I've always thought of epidemiology as a powerful science. By identifying the roots of a problem and providing that information to other people, such as doctors and engineers, it provides two of the most important tools to protect public health: education and prevention.

When I heard about the Young Epidemiology Scholars competition in my sophomore year of high school, I saw an opportunity to conduct some epidemiological research of my own. Unsure of where to start, I searched on the website of the nearby Robert Wood Johnson University Hospital for a possible mentor. I sent an e-mail to Dr. Arlene Potts, the Director of Infectious Disease Control and Prevention at RWJUH, asking if she would be willing to meet with me to discuss ideas for research.

At our meeting, Dr. Potts gave me a pile of medical journals that I could barely fit under one arm. She told me to call her when I found something I was interested in.

That night, I read through a few of the journals. One report really caught my attention. It was about a football player who died from a bacterial infection I was unfamiliar with: CA-MRSA. I tried getting through a few more reports, but that football player’s case kept drawing me back. I knew I’d found my research topic.

**Athletes at Risk**

In further research, I learned that Community-Associated Methicillin-Resistant Staphylococcus aureus is a virulent and antibiotic-resistant strain of the very common Staphylococcus bacteria. CA-MRSA was curable, I read. But some cases had resisted even the strongest antibiotics, treatments were often arduous and costly, and the victims were hospitalized for a long time.

I eventually landed on the website of the Centers for Disease Control and Prevention (CDC), which had identified athletes as a group at high risk of contracting CA-MRSA because they come into contact with each other on the field, in the locker room, or both. My thoughts immediately turned to the student athletes at my school. It struck me that no one had investigated how well athletes were being taught to protect themselves from contracting CA-MRSA. It seemed to me that prevention is especially critical when confronting a disease that is resistant to a broad spectrum of treatment.

A few days later, I went back to Dr. Potts to discuss my ideas.

My plan was to conduct a study that quantified both athletes’ knowledge of CA-MRSA and their hygiene practices, before and after an educational intervention that I would create.

I started from scratch, researching the latest CA-MRSA risk factors and developing my own education curriculum using materials such as reports and advisories from the CDC and the New Jersey State Department of Health. I also included findings from studies showing strong correlations between certain hygiene practices, such as cleaning equipment, and a reduced likelihood of contraction.

My education program included short lectures, question-and-answer sessions, and handouts detailing
proper hygiene procedures. My goal was to drive home the most important aspects of CA-MRSA prevention and to give athletes access to reliable resources on the subject if they had any more concerns.

**Locker Room Science**

Before I headed out to the fields to meet the athletes, I collected bacterial samples from their equipment. The microbiology department at RWJUH provided me with the sampling and culturing supplies as well as the training I needed to conduct this part of my research.

By tracking the relative amount of bacteria the athletes regularly encountered—especially the amount of staph—I hoped to identify pieces of gear that athletes should pay more attention to or to find a relationship between the amounts of bacteria on different pieces of equipment.

On almost all of the equipment I sampled, I found bacteria that typically live on human skin. But I also found large amounts of staph on all their gear, with the highest numbers inside athletes’ equipment bags. Because these bags had the most staph and because they contained the other gear athletes used, the bags clearly required the most attention. I added proper equipment-cleaning techniques, such as wiping them with a bleach-water solution, to my educational plan.

Then I headed out to the fields, where I met with four sports teams who were at high risk: the football team, the boys’ and girls’ soccer teams, and the field hockey team. Combined, these teams gave me a fairly large population of 160 athletes to follow for the entire season.

**Old Habits Die Hard**

My study was conducted during the teams’ regular practices. Unfortunately, some athletes missed practice on the days when post-intervention surveys were administered, so my study could not accurately assess the effects of my educational program on all the athletes. The absence of certain athletes had only a marginal effect on some of my conclusions, but participation was definitely an area to improve in further research.

Another challenge was that my study had to be completely anonymous. Usually, in studies like mine, there is some sort of identification roster that includes the true identity of the subjects. But school privacy requirements would not allow such a list, so I had to create an algorithm that assigned each athlete an identification number based on their demographic information. This allowed me to track athletes’ progress by pairing the scores of their surveys while keeping their identities anonymous.

At the season’s end, I was disappointed, but I had kind of expected the results I obtained. I found that the education program was effective at helping athletes better understand CA-MRSA, its causes and effects, and how to prevent its contraction. But I also found virtually no change in athletes’ behavior. Despite learning that they were at high risk, that treatments could be ineffective, and that a few simple steps each day could save their lives, they acted no differently.

I concluded that a better education system needs to be devised. Other studies have shown that mentoring programs are highly effective in changing medical students’ hygiene practices. It’s possible that such a program in a high school athletic setting could have similar results. For now, my work has led to changes in school policies for cleaning athletic equipment. Not only does school staff sanitize all school-owned equipment weekly, but they also clean wrestling mats and other communal equipment before and after each use. The school’s website now includes information about MRSA as well, and I hope such progress will continue.

When people ask me about the most memorable part of my research or what I learned from it, I tell them I discovered that it was a long, tiring, and thankless walk from the lab to the practice fields. To improve the quality of people’s lives, epidemiologists need to be persistent and tireless. They need to be passionate about what they’re doing in order to overcome frustration and keep looking for answers.

I hope one day to work as a member of the CDC’s Epidemic Intelligence Service. I’d like to pursue infectious disease research and join the global fight against malaria and tuberculosis. Working on this project made me realize that I have the drive and desire to keep making that long walk, to do what it takes to make a difference.

Scott Kobner is a senior at Hunterdon Central Regional High School in New Jersey. For his work on this project, he was a semifinalist in the 2008 Young Epidemiology Scholars competition. He was also a semifinalist in the 2008 USA Biology Olympiad. Scott enjoys scuba diving, playing guitar, and snowboarding.

For more information about the Young Epidemiology Scholars competition, see page 28.