



**February 2009**  
**Volume 47 Number 1**  
**Article Number 1RIB7**

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# **Reducing the Spread of Infectious Disease Through Hand Washing**

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**Abstract:** According to the Centers for Disease Control (2002), hand washing is the simplest, most effective measure for preventing the spread of bacteria, pathogens, and viruses. Recent studies by the American Society for Microbiology (2005) indicate that Americans do not wash their hands after going to the bathroom and before handling or eating food. The study reported here sought to determine the presence of publications encouraging the public to wash hands in two North Carolina counties. Public restrooms located in rest areas, convenience stores, restaurants, and childcare facilities were examined. Findings indicate that literature encouraging hand washing is not present.

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## Introduction

Hands are the highways to the transmission and spread of bacteria, pathogens, and viruses that cause diseases, food-borne illness, and infections resulting from hospital treatment (nosocomial). Infectious germs on the hands are the most common ways that people spread infection. This is caused by rubbing their nose or eyes with their hands, which have been contaminated with the cold virus and other bacteria. Numerous studies support the finding that hand washing reduces both the carriage of pathogens on the hands and nosocomial infections (Steere & Mallison, 1975; Cooper, Medley, & Scott, 1999; Rotter, 1999). However, several studies have found that hand washing is poorly practiced outside the healthcare profession, indicating a need in the community (American Society for Microbiology 2005).

## Statement of the Problem

According to the Centers for Disease Control (CDC) (2002), hand washing is the simplest, most effective measure for preventing the spread of bacteria, pathogens, and viruses. Even with this knowledge, many Americans do not wash their hands. Recent studies by the American Society for Microbiology (2000) indicate that only 67% of Americans wash their hands after going to the bathroom, 78% after changing diaper 77% before handling or eating food. Forty-five percent of Americans report that they do not wash up after petting an animal, 31% after coughing or sneezing, and 20% after handling money.

Even healthcare professionals fail to wash their hands or wash long enough (WHO, 2006). Studies conducted by the CDC and several others found that nurses and doctors fail to wash their hands the recommend time 60% of the time between patient contacts and procedures. Such behavior results in approximately 2,400,000 nosocomial infections occurring in the U.S. each year, which cost over \$4.5 billion annually in extended care and treatment.

It has been estimated that in the next 40 to 50 years infections such as Streptococci, Escherichia coli, P. aeruginosa, Enterobacter spp., and Klebsiella pneumoniae, which have been problematic for years, will become even more of a problem. This rise is due to several factors:

- The shift to outpatient care,
- Aging population.
- Growing populations, and
- Increase in global travel.

Several researchers worldwide agree that in order to prevent and control these emerging nosocomial infections, national surveillance must be improved and expanded, more noninvasive infection-resistant devices must be developed, and health care facilities must do a better job of implementing existing control measures such as hand washing (Brower, & Chalk, 2003; Who, 2006).

Another area of concern related to the lack of hand washing is the spread of food-borne illnesses. Over 70% of all food-borne outbreaks originate in foodservice operations, and approximately 40% are the result of poor hand washing

and cross contamination.

Hand washing guidelines set by regulatory agencies for hospitals, food preparation, preschools, and daycares have been in place for two decades. However regulation alone has not successfully changed hand-washing behaviors. Several investigative studies have concluded that adherence to recommended hand hygiene procedures of healthcare organizations has been unacceptably poor (Pittet, 2001; Who, 2006). Other studies have determined that the factors affecting adherence to proper procedures is rooted in individuals' behavior, that hand cleansing patterns are most likely established in the first 10 years of life, and that an individual's religious and cultural background influences their perceptions about hand washing (Who, 2006).

In-service educational programs have been implemented, in many healthcare organizations, to address environmental influences. Although most of these education programs have been reported to be successful, their impact is only short term. In order for behaviors to change a multifaceted approach must be implemented (Pittet et al., 2004).

One of the most effective tools for reaching broad audiences and promoting behavioral change is through Social Marketing, using commercial radio, television, and printed media. Several research studies have addressed the effects print and electronic media have on attitudes, beliefs, and behaviors (Villani, 2001; Scott et al., 2007). Mass media is used for both entertainment and relaxation, but it is also a vehicle for education and information sharing. Educators use videos to enhance learning (Stempleski & Tomalin, 1990). It is estimated that Americans spend at least 10% of their lives watching television and that adults 18 to 64 on average spend 3 hours listening to the radio (Radio and Television News Directors Foundation, 2001). Mass media is the most effective way to reach broad audiences; however, mass media also offers the ability to target a particular "niche."

Well-designed marketing programs can play a pivotal role in addressing community concerns by increasing awareness, building community support, changing attitudes, teaching skills, and reinforcing healthy behaviors. Social marketing has proven to be an effective tool to increase condom use for the prevention of HIV/AIDS and reduce tobacco use, drinking, and driving, and address many other community issues (Price, 2001).

Although mass social marketing campaigns are a powerful tool, to be effective, they must be planned and tested to ensure that the messages reach, and meet the interests of, the chosen audience segments (e.g., women, men, different age groups) (Appleton & Sijbesma, 2005; Siegel & Doner, 2004).

## **Purpose and Objectives**

The purpose of the study reported here was to exam how and if social marketing is an effective means of promoting behavioral changes in the citizens of North Carolina towards hand washing by determining hand hygiene practices in two North Carolina counties (Guilford and Caswell counties). The specific objectives were as follows.

1. Determine if public rest rooms, convenience stores, restaurants, and childcare facilities currently display advertising promoting hand washing.
2. Develop social marketing materials, posters, and flyers for distribution to public rest rooms, convenience stores, restaurants, and childcare facilities.
3. Determine the level of hand washing taking place in public rest rooms, convenience stores, restaurants, and childcare facilities.

4. Research and collect data on the current resources available that promote the use of hand washing as a preventive measure to reduce the spread of infection disease.

## Methodology and Findings

Data collection included multiple phases; a sample of public restrooms located in rest areas, convenience stores, restaurants, and childcare facilities was selected for existing advertising promoting hand washing. Through an Internet phonebook of all restaurants, convenience stores, and childcare facilities by zip code, a list was generated for each county. Using a die, a random number of 3 was selected and used to choose every third restaurant and convenience store from each listing. Childcare facilities were randomly selected from a list of cooperating centers, facilities where the university's early childhood majors go for observations and student teaching.

An instrument was developed by the researchers to serve as a checklist for determining the presence of publications, noting whether it was designed to target employees or the public, as well as its location.

### Results from Objective 1

Findings indicate that in North Carolina literature is not present to encourage the public to wash hands, nor is literature present in public facilities instructing the public about the proper way to wash hands. Publications aimed at the consumer were not present. Of the 299 sites sampled, only 3.7% (11) displayed hand-washing publications aimed at the consumer. Most 78% (223) had a sign that stated it was a state law to wash your hands before returning to work. This sign is required by law to be on display.

Communications about the proper way to wash hands is present in 90% of childcare facilities, which, in both counties, use similar systems that are endorsed by the state and required by law, pictures with step-by-step detailed instructions on how to properly wash. The publication is aimed at children. The location was most often found above the sink at a child's eye level. Differences were observed when viewing the staff bathrooms. There was a "homemade" sign that stated that staff should wash hands before going back to work. Each restroom had a "homemade" sign in the restroom, with one exception, where a state of North Carolina sign regarding employees and hand washing was on display.

Literature is present in facilities where food is served stating that "by law employees must wash their hands before returning to work." This is required by law (North Carolina Department of Environment & Natural Resources, 2007), and a violation can cost businesses fines (NC Department of Environment and Natural Resources, 2007).

### Results from Objective 2

Examining the literature regarding public health communications, we found that often the groups most at risk are low income and uneducated. According to Nation Healthy People (2010, 2000) and Jackson and Duffy (1998), the most effective types of publications that target these groups would use bright catchy image as an attention getter and non-technical wording and content. Following this framework, the team developed a communication that included a large stop sign in color with simple language (Figure 1).

**Figure 1.**  
Hand Washing Communication



**Did you wash your hands?**

Washing your hands for 15-20 seconds  
reduces the spread of infectious disease.

Produced by the North Carolina A&T State University Cooperative Extension Program in  
cooperation with the United States Department of Agriculture (USDA)

### Results from Objective 3

Data were collected and analyzed using pre- and post comparisons to determine the level of hand washing taking place in public rest areas. This was determined by measuring soap and paper towel usage for 3 months prior to placing posters and flyers in the facility, then taking similar measures 3 months afterwards and comparing the differences.

Various restrooms on the campus of North Carolina A&T and the Greensboro airport (Piedmont International Airport) were selected to make pre- and post comparisons. (Each restroom used paper towels only.) From January through May, the frequency of towel use each month was compared against traffic pattern trends.

No changes were noted. Either the publication had an impact, or 3 months was not enough time to have an effect. There were several factors that are believed to have affected the accuracy of data.

One factor was the restrooms used in the study. Airport authorities were reluctant in the beginning to permit the use of restrooms that would require security clearance, until they first tested how often we would need access. Therefore we only used restrooms located outside secure areas, which receive much less traffic.

Another factor is related to the products used. The airport keeps a very detailed record of what and how much is used. However, the university does not keep detailed records of what and how much is used each week. Every building uses a different type of paper towel and soap dispenser, which requires various types and brands of towels and soap, each with varying numbers/gallons of product. The university's records list items by stock number and prices, making it difficult to track actual numbers. Unlike the airport, products at the university are not changed as frequently. Product in the airport restrooms are checked and adjusted on the hour every hour. On the campus it may be days before items are replaced.

### Results from Objective 4

An extensive search for hand washing publications within the state of North Carolina was conducted. The search began in-house with Cooperative Extension. It was concluded that North Carolina Extension does not have any publications that promote hand washing. Then the search looked at the state's Department of Health and Department of Labor and

the Center for Public Health. None of these organizations possessed any publications that promoted hand washing.

The North Carolina Child Care Health and Safety Resource Center provides resources for Childcare facilities in the state of North Carolina. They have several resources that promote hand washing among young children and staff.

## Conclusions

Findings of this study indicate that there are no publications on display in public restrooms targeting consumers that promote hand washing in Guilford and Caswell counties of North Carolina. The publication on display in North Carolina public restroom facilities is aimed at employees, not the public, and is required by the state. Childcare facilities in the state display detailed posters and literature promoting hand washing among young children.

Various restrooms on the campus of North Carolina A&T and the Greensboro airport were selected to test the communication developed by the team. Before displaying the communication, 3 months of soap and paper towel usage for each facility was collected for post comparisons. The communication was displayed for 3 months. Findings about the level of hand washing occurring in public facilities were inconclusive due to various unknowns, such as the exact number people using the restrooms daily, how much soap each person used, and whether soap and paper towels were used for activities other than hand washing (e.g., for cleaning cups, for use as utensils).

With the exception of what can be found in the restrooms of childcare facilities, posters, booklets, brochures, etc., that promote hand washing are nearly non-existent. Various Departments of Health offices have homemade signs located in the restroom-but nothing official. North Carolina Extension does not have any stand-alone hand washing literature. However, information can be obtained from various Web sites that primarily targets youth or is combined with food safety information.

## Recommendations

Based on the findings of the research study and data analysis reported here, the following recommendations are made for further research.

1. Conduct a statewide survey or a series of surveys using a reliable delivery system to determine the public's perception toward hand washing and hygiene.
2. Replicate this study on a statewide scale.
3. Collect 2 or more years of product use data to determine trends.
4. Conduct marketing research before developing publications such as posters, booklets, brochures, bulletin boards, and television and radio commercials for a hand hygiene campaign.
5. Use various social marketing tools to deliver the message.
6. Examine the trends of communicable diseases throughout the state. This will provide another basis for determining the impact of a campaign.

7. Develop a better means of determining traffic patterns, such as counters at entrances.

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