

Hand Awareness

A Solution Not a Revolution for Respiratory Infections

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The concept of Hand Awareness affects a more comprehensive respiratory infection prevention plan than vaccine immunization alone, as most respiratory infections do not have a vaccine solution. Additionally, the resurgence of measles, mumps, and pertussis in those who have been vaccinated is a good reminder that we must improve our approach to respiratory infection prevention. Weak links exist in the vaccine production and administration chain. It is not the panacea we once hoped. Changing behavior, while very difficult, is critical in order to have a greater impact on reducing all respiratory infections. Hand Awareness is defined as an integrated approach of hand hygiene, respiratory etiquette, and cross-contamination awareness practices or, in lay terms, knowing where your hands are and what they are doing at all times. Teaching strategies and resources are explored to assist with student understanding and application of desired behaviors that will achieve the greatest impact of both student and staff productivity and wellness.

Keywords: T-zone; hand awareness; respiratory etiquette; infection prevention

Hand Awareness is an integrated concept of hand hygiene, respiratory etiquette, and cross-contamination awareness practices (or knowing where your hands are and what they are doing at all times). When practiced appropriately, these behaviors have the

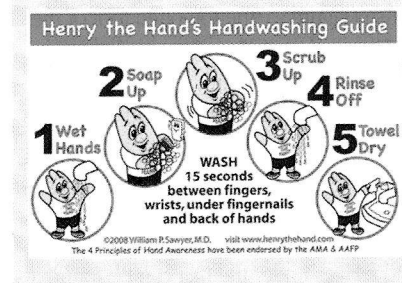
potential to dramatically reduce the incidence of the common cold, upper respiratory tract infections (URTI), and gastrointestinal infections. Practicing and promoting Hand Awareness is a significant step toward maintaining better health for both adults and children and acts as a personal and community protective strategy. School nurses are uniquely positioned to disseminate, teach, and model these important and practical hand hygiene behaviors and to have a significant impact to benefit the health and wellness of both students and staff.

While detailed research in the area of Hand Awareness has been limited and is in need of greater funding and study, recommendations currently encompass three sets of behavior modifications: (1) hand hygiene, (2) respiratory etiquette—not coughing or sneezing into the hands but into an elbow or a tissue, and (3) avoiding touches of the hand to the T-zone—the facial mucous membranes of the eyes, nose, and mouth. Of these three recommendations, the significance of the facial mucous membranes or T-zone, which are the *only* portal for entry into the body for all respiratory infections, remains the least discussed and could be the “missing link” in stopping the chain of infection perpetuation.

Hand Hygiene: Wash your hands when they are dirty and before eating

Hand hygiene is the act of cleaning one's hands to reduce the concentration of loosely attached germs, not the

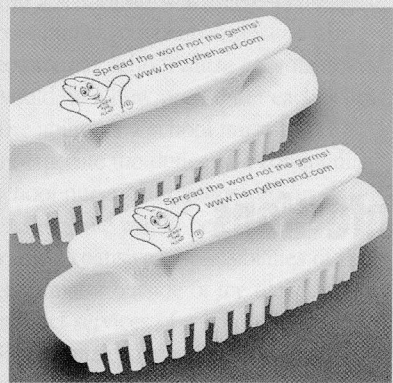
Figure 1. Hand Washing Instruction Static Cling Photo



indigenous flora, and can be accomplished by several different methods: soap and water, sanitizers, and wipes. Of these different methods, using plain soap (not antibacterial soap) and running water has been shown to be the most effective at removing more organisms from your hands.

The critical components for an effective hand wash are lathering with soap, using friction on all surfaces of the hands, and cleaning under the fingernails (see Figure 1). It is important to remember that soap does not kill germs. Soap is designed to loosen the loosely attached germs and organic matter by using friction as the hands are rubbed together during lathering. This creates a micelle effect (the soap huddling around the germs), making it easier to rinse it away. Then, rinsing the hands with running water removes the soap, now containing the germs and dirt, from the hands. The temperature of the water is of secondary importance to these two steps.

Figure 2. Nail Brush Photo



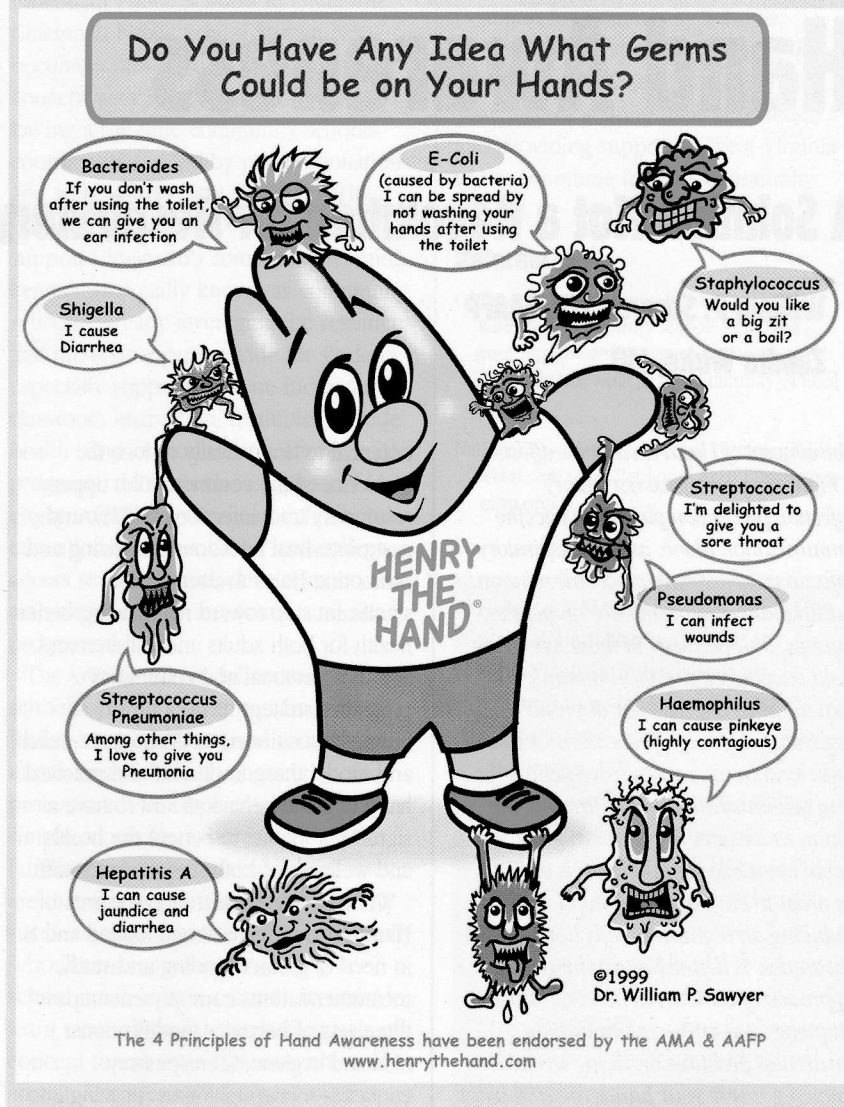
The third important step, cleaning under the fingernails, is often skipped. A nail brush (Figure 2), the forgotten tool of the 1950s, can be used to clean under the nails. Teachers in many schools used to inspect the students' hands and fingernails upon arrival at school in the 1960s. The area under the nail is a reservoir for germs and should receive attention at least once daily. Further information about what lives and thrives under the nail can be found at the Kenyon College MicrobeWiki entry titled "Human Hands and Fingernails" (Chen, Morales, & Nga Vo, n.d.).

Time is an additional variable to take into consideration, although there is growing discussion among scientists and the Centers for Disease Control and Prevention (CDC) about what is in fact an effective length of time for hand washing. As a general guideline, 15 to 30 seconds is what is referenced most frequently, and singing the ABCs or Happy Birthday twice is a close approximation of this amount of time. The Food and Drug Administration established 15 seconds for food service, and the CDC promotes 20 seconds for general public health. The correct technique of lathering all surfaces of the hand, however, is more critical than the overall length of time.

Respiratory Etiquette: Do not cough into your hands. Do not sneeze into your hands

Respiratory etiquette requires retraining ourselves to cough or sneeze into the

Figure 3. Germs on Hand Poster



elbow rather than our hands when a tissue is not readily available. Sneezing or coughing into the elbow still acts to cover the mouth or nose while preventing the hands from being contaminated and becoming fomites for transmission. The goal of this is to lower the total amount of aerosolized droplets and to decrease the range of droplet spread, which then in turn decreases the total area of infected surfaces and lowers the density of viruses on the affected surfaces. This is especially important as we shed viral particles for longer periods of time than we suspect (Bertsch, 2010; Winther, Gwaltney, Mygind, Turner, &

Hendley, 1986). Yes, you can always cough or sneeze into a tissue if they are available.

T-Zone Awareness: Do not put your fingers in your eyes, nose, or mouth

T-zone awareness is the most critical step in preventing the perpetuation of viral disease, as it prevents the transmission of respiratory pathogens by self-inoculation with a contaminated hand or finger. Self-inoculation occurs when a hand or finger, acting as a fomite, is brought to the mucous membranes of the face (T-zone).

Figure 4. The 4 Principles of Hand Awareness Poster



Touching the T-zone often occurs without thought, such as when we rub or scratch other parts of our face. While not all respiratory pathogens are transmitted via this route, many are, including respiratory syncytial virus and rhinovirus. CDC guidelines for influenza prevention have progressed to include the phrase “avoid touching your eyes, nose, and mouth” (Bertsch, 2010; CDC, 2013; Goldmann, 2000).

While T-zone awareness has not received the same study as hand hygiene, office workers have been documented to touch their faces at a rate of 16 times per hour, and more

disturbing—one in three health care workers have been documented to pick their nose during the course of a grand rounds meeting and another 1 in 2.7 rubbed their eyes (Elder, Sawyer, Pallerla, Khaja, & Blacker, 2014; Nicas & Best, 2008). Other studies have focused on wearing masks for preventing transmission (Aiello et al., 2010; Hogg & Huston, 2006), and Michael Bell, MD, of the CDC reiterated the significance of using protective eye wear to prevent the individual from self-inoculation of the conjunctival mucous membranes in his most recent Association for Professionals in Infection Control and Epidemiology,

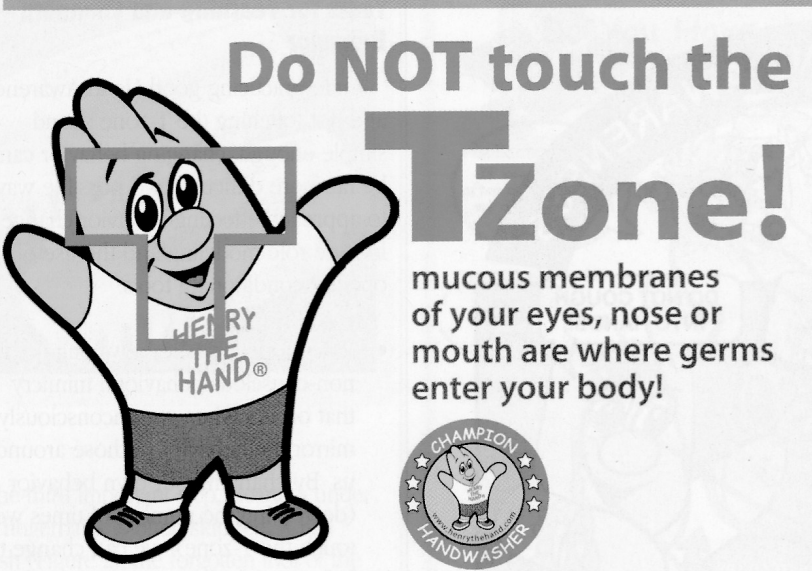
Inc webinar (Bell, 2014) about Middle East Respiratory Syndrome (MERS-CoV).

Tools for Teaching and Changing Behavior

While practicing good Hand Awareness and not touching the T-zone sound simple enough, changing behavior can be far more difficult. Two possible ways to approach effecting behavior change include role modeling and the use of operant conditioning tools.

- Role modeling takes advantage of the non-conscious behavioral mimicry that occurs when we unconsciously mirror the behavior of those around us. By changing our own behavior (decreasing the number of times we touch the T-zone), we can change the behavior of others. Research in this area has shown that this non-conscious behavioral mimicry can lead to a reduction in infectious disease (Chartrand & Bargh, 1999; Cheng & Chartrand, 2003). Given this, it is critical that all adults demonstrate the correct behavior so that children and adolescents learn to emulate this behavior. Conversely, if adults do not practice correct hand hygiene behavior, children will not learn the correct method either.
- Operant conditioning tools modify behavior by applying positive deviance strategies. For most of these, a trigger is used to draw attention to the aberrant or unhealthy behavior. Community and peer pressure are then used to modify or improve that behavior. This is known as the Hawthorne effect (McCarney et al., 2007).
 - Retraining Device is a small handheld tool frequently used in training dogs. A retraining device makes a clicking noise when depressed to draw one’s attention to the behavior you want to change. As a classroom tool with students, first split the group into smaller groups (e.g., in a staff meeting or classroom setting) based on the number of devices (clickers) you have. One


Figure 5. T-Zone Poster



The poster features a cartoon character named Henry the Hand, who is a hand with a face, wearing a white t-shirt with 'HENRY THE HAND' written on it and blue shorts. To the right of Henry is a diagram of a hand with a rectangular box highlighting the 'T-zone' (the area around the eyes, nose, and mouth). The text 'Do NOT touch the Tzone!' is written in large, bold letters. Below this, it says 'mucous membranes of your eyes, nose or mouth are where germs enter your body!'. There is a circular logo for 'CHAMPION HANDWASHER' with a star and a hand icon. At the bottom, it lists 'The 4 Principles of Hand Awareness' and provides a website URL.

Do NOT touch the Tzone!

mucous membranes of your eyes, nose or mouth are where germs enter your body!



The 4 Principles of Hand Awareness

1. **WASH** your hands when they are dirty and **BEFORE** eating.
2. **DO NOT** cough into your hands.
3. **DO NOT** sneeze into your hands.
4. Above all, **DO NOT** put your fingers into your eyes, nose or mouth!

Spread the word not the germs!

Visit www.henrythehand.com

The 4 Principles of Hand Awareness have been endorsed by the AMA & AAFP
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person within each group is then given a clicker and charged with observing the behavior of those in the group for some specified period of time, depressing the clicker when someone touches the T-zone. This audible click evokes a reaction that piques everyone's awareness about a T-zone breach that just occurred in the group. It is important to know that for some, this increase in awareness of touching or not touching facial membranes can cause a mild anxiety sensation.

- o Freeze Hands is a fun activity that can be used with younger students simultaneously during normal classroom activities. The

teacher, or a designated individual, periodically shouts "freeze." When the word *freeze* is called out, all students freeze the position of their hands. Everyone then looks around to see how many people have their hands in the T-zone area.

- o "Germ Potion" Lotion is a pumice-based, non-fragrant lotion that fluoresces and can be applied to the hands to simulate germs. A black light (UV 395) is then used to show distribution of "germs" as the lotion will fluoresce under the black light. This can be used on the hands before and after hand washing to show how effectively germs are being washed away. Another

game that uses Germ Lotion and increases awareness of how germs are spread begins by placing Germ Lotion (or glitter) on a ball. The ball is passed around the room to see where the "germs" end up. Then the black light is turned on to look for "germs" (Figure 3).

- o Respiratory Atomizer is a device filled with water and used to simulate the respiratory droplets that come out of the mouth and nose when coughing or sneezing and is an extremely effective training tool. The instructor walks around the room with the atomizer hidden, spraying the atomizer at random intervals on the students or adults in the room to simulate coughing and sneezing. Hear the reactions of surprise and disgust as droplets of water are deposited on them.

The infection prevention strategies emphasized in this article are derived from the 4 Principles of Hand Awareness (Figure 4) (endorsed by the American Medical Association and the American Academy of Family Physicians in 2001). These principles are simply packaged to provide a more programmatic approach to teach the Hand Awareness behavior modification that leads to developing lifelong good hand hygiene habits. Making the effort to teach these principles will better prepare future generations of students for working in health care and the food service industry, as hand hygiene is a critical behavior to master. Further, children do influence the behavior of adults and could help teach them to be more hand aware.

Hand Awareness protects from ALL respiratory infections. Imagine the positive health benefit to you personally, your family, and your school of not being sick again the rest of your life from a respiratory infection. It is more effective to act your way into a new way of doing things *than to try* thinking your way into a new way of acting. Kick the habit of touching the T-zone (see Figure 5)! Good health is in your hands.

References

- Aiello, A. E., Murray, G. F., Perez, V., Coulborn, R. M., Davis, B. M., Uddin, M., . . . Monto, A. S. (2010). Mask use, hand hygiene, and seasonal influenza-like illness among young adults: a randomized intervention trial. *The Journal of Infectious Diseases*, 201(4), 491–498. doi:10.1086/650396
- Bell, M. (2014, May 28). MERS-CoV. Implications for infection preventionists. *Apic Webinar*. Retrieved from <http://webinars.apic.org/session.php?id=13732>
- Bertsch, R. A. (2010). Avoiding upper respiratory tract infections by not touching the face. *Archives of Internal Medicine*, 170(9), 833–834. doi:10.1001/archinternmed.2010.96
- Centers for Disease Control and Prevention. (2013). *Everyday preventive actions that can help fight germs, like flu*. Retrieved from http://www.cdc.gov/flu/pdf/freeresources/updated/everyday_preventive.pdf
- Chartrand, T. L., & Bargh, J. A. (1999). The chameleon effect: The perception-behavior link and social interaction. *Journal of Personality and Social Psychology*, 76(6), 893–910.
- Chen, C. L., Morales, D., & Nga Vo, H. (Eds.). (n.d.). *Human hands and fingernails*. Retrieved from http://microbewiki.kenyon.edu/index.php/Human_Hands_and_Fingernails
- Cheng, C. M., & Chartrand, T. L. (2003). Self-monitoring without awareness: using mimicry as a nonconscious affiliation strategy. *Journal of Personality and Social Psychology*, 85(6), 1170–1179. doi:10.1037/0022-3514.85.6.1170
- Elder, N. C., Sawyer, W., Pallerla, H., Khaja, S., & Blacker, M. (2014). Hand hygiene and face touching in family medicine offices: A Cincinnati Area Research and Improvement Group (CARInG) network study. *Journal of the American Board of Family Medicine: JABFM*, 27(3), 339–346. doi:10.3122/jabfm.2014.03.130242
- Goldmann, D. A. (2000). Transmission of viral respiratory infections in the home. *The Pediatric Infectious Disease Journal*, 19(10 Suppl), S97–S102.
- Hogg, W., & Huston, P. (2006). Controlling droplet-transmitted respiratory infections: best practices and cost. *Canadian Family Physician Médecin De Famille Canadien*, 52(10), 1229–1232.
- McCarney, R., Warner, J., Iliffe, S., van Haselen, R., Griffin, M., & Fisher, P. (2007). The Hawthorne Effect: A randomised, controlled trial. *BMC Medical Research Methodology*, 7, 30. doi:10.1186/1471-2288-7-30
- Nicas, M., & Best, D. (2008). A study quantifying the hand-to-face contact rate and its potential application to predicting respiratory tract infection. *Journal of Occupational and Environmental Hygiene*, 5(6), 347–352. doi:10.1080/15459620802003896
- Winther, B., Gwaltney, J. M., Mygind, N., Turner, R. B., & Hendley, J. O. (1986). Sites of rhinovirus recovery after point inoculation of the upper airway. *JAMA*, 256(13), 1763–1767.

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