



This slide set “Hand Hygiene in Healthcare Settings-Core” and accompanying speaker notes provide an overview of the Guideline for Hand Hygiene in Healthcare Settings published in 2002.

A second slide set “Hand Hygiene in Healthcare Settings-Supplemental” which can be obtained at www.cdc.gov/handhygiene provides additional slides that may be used in conjunction with the core slide set.

The target audience for this slide set is healthcare workers in acute care hospitals.

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Hand Hygiene in Healthcare Settings: An Overview



- Background
- Definitions
- Indications
- Selection of Agents
- Techniques
- Surgical
- Other

Guideline for Hand Hygiene in Health-care Settings. *MMWR* 2002; vol. 51, no. RR-16.



So Why All the Fuss About Hand Hygiene?

Most common mode of transmission of pathogens is via hands!

- Infections acquired in healthcare
- Spread of antimicrobial resistance

- Clean hands are the single most important factor in preventing the spread of pathogens and antibiotic resistance in healthcare settings.
- Hand hygiene reduces the incidence of healthcare associated infections.
- CDC estimates that each year nearly 2 million patients in the United States get an infection in hospitals, and about 90,000 of these patients die as a result of their infection.
- More widespread use of hand hygiene products that improve adherence to recommended hand hygiene practices will promote patient safety and prevent infections.



Evidence of Relationship Between Hand Hygiene and Healthcare-Associated Infections

- Substantial evidence that hand hygiene reduces the incidence of infections
- Historical study: Semmelweis
- More recent studies: rates lower when antiseptic handwashing was performed

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- There is substantial evidence that hand hygiene reduces the incidence of infections.
- Semmelweis demonstrated that the mortality rate among mothers who delivered in the First Obstetrics Clinic at the General Hospital of Vienna was significantly lower when hospital staff cleaned their hands with an antiseptic agent than when they washed their hands with plain soap and water.
- In more recent studies healthcare-associated infection rates were lower when antiseptic handwashing was performed by personnel and went down when adherence to recommended hand hygiene practices improved.



Hand Hygiene Adherence in Hospitals

Year of Study	Adherence Rate	Hospital Area
1994 ⁽¹⁾	29%	General and ICU
1995 ⁽²⁾	41%	General
1996 ⁽³⁾	41%	ICU
1998 ⁽⁴⁾	30%	General
2000 ⁽⁵⁾	48%	General

1. Gould D, *J Hosp Infect* 1994;28:15-30. 2. Larson E, *J Hosp Infect* 1995;30:88-106. 3. Slaughter S, *Ann Intern Med* 1996;3:360-365. 4. Watanakunakorn C, *Infect Control Hosp Epidemiol* 1998;19:858-860. 5. Pittet D, *Lancet* 2000;356:1307-1312.

- In general, adherence of healthcare workers to recommended hand hygiene procedures has been poor.
- Studies shown here are representative of the overall adherence rates which averaged about 40%.
- Adherence rates do vary by occupation.



Self-Reported Factors for Poor Adherence with Hand Hygiene



- Handwashing agents cause irritation and dryness
- Sinks are inconveniently located/lack of sinks
- Lack of soap and paper towels
- Too busy/insufficient time
- Understaffing/overcrowding
- Patient needs take priority
- Low risk of acquiring infection from patients

Adapted from Pittet D, *Infect Control Hosp Epidemiol* 2000;21:381-386.

- Healthcare workers have reported several factors that may negatively impact their adherence with recommended practices including; handwashing agents cause irritation and dryness, sinks are inconveniently located, lack of soap and paper towels, not enough time, understaffing or overcrowding, and patient needs taking priority.
- Lack of knowledge of guidelines/protocols, forgetfulness, and disagreement with the recommendations were also self reported factors for poor adherence with hand hygiene.
- Perceived barriers to hand hygiene are linked to the institution and HCWs colleagues. Therefore, both institutional and small-group dynamics need to be considered when implementing a system change to secure and improve HCWs hand hygiene practice.

Definitions

- Hand hygiene
 - Performing handwashing, antiseptic handwash, alcohol-based handrub, surgical hand hygiene/antiseptis
- Handwashing
 - Washing hands with plain soap and water
- Antiseptic handwash
 - Washing hands with water and soap or other detergents containing an antiseptic agent
- Alcohol-based handrub
 - Rubbing hands with an alcohol-containing preparation
- Surgical hand hygiene/antiseptis
 - Handwashing or using an alcohol-based handrub before operations by surgical personnel

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- Hand hygiene is a general term that applies to either handwashing, antiseptic handwash, alcohol-based handrub, or surgical hand hygiene/antiseptis.
- Handwashing refers to washing hands with plain soap and water. Handwashing with soap and water remains a sensible strategy for hand hygiene in non-healthcare settings and is recommended by CDC and other experts.
- Antiseptic handwash refers to washing hands with water and soap or other detergents containing an antiseptic agent.
- Alcohol-based handrub refers to the alcohol-containing preparation applied to the hands to reduce the number of viable microorganisms.
- Surgical hand hygiene/antiseptis refers to an antiseptic handwash or antiseptic handrub performed preoperatively by surgical personnel to eliminate transient and reduce resident hand flora. Antiseptic detergent preparations often have persistent antimicrobial activity.



Indications for Hand Hygiene

- When hands are visibly dirty, contaminated, or soiled, wash with non-antimicrobial or antimicrobial soap and water.
- If hands are not visibly soiled, use an alcohol-based handrub for routinely decontaminating hands.

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- Healthcare workers should wash hands with soap and water when hands are visibly dirty, contaminated or soiled and use an alcohol-based handrub when hands are not visibly soiled to reduce bacterial counts.



Specific Indications for Hand Hygiene



■ Before:

- Patient contact
- Donning gloves when inserting a CVC
- Inserting urinary catheters, peripheral vascular catheters, or other invasive devices that don't require surgery

■ After:

- Contact with a patient's skin
- Contact with body fluids or excretions, non-intact skin, wound dressings
- Removing gloves

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- Hand hygiene is indicated before: patient contact, donning gloves when inserting a central venous catheter (CVC), and inserting urinary catheters, peripheral vascular catheters, or other invasive devices that don't require surgery.
- Hand hygiene is also indicated after contact with a patient's intact skin, contact with body fluids or excretions, non-intact skin, or wound dressings, and after removing gloves.
- Gloves should be used when a HCW has contact with blood or other body fluids in accordance with universal precautions.



Selection of Hand Hygiene Agents: Factors to Consider

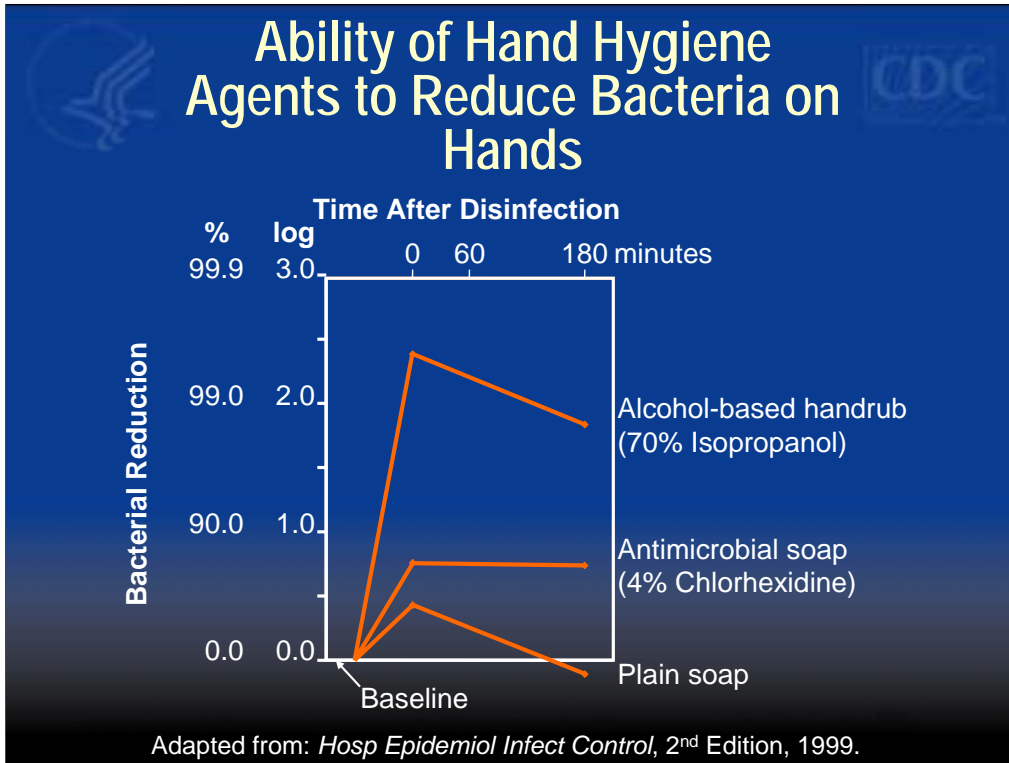
- Efficacy of antiseptic agent
- Acceptance of product by healthcare personnel
 - Characteristics of product
 - Skin irritation and dryness
- Accessibility of product
- Dispenser systems

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- When evaluating hand hygiene products for potential use in healthcare facilities, administrators or product selection committees should consider the relative efficacy of antiseptic agents against various pathogens and the acceptability of hand hygiene products by personnel.
- Product acceptance can be affected by characteristics of the product such as its smell, consistency, color and the effect of skin irritation and dryness on hands.
- Easy access to hand hygiene supplies is essential for acceptance and use of products.
- Dispenser systems should function adequately and deliver an appropriate volume of product. Soap should not be added to a partially empty soap dispenser because of potential bacterial contamination of the soap.

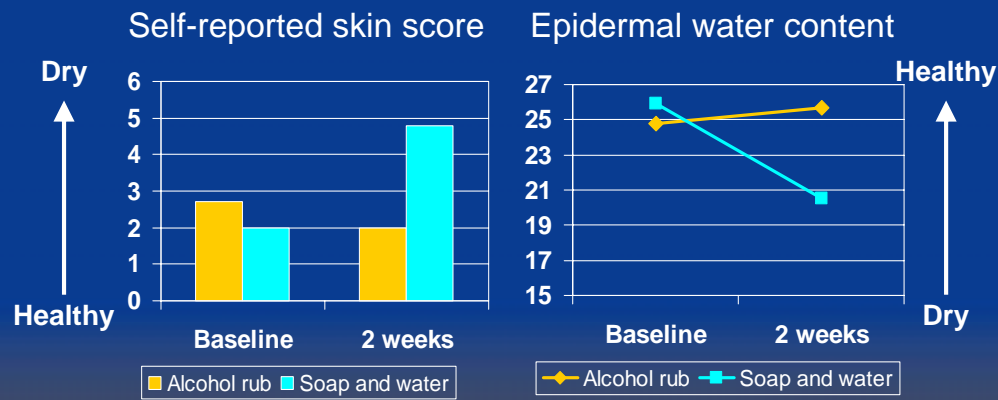


- Plain soap is good at reducing bacterial counts but antimicrobial soap is better, and alcohol-based handrubs are the best.



- This graph shows that alcohol-based handrub is better than handwashing at killing bacteria.
- Shown across the top of this graph is the amount of time after disinfection with the hand hygiene agent.
- The left axis shows the percent reduction in bacterial counts.
- The three lines represent alcohol-based handrub, antimicrobial soap, and plain soap.

Effect of Alcohol-Based Handrubs on Skin Condition



~ Alcohol-based handrub is less damaging to the skin ~

Boyce J, *Infect Control Hosp Epidemiol* 2000;21(7):438-441.

- Alcohol-based handrubs are less damaging to the skin than soap and water.
- In the graph on the left the blue bar shows self-reported skin health scores for persons using soap and water, and persons using alcohol-based handrubs are depicted by the orange bar. Self-reported studies indicate participants using soap and water reported a significant increase in dryness, cracking, and irritation after 2 weeks, whereas those that used the alcohol-based handrub reported improvement in skin dryness.
- Epidermal water content shows the same results as the self reported scores, after 2 weeks of use, the skin water content decreased for those that used soap and water (resulting in dryer skin) as compared with those who used an alcohol-based handrub.



Time Spent Cleansing Hands: one nurse per 8 hour shift

- Hand washing with soap and water: 56 minutes
 - Based on seven (60 second) handwashing episodes per hour
- Alcohol-based handrub: 18 minutes
 - Based on seven (20 second) handrub episodes per hour

**~ Alcohol-based handrubs reduce time
needed for hand disinfection ~**

Voss A and Widmer AF, *Infect Control Hosp Epidemiol* 1997;18;205-208.

- The time required for nurses to leave a patient's bedside, go to a sink, and wash and dry their hands before attending the next patient is a deterrent to frequent handwashing or hand antisepsis.
- More rapid access to hand hygiene materials could help improve adherence.
- Alcohol-based handrubs may be a better option than traditional handwashing with plain soap and water or antiseptic handwash because they require less time, act faster, and irritate hands less often.



Recommended Hand Hygiene Technique



- Handrubs
 - Apply to palm of one hand, rub hands together covering all surfaces until dry
 - Volume: based on manufacturer
- Handwashing
 - Wet hands with water, apply soap, rub hands together for at least 15 seconds
 - Rinse and dry with disposable towel
 - Use towel to turn off faucet

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- These recommendations will improve hand hygiene practices of HCWs and reduce transmission of pathogenic microorganisms to patients and personnel in healthcare settings.
- When decontaminating hands with an alcohol-based handrub, apply product to palm of one hand and rub hands together, covering all surfaces of hands and fingers, until hands are dry.
- When washing hands with soap and water, wet hands first with water, apply the amount of soap recommended by the manufacturer, and rub hands together for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse hands with water, dry thoroughly with a disposable towel, and use the towel to turn off the faucet.



Surgical Hand Hygiene/Antisepsis

- Use either an antimicrobial soap or alcohol-based handrub
- Antimicrobial soap: scrub hands and forearms for length of time recommended by manufacturer
- Alcohol-based handrub: follow manufacturer's recommendations. Before applying, pre-wash hands and forearms with non-antimicrobial soap

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- Surgical hand hygiene (or antisepsis) can be performed by using either an antimicrobial soap OR an alcohol-based handrub with persistent activity.
- When an antimicrobial soap is used, the hands and forearms should be scrubbed for the length of time recommended by the product's manufacturer, usually 2-6 minutes. Longer scrub times (e.g. 10 minutes) are usually not necessary.
- When an alcohol-based handrub with persistent activity is used, follow the manufacturer's instructions on the amount of product to use. Pre-wash hands and forearms with a non-antimicrobial soap and allow them to dry completely. After application of the alcohol-based product as recommended, allow hands and forearms to dry thoroughly before donning sterile gloves.

Infection Rates: Surgical Handscrub vs. Handrub

<u>Class of Contamination</u>	<u>No. SSI/No. Handscrub</u>	<u>Operations (%) Handrub</u>	χ^2 Test of Equivalence (p-value)
Clean	29/1485 (1.9)	32/1520 (2.1)	16.0 (<0.001)
Clean-Contaminated	24/650 (3.7)	23/732 (3.1)	1.9 (0.09)
All	53/2135 (2.5)	55/2252 (2.4)	19.5 (<0.001)

Parianti et al. *JAMA* 2002; 288(6):722-27.

- Parienti et al. compared 30-day surgical site infection rates among clean and clean-contaminated procedures where either a traditional surgical handscrub (using soap and water) or an alcohol-based handrub were used.
- The chi-square test for equivalence shows that SSI rates were comparable for the two forms of hand antisepsis. That is the handrubs were not associated with an increased risk of SSIs compared with traditional handscrubs. Moreover, the alcohol-based handrub was better tolerated by the surgical teams, and improved compliance with hand hygiene guidelines.



Skin Care



- Provide healthcare workers with hand lotions or creams
- Get information from manufacturers regarding effects that hand lotions, creams, or alcohol-based handrubs may have on the effectiveness of antimicrobial soaps

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- Provide healthcare workers with hand lotions or creams in order to minimize the occurrence of irritant contact dermatitis associated with handwashing.
- Because soaps and detergents can damage skin when applied on a regular basis, HCWs must be better informed regarding adverse effects associated with hand hygiene agents. Information regarding adverse effects can be obtained from manufacturers.
- Information should be obtained from manufacturers regarding the effect that hand lotions, creams, or alcohol-based handrubs have on the effectiveness of antimicrobial soaps.


A blue slide with a white CDC logo in the top right corner. The title "Fingernails and Artificial Nails" is centered in white. Below the title are two bullet points with yellow square markers. At the bottom, there is a small white text box containing a reference.

Fingernails and Artificial Nails

- Natural nail tips should be kept to ¼ inch in length
- Artificial nails should not be worn when having direct contact with high-risk patients (e.g., ICU, OR)

Guideline for Hand Hygiene in Health-care Settings. *MMWR* 2002; vol. 51, no. RR-16.

- Nail length is important because even after careful handwashing, HCWs often harbor substantial numbers of potential pathogens in the subungual spaces.
- Numerous studies have documented that subungual areas of the hand harbor high concentrations of bacteria, most frequently coagulase-negative staphylococci, gram-negative rods (including *Pseudomonas* spp.), corynebacteria, and yeasts.
- Natural nail tips should be kept to ¼ inch in length.
- 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. Therefore, artificial nails should not be worn when having direct contact with high risk patients.



Unresolved Issues

- Routine use of *nonalcohol*-based handrubs
- Wearing rings in healthcare settings

Guideline for Hand Hygiene in Health-care Settings. *MMWR* 2002; vol. 51, no. RR-16.

- No recommendation can be made regarding the routine use of nonalcohol-based handrubs for hand hygiene in healthcare settings.
- Whether the wearing of rings results in greater transmission of pathogens is unknown.

Gloving

- Wear gloves when contact with blood or other potentially infectious materials is possible
- Remove gloves after caring for a patient
- Do not wear the same pair of gloves for the care of more than one patient
- Do not wash gloves

Guideline for Hand Hygiene in Health-care Settings. *MMWR* 2002; vol. 51, no. RR-16.

- Wearing gloves reduces the risk of healthcare workers acquiring infections from patients, prevents flora from being transmitted from healthcare workers to patients, and reduces contamination of the hands of healthcare workers by flora that can be transmitted from one patient to another.
- Gloves should be used when HCWs have contact with blood or other body fluids.
- Gloves should be removed after caring for a patient.
- The same pair of gloves should not be worn for the care of more than one patient.
- Gloves should not be washed or reused.



Education/Motivation Programs



- Monitor healthcare workers (HCWs) adherence with recommended hand hygiene practices and give feedback
- Implement a multidisciplinary program to improve adherence to recommended practices
- Encourage patients and their families to remind HCWs to practice hand hygiene

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- One strategy to promote improved hand hygiene behavior is to monitor healthcare worker adherence with recommended hand hygiene practices and to give feedback.
- Strategies to improve adherence to hand hygiene practices should be both multimodal (i.e. use several different methods or strategies) and multidisciplinary (i.e. involve several different areas of the institution, and types of HCWs). Patients and their families can be involved in reminding HCWs to wash their hands.



Administrative Measures to Improve Hand Hygiene

- Make improved hand hygiene an institutional priority
- Place alcohol-based handrubs at entrance to patient room, or at bedside
- Provide HCWs with pocket-sized containers

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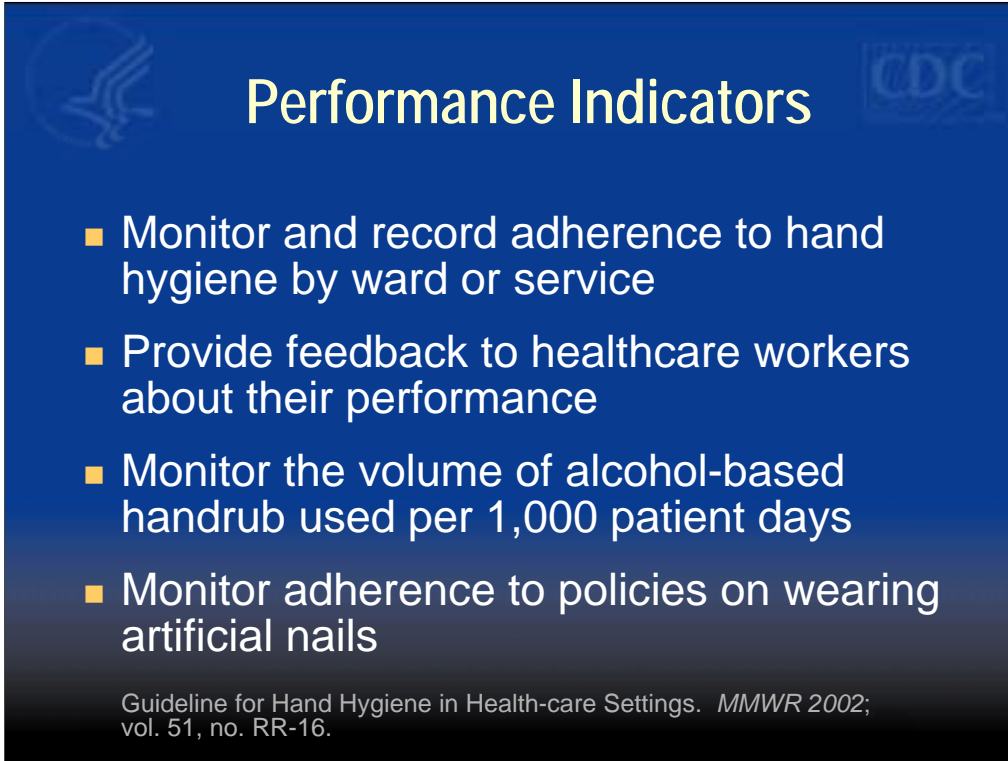
- Make improved hand hygiene an institutional priority and provide appropriate administrative support and financial resources.
- Several administrative measures may help improve hand hygiene adherence among personnel who work in areas where high workloads and high intensity of patient care are anticipated. These include placing alcohol-based handrubs at the entrance to patients' rooms, or at the bedside and providing healthcare workers with individual pocket-sized containers.

Alcohol and Flammability

- Alcohols are flammable
- Alcohol-based handrubs should be stored away from high temperatures or flames
- Europe: fire incidence low
- U.S.: one report of flash fire
- Application is key: Let It Dry!

Guideline for Hand Hygiene in Health-care Settings. *MMWR* 2002; vol. 51, no. RR-16.

- Alcohol-based handrubs should be stored away from high temperatures or flames, in accordance with National Fire Protection Agency recommendations.
- In Europe, where alcohol-based handrubs have been used extensively for many years, the reported incidence of fires related to such products has been extremely low.
- In the U.S., there has been a report of a flash fire that occurred as a result of an unusual series of events, which included a healthcare worker applying an alcohol gel to her hands, then immediately removing a polyester isolation gown, and touching a metal door before the alcohol had evaporated. Removing the polyester gown created a large amount of static electricity that generated an audible static spark when she touched the metal door, igniting the unevaporated alcohol on her hands.
- Following application of alcohol-based handrubs, hands should be rubbed together until all the alcohol has evaporated. In other words, Let It Dry!

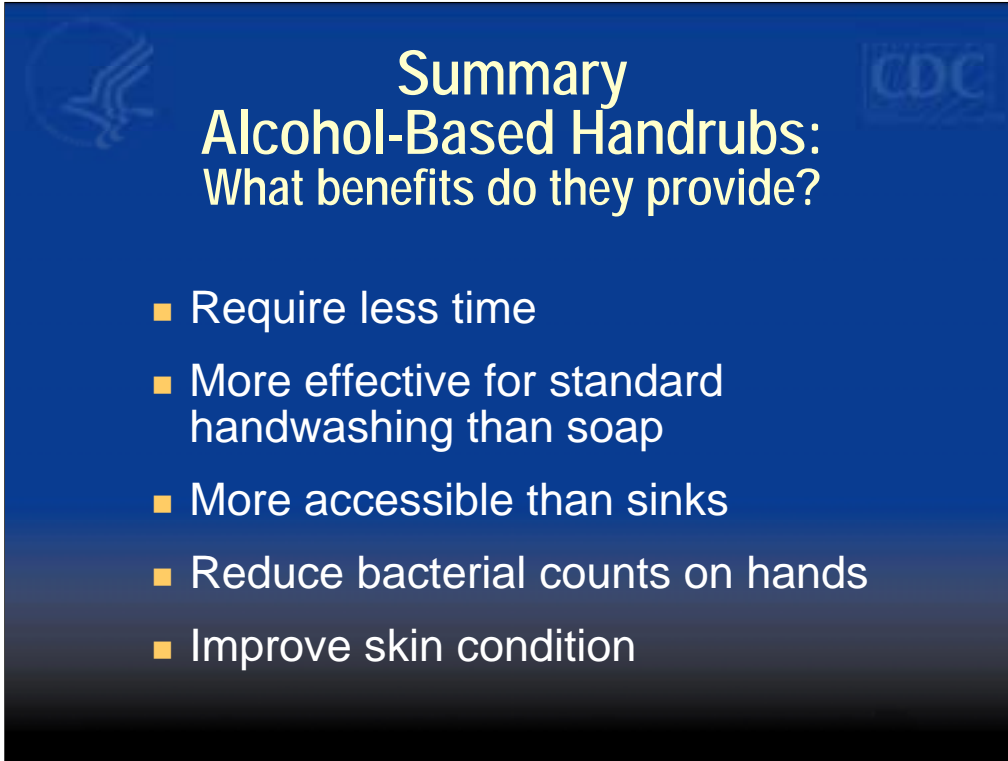
A blue slide with a white title 'Performance Indicators' and a list of four bullet points. The CDC logo is in the top right corner. At the bottom, there is a citation: 'Guideline for Hand Hygiene in Health-care Settings. MMWR 2002; vol. 51, no. RR-16.'

Performance Indicators

- Monitor and record adherence to hand hygiene by ward or service
- Provide feedback to healthcare workers about their performance
- Monitor the volume of alcohol-based handrub used per 1,000 patient days
- Monitor adherence to policies on wearing artificial nails

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- These performance indicators are recommended for measuring improvements in HCWs hand-hygiene adherence.
- Monitor and record adherence to hand hygiene by ward or service.
- Provide feedback to healthcare workers about their performance.
- Monitor the volume of alcohol-based handrub used per 1,000 patient days.
- Monitor adherence to policies on wearing artificial nails.



The slide features a dark blue background with a white CDC logo in the top right corner and a faint graphic of hands being washed in the top left. The title is centered in white text, and the list of benefits is presented as a bulleted list with yellow square markers.

Summary

Alcohol-Based Handrubs: What benefits do they provide?

- Require less time
- More effective for standard handwashing than soap
- More accessible than sinks
- Reduce bacterial counts on hands
- Improve skin condition

• In summary, alcohol-based handrubs provide several advantages compared with handwashing with soap and water, because they not only require less time, they also act faster. In addition, alcohol-based handrubs are more effective for standard handwashing than soap, are more accessible than sinks, are the most efficacious agents for reducing the number of bacteria on the hands of healthcare workers, and can even provide improved skin condition.

**PREVENTION
IS PRIMARY!**

*Protect patients...protect healthcare personnel...
promote quality healthcare!*

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