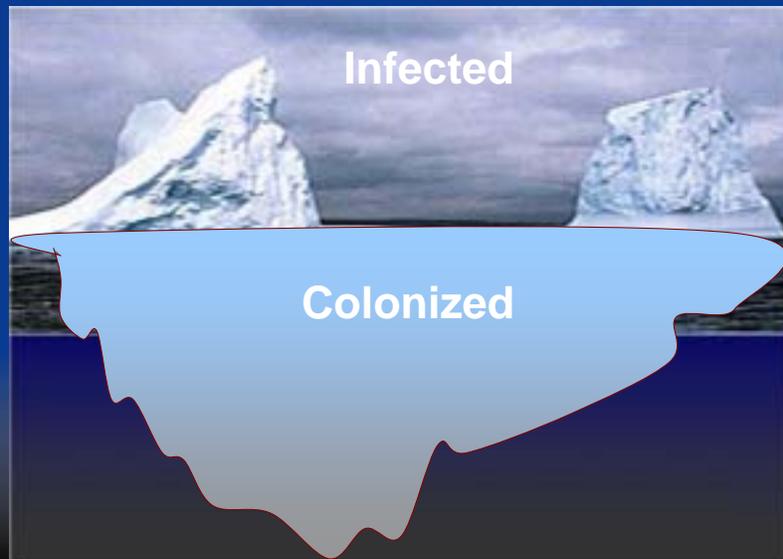


- People who carry bacteria without evidence of infection (fever, increased white blood cell count) are colonized
- If an infection develops, it is usually from bacteria that colonize patients
- Bacteria that colonize patients can be transmitted from one patient to another by the hands of healthcare workers

~ **Bacteria can be transmitted even if the patient is not infected** ~

- People who carry bacteria without evidence of infection are colonized.
- If an infection develops, it is usually from bacteria that colonize patients.
- Bacteria that colonize patients can be transmitted from one patient to another by the hands of healthcare workers.

## The Iceberg Effect



- This iceberg graphically represents colonization versus infection. Those patients that are infected with an organism represent just the “tip of the iceberg” of patients that are colonized or infected.
- Just because a patient is not infected, or showing signs of infection, does not mean that they do not carry organisms that could be transferred to another patient if proper hand hygiene and other infection control precautions are not taken.



## Recovery of VRE from Hands and Environmental Surfaces

- Up to 41% of healthcare worker's hands sampled (after patient care and before hand hygiene) were positive for VRE<sup>1</sup>
- VRE were recovered from a number of environmental surfaces in patient rooms
- VRE survived on a countertop for up to 7 days<sup>2</sup>

<sup>1</sup> Hayden MK, *Clin Infect Diseases* 2000;31:1058-1065.

<sup>2</sup> Noskin G, *Infect Control and Hosp Epidemi* 1995;16:577-581.

- Many patients in the hospital acquire Vancomycin-Resistant Enterococci (VRE) from another patient, potentially via the hands of healthcare workers.
- In epidemiologic investigations of contamination of the hands of healthcare workers with VRE, up to 41% of hands sampled were positive for VRE.
- VRE has been recovered from a number of environmental surfaces in patient rooms, including patient and healthcare worker gowns, door handles, cabinets, floors, blood pressure cuffs, bed rails, urinals, bedpans, and toilet seats.
- In one study, VRE survived on a countertop for up to 7 days.

## ***The Inanimate Environment Can Facilitate Transmission***

**X** represents VRE culture positive sites



~ **Contaminated surfaces increase cross-transmission** ~

Abstract: The Risk of Hand and Glove Contamination after Contact with a VRE (+) Patient Environment. Hayden M, ICAAC, 2001, Chicago, IL.

- In one study, hands of 131 healthcare workers (HCWs) were cultured before, and hands and gloves after, routine care.
- A mean of 56% of body sites and 17% of environmental sites were VRE positive.
- After touching the patient and environment, 75% of ungloved HCWs hands and 9% of gloved HCWs hands were contaminated with VRE.
- After touching only the environment, 21% of ungloved and 0 gloved HCWs hands were contaminated.
- The inanimate environment plays a role in facilitating transmission of organisms.



What is the single most important reason for healthcare workers to practice good hand hygiene?

1. To remove visible soiling from hands
2. To prevent transfer of bacteria from the home to the hospital
3. To prevent transfer of bacteria from the hospital to the home
4. To prevent infections that patients acquire in the hospital



What is the single most important reason for healthcare workers to practice good hand hygiene?

1. To remove visible soiling from hands
2. To prevent transfer of bacteria from the home to the hospital
3. To prevent transfer of bacteria from the hospital to the home
4. To prevent infections that patients acquire in the hospital

- The correct answer is #4, to prevent infections that patients acquire in the hospital.
- All answers are good reasons to practice good hand hygiene.
- Improved adherence to hand hygiene has been shown to terminate outbreaks in healthcare facilities, reduce the transmission of antimicrobial resistant organisms, and reduce overall infection rates.



How often do you clean your hands after touching a PATIENT'S INTACT SKIN (for example, when measuring a pulse or blood pressure)?

1. Always
2. Often
3. Sometimes
4. Never



How often do you clean your hands after touching a PATIENT'S INTACT SKIN (for example, when measuring a pulse or blood pressure)?

1. Always
2. Often
3. Sometimes
4. Never



- The correct answer is always.
- According to the HICPAC hand hygiene guideline, you should always clean your hands after contact with a patient's intact skin.

Estimate how often YOU clean your hands after touching a patient or a contaminated surface in the hospital?

1. 25%
2. 50%
3. 75%
4. 90%
5. 100%



- According to the HICPAC hand hygiene guideline, you should always clean your hands after touching a patient or a contaminated surface in the hospital.

Now, estimate how often YOUR CO-WORKERS clean their hands after touching a patient or a contaminated surface in the hospital?

1. 25%
2. 50%
3. 75%
4. 90%
5. 100%



- According to the HICPAC hand hygiene guideline, you should always clean your hands after touching a patient or a contaminated surface in the hospital.



## Which method do you use to clean your hands at work?

1. Plain soap and water
2. Antimicrobial soap and water
3. Alcohol-based handrub



- The HICPAC hand hygiene guideline recommends that when hands are visibly contaminated, plain soap and water, or an antimicrobial soap and water should be used.
- When hands are not visibly soiled, use an alcohol-based handrub.



## Which hand hygiene method is best at killing bacteria?

1. Plain soap and water
2. Antimicrobial soap and water
3. Alcohol-based handrub



## Which hand hygiene method is best at killing bacteria?

1. Plain soap and water
2. Antimicrobial soap and water
3. Alcohol-based handrub

- According to the HICPAC hand hygiene guideline, an alcohol-based handrub is the best at killing bacteria.



Which of the following hand hygiene agents is LEAST drying to your skin?

1. Plain soap and water
2. Antimicrobial soap and water
3. Alcohol-based handrub



Which of the following hand hygiene agents is LEAST drying to your skin?

1. Plain soap and water
2. Antimicrobial soap and water
3. Alcohol-based handrub

- According to the HICPAC hand hygiene guideline, alcohol-based handrubs, particularly those that contain an emollient, are less drying to your skin than plain soap and water, or antimicrobial soap and water.



It is acceptable for healthcare workers to supply their own lotions to relieve dryness of hands in the hospital.

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree



 It is acceptable for healthcare workers to supply their own lotions to relieve dryness of hands in the hospital.

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree



- The correct response would be to either disagree, or strongly disagree.
- According to the HICPAC hand hygiene guideline, only hospital-supplied lotions should be used, as some lotions may affect the integrity of latex gloves and the efficacy of antimicrobial soaps or alcohol-based handrubs used in the facility.



How much time would an ICU nurse save during an 8 hour shift by using an alcohol-based handrub instead of soap and water?

1. 15 minutes
2. 30 minutes
3. 1 hour
4. 2.5 hours



How much time would an ICU nurse save during an 8 hour shift by using an alcohol-based handrub instead of soap and water?

1. 15 minutes
2. 30 minutes
3. 1 hour
4. 2.5 hours



\* Based on 12 opportunities/hour, handwashing time=60 seconds, alcohol-based handrub time=20 seconds

- The correct answer is 1 hour, based on 12 opportunities per hour for 8 hours with a handwashing time (including walking to the sink and back) of 60 seconds per wash, and an alcohol-based handrub time of 20 seconds per handrub.
- According to the HICPAC hand hygiene guideline, providing an alcohol-based handrub at the patient's bedside will save time because healthcare workers will no longer need to walk the sink and wash their hands.



**Healthcare-associated organisms are commonly resistant to alcohol.**

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree

Healthcare-associated organisms are commonly resistant to alcohol.

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree

- The correct answer is disagree, or strongly disagree.
- To date, there have been no reported cases of organisms resistant to alcohol.



When a healthcare worker touches a patient who is COLONIZED, but not infected with resistant organisms (e.g., MRSA or VRE) the HCW's hands are a source for spreading resistant organisms to other patients.

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree



When a healthcare worker touches a patient who is COLONIZED, but not infected with resistant organisms (e.g., MRSA or VRE) the HCW's hands are a source for spreading resistant organisms to other patients.

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree



- The correct answer is strongly agree or agree.
- Patients that are colonized but not infected with bacteria can still contaminate the hands of healthcare workers, who can then spread the organisms to other patients unless proper hand hygiene is practiced.

 A co-worker who examines a patient with VRE, then borrows my pen without cleaning his/her hands is likely to contaminate my pen with VRE. 

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree



A co-worker who examines a patient with VRE, then borrows my pen without cleaning his/her hands is likely to contaminate my pen with VRE.

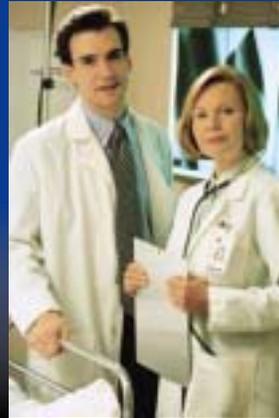
1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree



- The correct answer is strongly agree or agree.
- Many patients in the hospital acquire VRE from another patient, potentially via the hands of healthcare workers.
- In epidemiologic investigations of contamination of the hands of healthcare workers with VRE, up to 41% of hands sampled were positive for VRE.

How often do you clean your hands after touching an ENVIRONMENTAL SURFACE near a patient (for example, a countertop or bedrail)?

1. Always
2. Often
3. Sometimes
4. Never



How often do you clean your hands after touching an ENVIRONMENTAL SURFACE near a patient (for example, a countertop or bedrail)?

1. Always
2. Often
3. Sometimes
4. Never



- The correct answer is always.
- Patient gowns, bed linens, bedside furniture, and other objects in the patient's immediate environment can easily become contaminated with patient flora.



## Use of artificial nails by healthcare workers poses no risk to patients.

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree



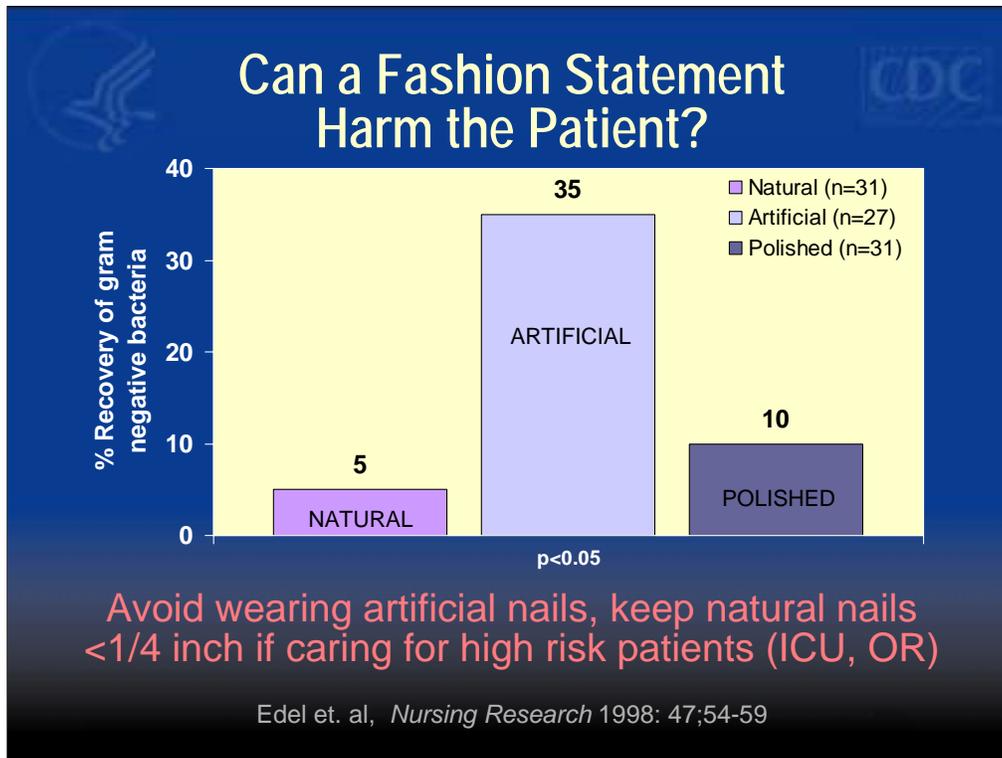
Use of artificial nails by healthcare workers poses no risk to patients.

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree



The image shows a close-up of a person's hand with artificial red nails. The hand is positioned horizontally, with the fingers slightly spread. The background is white, making the hand and nails stand out. The nails are a vibrant red color and appear to be made of a smooth, possibly acrylic or gel material. The skin tone is light.

- The correct answer is disagree, or strongly disagree.
- Even after careful handwashing, healthcare workers often harbor substantial numbers of potential pathogens in the subungual spaces. A growing body of evidence suggests that wearing artificial nails may contribute to transmission of certain healthcare-associated pathogens. Healthcare workers who wear artificial nails are more likely to harbor gram-negative pathogens on their fingertips than are those who have natural nails, both before and after handwashing.



- Studies have shown that hospital personnel with artificial nails harbor more potential pathogens both before and after handwashing than personnel with natural nails.
- Artificial nails contribute to nail changes that can increase the risk of colonization and transmission of organisms from HCWs to patients.
- Natural nail tips should be kept to  $\frac{1}{4}$  inch in length.



Glove use for all patient care contacts is a useful strategy for reducing risk of transmission of organisms.

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree



Glove use for all patient care contacts is a useful strategy for reducing risk of transmission of organisms.

1. Strongly agree
2. Agree
3. Don't know
4. Disagree
5. Strongly disagree



- The correct answer is strongly agree, or agree.
- For many years, authorities have recommended that healthcare workers wear gloves for three reasons: to reduce the risk of healthcare workers acquiring infections from patients, to prevent flora from being transmitted from healthcare workers to patients, and to reduce contamination of the hands of healthcare workers by flora that can be transmitted from one patient to another.



At your hospital, what percentage of [insert organism name] isolates are resistant to [insert drug name]?

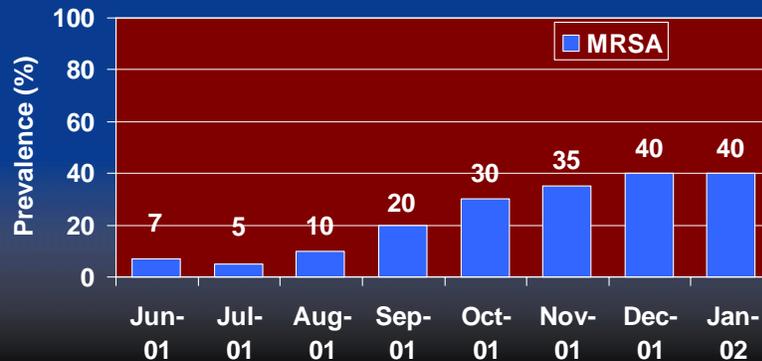
- 1. <5%
- 2. 15%
- 3. 20%
- 4. 30%
- 5. >50%



You can personalize this slide to an organism-drug combination that is a problem at your institution.

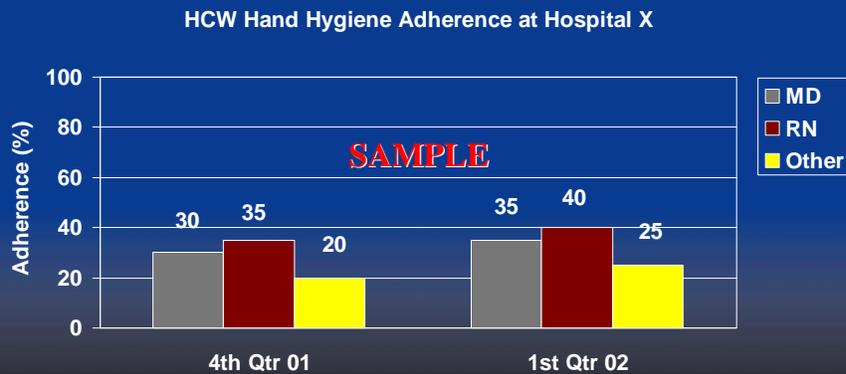
*Insert graph showing annual, monthly, or quarterly trend in antimicrobial (e.g. MRSA) prevalence, or number of isolates at Hospital X below*

Prevalence of MRSA at Hospital X

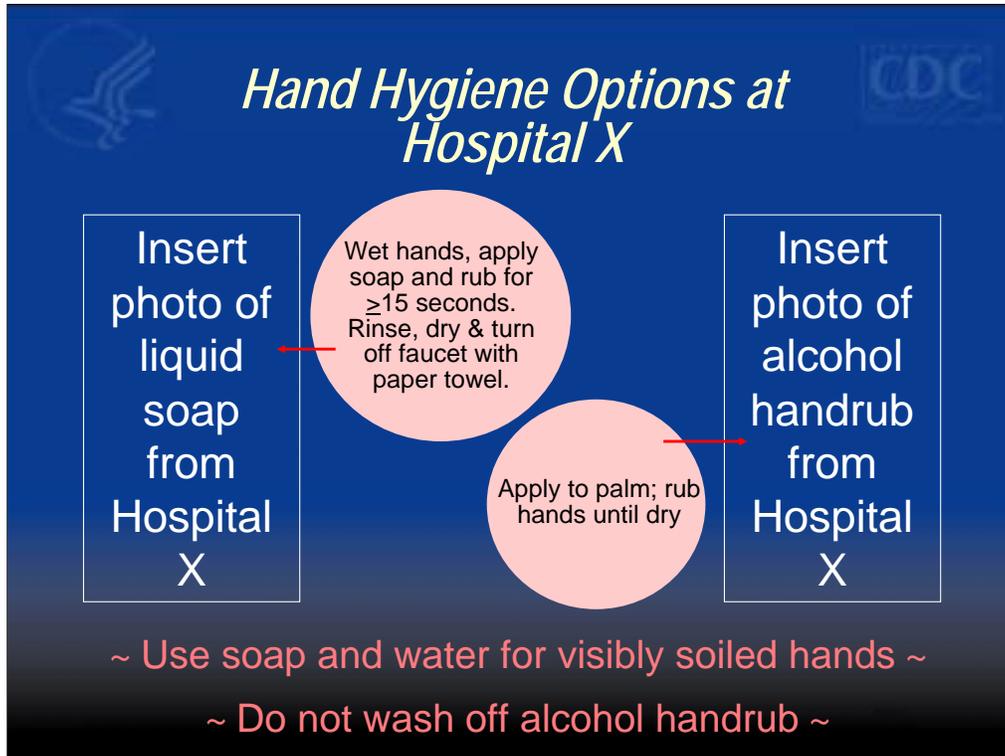


This slide should be customized with data from your healthcare facility or system. As mentioned in the title, annual, monthly, or quarterly rates of resistance may be displayed.

# Insert facility-specific data on HCW hand hygiene adherence below



Insert data on hand hygiene adherence rates at your healthcare facility. The data may be displayed by healthcare workers or group (e.g. RN, physicians, respiratory therapists), as shown above, for two different time periods, or even by facility, if there is more than one facility.



Insert pictures of the liquid soap (either antimicrobial or non-antimicrobial) and the alcohol-based handrub available at your healthcare facility. Some staff may have trouble telling the difference between the two types of products when they go to use them, so this will help them see what the difference is.

## What is the Story on Moisturizers and Lotions?

**ONLY USE facility-approved and supplied lotions**

Because:

- Some lotions may make medicated soaps less effective
- Some lotions cause breakdown of latex gloves
- Lotions can become contaminated with bacteria if dispensers are refilled

Insert  
photo of  
lotion  
from  
Hospital  
X

*~ Do not refill lotion bottles ~*

This slide provides an opportunity for the healthcare facility to insert a picture of the lotions used at their facility.



- This is one of the materials distributed by CDC to improve hand hygiene in healthcare settings. Buttons, bearing the graphic, as well as other hand hygiene promotional materials, may be found at [www.cdc.gov/handhygiene](http://www.cdc.gov/handhygiene).