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2002 Update on Hand Hygiene in Child (Day) Care Settings

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New CDC Guideline for Hand Hygiene in Health-Care Settings

On October 25, 2002, in the *Morbidity and Mortality Weekly Report*,¹ in conjunction with several other organizations, the CDC published recommendations for hand hygiene in health care settings. The CDC is explicit in the corresponding *Hand Hygiene Guidelines Fact Sheet* about the type of hand hygiene recommended in non-health care settings: "Handwashing with soap and water remains a sensible strategy for hand hygiene in non-health care settings and is recommended by CDC and other experts."² With the publicity that followed the release of the guideline for health care settings, many child care workers incorrectly assumed that new recommendations for alternatives to handwashing apply in the child care setting.

In the recommendations for health care settings, the CDC authors stated a preference for use of alcohol-based gel, liquid, and foam hand sanitizers IF the health care worker's hands were free of any visible soil. The evidence presented for this recommendation included studies that showed how hospital staff wash their hands at a sink infrequently when they should do so, and that they fail to

wash their hands for the recommended time. Their failure to remove germs commonly found in hospitals when they were using either plain or antiseptic soap and water led to the spread of germs that commonly cause infections among patients who are cared for in a hospital.

On the other hand, studies conducted in hospital settings found that the use of alcohol-based hand sanitizers on visibly clean hands reduced transmission of germs. The hand rubs were more likely to be used when staff received educational and motivational programs on proper hand hygiene procedures using these products. Skin irritation from frequent handwashing with soap and water was more of a problem than when alcohol-based sanitizers were used, especially when the hand rub products also contained skin-conditioning agents.

Use of alcohol-based hand rubs has some drawbacks. The hand rubs cost almost twice as much as either plain or antibacterial soap. The dispensers for the products must be checked regularly to be sure they are giving out enough of the product to do the job. In one study, more than half of the dispensers did not give enough of the sanitizer product required to achieve decontamination,

and a significant number were plugged up altogether. Keeping small individual disposable bottles in a worker's pocket seemed to help promote use. Although the CDC article did not say so, perhaps using these little disposable bottles would overcome the problem of clogged refillable dispensers. Using disposable bottles could be expected to further increase the cost of the product however. The amount of the hand rub required varies from product to product. The volume used should keep the hands wet with the sanitizer for at least 15 seconds — an amount of time that can be spent walking out of a patient room and down the hall in a hospital. Some of the tests involved putting 3 milliliters (a little more than 1/2 teaspoon) on the hands to rub for about 30 seconds or until it all evaporated and then repeating the application.³ This type of use isn't practical, even in the health care setting. The CDC guideline notes that the alcohol rubs are flammable and must be stored and handled as required for flammable substances.

The guideline warns that hand hygiene must include some decontamination method even when wearing gloves for protection. Gloves may have small defects not visible to the naked eye that allow hands to be contaminated. The

guideline also recommends against artificial and long nails as well as hand jewelry because they can harbor contamination that may not be reduced sufficiently by recommended hand hygiene practices.

How Child Care Settings Compare With Hospitals for Hand Hygiene

Many differences are apparent between child care and hospital settings:

■ The type of contamination with germs that commonly causes infectious diseases in child care settings is quite different from the type found in hospital settings, except perhaps in areas of hospitals where children are patients. Child care workers spread disease by changing diapers, feeding children, wiping noses, playing on the playground and in playrooms with objects that the children handle, drool on, and put into their mouths. Frequently, caregivers and children's hands are visibly soiled by lunches partially eaten, reusable play materials that are particulate or doughy, communal water for play, playground sand and dirt, finger paints, and shoes that must be removed and replaced for many children each day.

Caregivers have difficulty distinguishing between the concepts of cleaning and sanitizing. Cleaning removes visible soil while sanitizing treats a cleaned and rinsed surface reducing the number of germs on the surface to a level that is unlikely to transmit disease. For example, the commercial baby wipes that many child care providers and parents use, clean and thereby reduce the number of germs, but they do not clean enough to make disease transmission unlikely. After the caregiver discards a soiled diaper and removes any disposable gloves she wore, it would help to reduce contamination if she cleaned her

hands with a baby wipe before grabbing the clean diaper. She still needs to clean and sanitize her hands when she is finished with diapering by washing at a sink or by using an alcohol-based rub applied to her visibly clean hands — if an alcohol-based rub product could be kept inaccessible to children in the diaper area yet where the caregiver would use it before touching other surfaces.

Workers in child care settings are educators, not health care professionals. They neither have training in infection control nor access to personnel who have such training involved in supervising and monitoring hand hygiene, as do workers in hospital settings. Use of gloves as a barrier to prevent soiling of hands is misunderstood and inappropriately applied by many child care workers. Commonly, caregivers who wear gloves to reduce contamination of their hands forget to take them off before touching clean diapers and other surfaces that thus are contaminated by their soiled gloves.

Studies cited by the CDC noted that overcrowding and understaffing led to more hand contamination. Overcrowding and chronic understaffing are common in child care. Low pay and minimal benefits result in high turnover rates (30% to 50% per year) for child care staff. With these workforce conditions, educating and maintaining performance of any procedure beyond usual household routines poses significant challenges.

Unlike hospital settings, the mission of child care is the education of young children, including teaching personal hygiene as part of daily routines. When adults are performing hand hygiene, they are nearly always in a setting where children are present, and watching what the caregivers do — as role models. While hand rubs could conceiv-

ably be used for the children too, the lesson is not one that is likely to be particularly useful for hand hygiene when the child is not in child care.

Any substance brought into the child care setting must be safe since the product could serve as a potential source of ingestion, spillage, or be splashed into eyes of children. If products are not safe, they must be inaccessible to children. For practical reasons, this means keeping anything that could be toxic out of the child care area. If these substances are stored in the child care facility, they must be kept in a secure, locked place suitable for keeping flammable substances. This type of storage arrangement is not easily provided in many child care facilities. If storage requirements are met for alcohol-based hand rubs, the product would have limited use — only in areas inaccessible to the children and where they can be stored as a flammable liquid.

The CDC report says that alcohol-based hand sanitizers typically contain isopropanol, ethanol, n-propanol, or a combination of these chemicals at a concentration of 60% to 95% alcohol. These amounts of alcohol may represent potentially toxic exposures that could have significant health consequences. Skin absorption of ethanol and isopropanol can occur, but with brief exposures to intact skin, this route of entry into the body is unlikely to be a problem. Accidental splashes of these chemicals into the eye might result in eye irritation. The biggest worry for poisoning is from ingestion of the products, some of which are colored to make them more attractive. Although scientific studies of ingestion of hand sanitizers have not been published, some anecdotal experience exists. One regional Poison Control Center medical director reported that a brief review of recent calls to the center revealed several such incidents. In every case to date, the child was believed to have ingested a small volume, and was often noted to

Standards for Hand Hygiene in Caring for Our Children⁶

In January 2002, the American Academy of Pediatrics and the American Public Health Association published the 2nd edition of health and safety performance standards for out-of-home child care. Prepared before the release of the new CDC recommendations for hand hygiene in hospitals, the standards make scant mention of hand sanitizers. Standard 3.020 lists the situations that require handwashing:

- Upon arrival for the day or when moving from one child care group to another;
- Before and after:
 - Eating, handling food, or feeding a child,
 - Giving medication,
 - Playing in water that is used by more than one person;
- After:
 - Diapering,
 - Using the toilet or helping a child use a toilet,
 - Handling bodily fluid (mucus, blood, vomit) from sneezing, wiping and blowing noses, from mouths, or from sores,
 - Handling uncooked food, especially raw meat and poultry,
 - Handling pets and other animals,
 - Playing in sandboxes,
 - Cleaning or handling the garbage.

The rationale for this standard cites studies that show reduction of diarrheal illness and colds when frequent and proper handwashing practices were used.

Standard 3.021 specifies the handwashing procedure, including the use of liquid soap, disposable towels, comfortably warm water (60°F or warmer), 10 seconds for lathering, followed by rinsing until the hands are free of soap and dirt.

Standard 3.022 requires that caregivers help children wash at a sink. The standard stipulates an alternative hand hygiene method for children who cannot wash at a sink because they are unable to stand and they are too heavy for an adult to hold them safely to wash their hands at a sink. The alternative method involves wiping the child's hands sequentially with a wet towel, a soapy towel, and then a fresh wet paper towel to remove all soap. The rationale for this standard emphasizes the importance of teaching children good handwashing practices as well as preventing the spread of disease in child care.

Standard 3.023 addresses teaching and monitoring staff performance of handwashing, citing references that describe research findings of reduction of the spread of infection in child care associated with teaching and monitoring staff in child care centers. The standard cites a study where monitoring for hand hygiene without special training was shown to be associated with reduction in diarrhea in child care. A single episode of training without monitoring did not improve performance above that achieved by monitoring.

In Standard 5.060, a portable handwashing sink is required when plumbing is unavailable to provide a handwashing sink. The rationale for that standard says: "No barrier (gloves) or chemical substitute (sanitizer solutions) is as effective as running water . . . Hand sanitizers do not substitute for handwashing."

Source: American Academy of Pediatrics and the American Public Health Association. (2002). *Caring for Our Children. National Health and Safety Performance Standards: Guidelines for Out-of-Home Child Care* (2nd edition).

immediately spit much of it out, suggesting that the taste was bad enough that the child did not want to swallow the product. Thus far, none of the children who have ingested a hand sanitizer have exhibited significant toxicity. At least one child who was initially thought to have symptoms from drinking a hand sanitizer product had an undetectable blood alcohol level when tested shortly thereafter. However, experience with this type of poisoning is limited to date. It's certainly possible that a toxic exposure might occur. The results of ingestion of hand sanitizers will probably parallel the considerable experience with ingestions of colognes and perfumes, which also contain 50-99% ethanol. Most toddlers ingesting such products do not develop symptoms. In a 1988 case series of 119 patients, ingestions of less than one ounce occurred in 102 of the individuals who were poisoned, and none who swallowed less than one ounce developed symptoms. Three people with larger ingestions had transient symptoms.⁴ On the other hand, mouthwash may have an ethanol content of 15-25%. Some of the ingestions of mouthwash presumably involved drinking much larger volumes and were associated with serious, even fatal toxicity.

The estimated amount of the more widely distributed hand sanitizer products that could be potentially toxic for a toddler would be only 0.5 cc/kg, or about 5-7.5 cc (1-2 tsp, or 1-2 swallows) for the average toddler. Hopefully, the squeeze bottle packaging and gelatinous nature of these products will reduce the likelihood that such amounts would be ingested. Nevertheless, use of these products in child care will require vigilance and prompt evaluation by a health care professional if a child drinks even a small amount of the product.⁵

Any questions about ingestion or toxicity should be addressed by a region-

ally qualified poison control center accessible nationwide by calling 1-800-222-1222.

■ Like hospital settings, hand hygiene is most likely to occur when the required equipment and materials are close at hand whenever and wherever hand hygiene should be done. In many child care facilities, the expense of providing sinks precludes installation of sinks where they are needed — close enough to the child care action — to support handwashing when it must happen. The ability of the child care provider to afford installation and maintenance of equipment and sufficient handwashing supplies is far less than that of hospitals. Use of hand gels should not be used to avoid installing sinks in child care rooms. As noted in the CDC Fact Sheet, using hand rub products does not substitute for handwashing in non-health care settings.

■ Like hospital staff, caregivers rarely wash their hands using the recommended technique. However, unlike hospital staff, whether they wash at the right times or at all is usually not monitored. Even the most commonly used, nationally recommended quality assessment tools (e.g., Early Childhood Environmental Rating Scale-Revised [ECERS-R] and the accreditation self-study and validation tools for the accreditation process of the National Association for the Education of Young Children) leave it up to evaluators, most of whom are not health professionals, to decide whether hand hygiene is correctly performed at the times when it is required. Substantial compliance is judged by the observer and is necessary for a high quality rating. A newer version of one popular instrument used to assess infant-toddler care (Infant Toddler Environmental Rating Scale-Revised 2002 [ITERS-R]) specifies in greater detail when hand hygiene should occur.

■ The promotion of correct handwashing techniques in hospitals involves formal educational sessions and in-house infection control practitioners who can reinforce their teaching by doing spot checks of contamination and tracking outbreaks of disease in the institution. Unless a major outbreak is recognized and reported, no health professional surveillance of disease occurs. In child care, caregiver training relies on teaching by other early childhood educators for the most part. Involvement of health professionals as child care health consultants in child care is a growing trend, but is not yet widespread.

■ At this time, no studies have been published on use of hand sanitizers in child care. The available research suggests, but does not tell us how well these products might help control contamination and disease in the child care setting.

What Do We Do Now?

Recommendations for Hand Hygiene in Child (Day) Care Settings
Based on information contained in CDC October 25, 2002 MMWR Report and AAP/APHA *Caring for Our Children* 2002

We need to decide whether and when to use alcohol-based hand sanitizers in child care settings based on what we know about the benefits of using these products in health care settings and what we know about how child care operates. Until studies of hand sanitizer liquids, foams, and gels inform practice in the child care setting, it seems prudent to recommend the following:

When to Wash:

Caregivers and children in child care settings should wash their hands with soap and water in each of the situations listed in *Caring For Our Children* Stan-

dard 3.020 and whenever their hands are visibly dirty or soiled.

- Upon arrival for the day or when moving from one child care group to another;
- Before and after:
 - Eating, handling food, or feeding a child,
 - Giving medication,
 - Playing in water that is used by more than one person;
- After:
 - Diapering,
 - Using the toilet or helping a child use a toilet,
 - Handling bodily fluid (mucus, blood, vomit) from sneezing, wiping and blowing noses, from mouths, or from sores,
 - Handling uncooked food, especially raw meat and poultry,
 - Handling pets and other animals,
 - Playing in sandboxes,
 - Cleaning or handling the garbage.

Alcohol-based Hand Rubs (liquid, gel or foam hand sanitizers):

- Limit use of alcohol-based hand rubs to areas of the child care facility that are inaccessible to children, e.g., in a kitchen that is off-limits to children or in the maintenance equipment area. These products should not be accessible to children.
- Discourage alcohol-based hand rubs for hand hygiene in child use areas. If used, it should be limited to situations where there is no visible soil on the hands, where sinks are not available, and where the use and control of containers of the chemical sanitizer can ensure that no child can have independent use of the container or dispenser.
- Be sure that hand hygiene using alcohol-based hand rubs conform to the manufacturer's instructions. The procedure for using alcohol-based rubs should include:
 - Applying the required volume of the product to the palm of one hand

and rubbing hands together, covering all surfaces of the hands and fingers until the hands are dry. The required volume should keep the hand surfaces wet for at least 15 seconds or longer if so indicated by the manufacturer.

— Checking the dispenser systems for hand hygiene rubs on a regular schedule to be sure they deliver the required volume of the product and that they do not become clogged or malfunction in some other way.

— Storing supplies of alcohol-based hand rubs in cabinets or areas approved for flammable materials.

- **Fingernails:** Do not wear artificial fingernails or extenders when working in child care. Keep natural nail tips less than 1/4 inch long.
- **Rings:** Limit hand jewelry to simple finger bands to make it easy to clean and sanitize under and around them.
- **Contact with Body Fluids:** Follow Standard Precautions for Child Care whenever contact with body fluids occurs. (See *Caring for Our Children*, p. 492)
- **Staff Training:** Educate all personnel about hand hygiene and the importance of appropriate hand hygiene practices to their health and the health of the children.
- **Monitoring and Evaluation:** Monitor hand hygiene with unannounced and regular direct observation. When

hand rubs are used, check how much of the product is being used to be sure the appropriate amounts get used up as a way to verify the staff who are authorized to use this method of hand hygiene are continuing to use the material as they should.

References

- ¹ Centers for Disease Control and Prevention. (2002). Guideline for Hand Hygiene in Health-Care Settings: Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *MMWR*, 51 (No. RR-16):1-45.
- ² Centers for Disease Control and Promotion, Office of Communication. *Hand Hygiene Fact Sheet*. Found on 11/10/02 at www.cdc.gov/od/oc/media/pressrel/fs021025.htm
- ³ Ibid. CDC. Guideline for Hand Hygiene in Health-Care Settings, p.8.
- ⁴ Scherger, D.L., Wruk, K.M., Kulig, K.W., Rumack, B.H. (1988). Ethyl alcohol (ethanol)-containing cologne, perfume, and after-shave ingestions in children. *Am J Dis Child*, 142: 630-2.
- ⁵ Henretig, F., MD, FAAP. Poison Control Center, Philadelphia, PA. Personal communication, November 14, 2002.