

**1. Provide a brief abstract or summary of your Honors in Action project including the following components: academic research and analysis, leadership roles, leadership development, action, collaboration, reflection and outcomes.**

In 1847 Dr. Ignaz Semmelweiss discovered fatal infections could be prevented among patients by hand-washing. By the 1940s, the frontier to health and medicine was the introduction of antibiotics. In 1969, United States Surgeon General, Dr. William Stewart, misguidedly declared, "It is time to close the book on infectious disease and declare the war against pestilence won." Ironically, microbes began a counter-assault against antibiotics almost immediately. Today's frontier is combating antibiotic resistance. Scientists believed developing antimicrobial agents was the answer, but the FDA is now investigating their safety and whether they contribute to antibiotic resistance. According to Nobel laureate Dr. Joshua Lederberg, "The future of humanity & microbes will likely evolve as...episodes of our wits versus their genes. We will never defeat antibiotic resistance; our only hope is to keep pace with it."

Methicillin-resistant Staphylococcus aureus (MRSA) is antibiotic-resistant bacteria that can cause a range of infections from Skin and Soft Tissue Infections (SSTIs) to life threatening invasive infections of the heart, blood, and internal organs. In 2013 the Centers for Disease Control and Prevention (CDC) reported over 80,000 people are treated annually for invasive MRSA infections resulting in over 11,000 deaths, and the World Health Organization reported high rates of antibiotic resistance in all of its regions. Originally the primary source of MRSA infections was hospital associated (HA-MRSA); however, community associated (CA-MRSA) infections are now a greater cause for concern. These and other antibiotic-resistant infections are estimated to surpass cancer as a cause of death by 2050.

Chapter members attended workshops to develop skills that would help us to research, plan, and implement our project. Researching this project caused us to come full circle back to the necessity of hand-washing to prevent infections. We interviewed local businesses to assess the need for CA-MRSA education in our community. We collaborated with a CDC researcher as well as Horry Georgetown Technical College (HGTC) professors and administrators. We surveyed over 500 people at our college to assess their knowledge of CA-MRSA and their level of commitment to community health. "Spread the Word, Not the Germ!" became the mantra for Alpha Nu Sigma's Honors in Action (HiA) project, a CA-MRSA awareness and prevention initiative. We utilized interactive hand-washing activities and designed brochures to educate our community of the many ways CA-MRSA is spread. Through this project we grew as scholar-servant-leaders when we learned how to critically analyze complex research and statistics, to compile professional reports, and most importantly that we have the ability to effect change on our campus.

**2. What theme in the current Honors Program Guide did your chapter focus on?**

Theme 7: What are the physical and ethical boundaries to the frontiers of health and medicine?

**3. Why and by what process did you choose this theme?**

During officer training, we discussed which HiA theme would be our focus. Officers broke into three groups to brainstorm. Each group narrowed its choice to one theme. There was a tie between groups in frontiers in thought, environment, and health. Ultimately, we took the debate to our chapter for a vote. Officers conducted preliminary research before presenting to chapter members. Valarie presented Theme 2 because she advocates for transgender acceptance. Terri presented Theme 4 because she is an environmentalist. Kelly presented Theme 7, specifically antibiotic resistance, because she is fascinated with microbiology. Chapter members voted in favor of Theme 7 because we wanted to explore the physical and ethical boundaries of antibiotics resistance.

**4. List the 8 academic/expert sources that were most enlightening regarding multiple perspectives of the Honors Study Topic Theme you selected. Briefly explain why these were the most important sources and what you learned from each of them as you researched your Theme.**

Aiello, PhD, A. E., et al. (2008, Aug.). Effect of Hand-hygiene on Infectious Disease Risk in the Community Setting: A Meta-Analysis. American Journal of Public Health.

This meta-analysis provides global data indicating hand-hygiene education positively affects prevention of infectious disease. Additionally, proper hand-washing lessens the need for antimicrobial agents and hand sanitizers.

David, M. Z., et al. (2014, April). Replacement of HA-MRSA by CA-MRSA Infections at an Academic Medical Center in the Midwestern United States, 2004-5 to 2008. PLoS ONE.

This article illustrates the dramatic shift from hospital to community acquired MRSA infections. It inspired us to research our community's knowledge of CA-MRSA.

Davis, J., et al. (2014). Carriage of methicillin-resistant staphylococci by healthy companion animals in the US. Letters in Applied Microbiology.

This article explains the ability of pets to act as a reservoir for MRSA through human-to-pet contact causing them to become asymptomatic carriers, demonstrating a newly discovered way MRSA can be spread in the community.

Everett, Stephen (2014, Aug. 13). Adjunct Ethics Professor, Horry Georgetown Technical College  
(K. Botoulas, Interviewer)

Professor Everett helped us define ethical boundaries within the frontiers of health and medicine. He enlightened us on the concept of narcissistic apathy by explaining we need to determine how we value something to recognize its boundary.

Hwan, K., et al. (2012, Feb.). Recurrent infections and immune evasion strategies of Staphylococcus aureus. Current Opinion in Microbiology.

This study explains how all strains of Staphylococcus aureus use the same mechanisms to evade our immune system. We finally understood in scientific terms what Spellberg and Lederberg state. Hwan contradicts them by suggesting a possible frontier that exploits Staphylococcus aureus' strategies to develop vaccines and chemotherapies decades from now.

Schlett, MPH, Carey D., et al. (2012, November). Marine Recruit Adherence in Skin and Soft Tissue Infection Prevention Trial: Implications for Recruit Research and Public Health Application. Military Medicine.

This article addresses an ethical boundary. Although MRSA-SSTIs are a recognized health threat among military personnel, officer candidates disregarded instructions to use chlorhexidine wipes thrice weekly to prevent infection. This supports Dr. Spellberg's statement that up to half of combat-related medical evacuations during Desert Storm in 1991 were due to infection.

See, MD, Isaac (2014, Sep. 18). Commissioned Corps Medical Officer, Centers for Disease Control and Prevention (CDC)  
(K. Williams, Interviewer)

Dr. See reported there are several different bacteria that are considered to be a serious threat and MRSA is one. He gave us the CDC report, Antibiotic Resistance Threats in The United States, 2013. For the first time the CDC prioritized bacteria based on threat level: urgent, serious, and concerning. He also directed us to educational materials for our action components.

Spellberg, MD, B. (2009). Rising Plague: The Global Threat from Deadly Bacteria and Our Dwindling Arsenal to Fight Them.

Alpha Nu Sigma 2015 Honors in Action Hallmark Award Entry  
Honors Study Topic: "Frontiers and the Spirit of Exploration"

Dr. Spellberg is an expert on antibiotic resistance and his book identified factors contributing to its complex web: agricultural practices, FDA protocols, prescription misuse, microbiology, and MRSA. He explained if hospital acquired infections are not contained they eventually make their way into the community.

**5. What conclusions did your chapter reach based on your research and how did these conclusions guide you to select the action part of your project?**

Our research team concluded a physical boundary to the frontier of antibiotic resistance is the ability of microbes to continually outwit our best science, and an ethical boundary of antibiotics resistance is narcissistic apathy toward infection prevention.

Bacteria are incredibly resourceful and research indicates a multitude of factors contribute to antibiotic resistance: preventative antibiotics in agriculture, patient misuse of prescriptions, and the widespread use of antimicrobial agent triclosan. Even if we removed all of them, bacteria would still find a way to evade antibiotics because they can trade resistance genes asexually and utilize chemicals to combat antibiotics. MRSA is one of the more common bacteria with these abilities. Since MRSA survives on things in our community we never considered such as beaches, pets, and numerous inanimate objects, we focused on CA-MRSA awareness and prevention.

We then researched the best way to prevent the spread of CA-MRSA. Despite the popularity of hand sanitizers, they pose problems because many use antimicrobial agents that promote antibiotic resistance. The most effective way to avoid infection and reduce the need for antibiotics is simple: wash your hands with soap and water! Alcohol-based hand sanitizers are the next best thing because they do not contribute to antibiotic resistance. This conclusion caused us to investigate why our college installed antimicrobial-based hand sanitizers only in restrooms, where people should wash their hands. This placement contributes to the misconception that using hand sanitizers is an acceptable substitution. Further research indicated educating the public about the importance of practicing proper hand-hygiene lowers infection rates.

Even though physical boundaries were clear, we struggled to understand ethical boundaries. HGTC Ethics Professor Dr. Peter Saltzstein explained ethics involves taking the interests of others into account. We discussed the Schlett study with him and Professor Everett who helped us define the growing disregard for community health as an ethical boundary. We termed this "I've never had MRSA so why should I care" attitude as narcissistic apathy. We concluded to overcome this ethical boundary, we would educate the community about the prevalence of CA-MRSA and promote proper hand-hygiene to combat its spread.

**6. Summarize your objective for this Honors in Action project and the process by which the chapter set these objectives.**

Our concern for community health grew during the research process which led us to brainstorm and finalize the following objectives:

- Interview a cross-section of area businesses to gauge their knowledge of CA-MRSA and prevention protocols.
- Survey HGTC students, faculty, and staff to assess their knowledge about CA-MRSA and their ethical stance regarding community health.
- Use Glo Germ™ activities to illustrate proper hand-washing and to raise CA-MRSA awareness.
- Display impactful signage in campus restrooms to reinforce the importance of hand-washing.
- Remove antimicrobial-based hand sanitizers from HGTC restrooms.
- Install alcohol-based hand sanitizers in common areas.

**7. With whom did you collaborate for this Honors in Action project?**

HGTC Academic Departments: Natural and Physical Science, Allied Health, Humanities, and Communications.  
HGTC Administrative Departments: Academic Affairs, Business and Finance, Marketing and Public Relations, Career Resource Center, Library, Printing Services, and Institutional Research  
Medical Professionals: Dr. Lonni Cox, Grand Strand Medical Center Pharmacist and Cindy Lomax, EMT  
Health Organization: Centers for Disease Control and Prevention

**8. Describe the leadership of chapter members that contributed to the planning, preparations, and implementation of this Honors in Action project. The exercise of leadership may come from groups/committees, officers, and non-officers. Leadership roles are not necessarily those that come with "titles."**

Chapter nursing students critically analyzed and interpreted complex scientific data found in much of our research. The Research Chairperson organized our project using the online collaboration tool *Trello.com* to assign research tasks and set deadlines. Committee members also used it to organize findings and make data easily accessible. Our community interview team created a flowchart of questions to ensure consistent communication between interviewers and participants. Our HiA Chairperson used knowledge gained from our interview skills seminar to collaborate with a leading researcher at the CDC and a local hospital pharmacist. In order to demonstrate effective hand-washing, our Glo Germ™ event coordinator collaborated with the microbiology department to secure their participation and donation of Glo Germ™ lotion and blacklights. Two committee members designed "Spread the Word, Not the Germ!" brochures and oversaw the printing and displaying of CDC educational material. Our survey developer worked extensively with ethics Professor Everett to define ethical boundaries. She also recruited several members to form the survey committee who collaborated with Dr. Saltzstein to develop questions to measure narcissistic apathy in our CA-MRSA Awareness Survey. The survey committee met several times with the Vice President (VP) of Academic Affairs to review and revise survey questions. The survey developer coordinated a schedule for chapter members to administer in-person surveys to a variety of classes. HiA and Research Chairpersons tabulated survey results and analyzed responses. Our Research Chairperson compiled a report of findings and recommendations. Chapter officers used skills learned from a speech professor to review this report with HGTC administrators.

**9. Describe leadership education and training activities taken to specifically help chapter members be more effective leaders for *this* Honors in Action project.**

Our training began with an academic research workshop led by an HGTC research librarian where we were instructed how to use the electronic library guide created specifically for our HiA theme. An HGTC Career Resource Center Specialist taught us how to interview medical professionals. All committee members took advantage of regional HiA training opportunities by participating in pre-conference workshops, such as "What is Academic Research," at the Carolinas Region Honors Institute and the Carolinas Region Leadership Conference. Three committee members attended HiA educational forums at NerdNation 2014, and one attended the International Honors Institute. Our survey developer defined ethical boundaries with an HGTC ethics professor and shared this knowledge with the committee to develop our CA-MRSA Awareness Survey. A College Project committee member instructed two HiA members in creating an Excel tabulation worksheet. They used this new skill to compile their survey data efficiently. An HGTC speech professor conducted a public speaking workshop for chapter officers.

**10. Describe the service or "action" components of this Honors in Action project that were inspired by your Honors Study Topic research. (Action can also include advocacy.)**

We conducted interviews with a cross-section of local businesses to determine if CA-MRSA awareness was a need in our community. We designed three flowcharts of questions for nonmedical personnel, medical professionals, and educators. For the businesses that were unaware of CA-MRSA, we designed and distributed awareness flyers. Previous microbiology students knew the benefit of participating in a Glo Germ™ activity. This three-step procedure illustrates most people do not properly wash their hands. The simulated bacteria glow under a blacklight and show participants where they should wash their hands better. We distributed "Spread the Word, Not the Germ!" brochures, gummy germs, and Purell® wipes. We also provided CDC instructions for proper hand-washing and correct hand sanitizer use to educate our college community and their children. We used these tools again to educate our region during our Fall Fellowship Campout. We created and administered a CA-MRSA Awareness Survey to HGTC faculty, staff, and students. We utilized survey results and research findings to create a formal report with recommendations which we presented to HGTC administrators. We requested removing antimicrobial-based hand sanitizers from all campus restrooms and installing alcohol-based hand sanitizers in common areas.

**11. What were the quantitative and qualitative outcomes of your project, including the lessons learned by your chapter members and others?**

We conducted telephone interviews with twenty-five area businesses that have skin-to-skin contact with the public. We were surprised to learn almost half of them were unaware of CA-MRSA. Interestingly, every tanning salon, gym, nail salon, and tattoo parlor had an understanding of CA-MRSA and its prevention, yet a chiropractic doctor struggled to define it. Additionally, several secretaries for other chiropractors and dentists would not allow us to conduct interviews. We were told, "We don't deal with infections." We found exercise facilities do a great job of educating patrons to prevent infection by cleaning equipment after use. We designed and distributed 50 CA-MRSA flyers to community businesses in need of this information.

Working with our college administrators created challenges. We were required to make several revisions to our CA-MRSA Awareness Survey, weakening the ethical portion of it. We requested a mass-email distribution of our survey; however, they required us to administer it in-person because they were worried CA-MRSA would be confused with the Ebola virus. We overcame this challenge by creating a survey distribution team that visited over twenty classes across a variety of disciplines. We surveyed 397 students and 115 faculty and staff. Findings included:

- Twice as many respondents wipe down gym equipment as wipe down shopping carts.
- 76% of students are willing to wash their hands after each visit to classrooms and common areas.
- Almost 80% of respondents believed hand sanitizer is less effective than hand-washing.
- Over 90% of respondents would use available hand sanitizers in common areas.

One student commented, "I had a dangerous MRSA infection. Public awareness and prevention would be highly beneficial."

We used a Glo Germ™ activity to demonstrate proper hand-hygiene in a fun and engaging way to over 100 HGTC employees, students, and their children, as well as 50 of our regional members and their children. One child's priceless reaction was "I'm never leaving the bathroom without washing my hands twice!" Teaching children how to properly wash their hands was our favorite part of this project.

An exciting outcome was VP of Finance Harold Hawley agreed to install alcohol-based hand sanitizers in HGTC common areas in 2015. Unfortunately, he refused to remove them from restrooms. He recognized the need to promote hand-washing and agreed to install educational signage in restrooms. Despite the challenges we faced with our administrators, we learned we must be persistent to facilitate change on campus.

**12. What is left undone or what opportunities remain for the future?**

Alpha Nu Sigma is committed to fulfilling our promise to VP Hawley to continually educate our college community on the importance of proper hand-washing. Mr. Hawley assured us that alcohol-based sanitizers and impactful signage will be installed on all three campuses by March 1st. Antimicrobial sanitizer will be replaced with alcohol-based in all campus restrooms also by March 1st. We will host another Glo Germ™ activity.