S.P.O.V.*

*Student Point of View

Scabs and Scars

For the greater good, a student participates in Vanderbilt's smallpox vaccine trial. By Ellen Stormer, BS'04

In the days following Sept. 11, I didn't know what to do. In fact, I didn't do anything. Nine months later, however, I heard that Vanderbilt Medical Center was looking for subjects for a study to test smallpox vaccine, and something finally clicked: Here was a way I could help. Instead of sending money or blood, I would let my antibodies do the work.

The information gained from this study could save American lives in the future. There was a more tangible compensation as well: As a college student attempting to accumulate the least amount of loans while completing my degree, the monetary payment for participating in the study was also attractive.

When I informed my parents of my intent, they expressed a degree of concern that surprised me. I did not expect this reaction from a chemistry teacher and nurse. But they did have some basis for alarm. Smallpox is the longest-lived human pathogen in history. It begins like any other virus, with symptoms of headache, fever and nausea. Soon the skin turns scarlet and a rash of red spots appears. The spots turn into blisters, then yellow pustules and then scabs—if you are lucky. The unlucky 40 percent die. The survivors live scarred, many without their eyesight.

I explained to my parents that the smallpox vaccine being tested is made from the bovine version of the virus. Contracting this weaker strain does not put human lives at risk. Yet, the similarities between the two strains are enough to build immunity against the deadly human variety.

Before deciding to join the study, I did some research to learn more about smallpox today. I found that two known sources of the human virus exist in the world. Colonies of the virus are frozen in liquid nitrogen in a government laboratory in Atlanta, where the vials lie under constant electronic surveillance. In Moscow another set of frozen vials stands guarded by police around the clock. Since Sept. 11 many fear smallpox as the next biological warfare agent. This raises serious questions: How secure are the facilities in Atlanta and Moscow? In the event of a terrorist attack, will U.S. health officials be prepared for action?

Smallpox vaccination policies in the event of a biological attack have become a hot topic. The year 1972 marked the last vaccination of children against smallpox in the United States. Citizens under 30 (half the population) have never received vaccinations. For those vaccinated, it is uncertain how long immunity lasts. The available quantity of smallpox vaccine is inadequate for the entire U.S. population, and no manufacturers are currently equipped to produce smallpox vaccine in large quantities. Frozen for more than 30 years, the current vaccine's viability was uncertain.

The Vanderbilt smallpox vaccine study examined the two frozen stocks of vaccine possessed by the federal government. One stock, known as Dryvas, has been stored at the Centers for Disease Control in Atlanta. Aventis, the other stock, was created for the military but never tested due to the eradication of smallpox in the '70s. The goal of the study was to determine if the Dryvas vaccine is safe and if both Aventis and Dryvas can be diluted without compromising their effectiveness. If diluted to a one-10th solution, existing stocks of vaccine could protect the entire nation.

To qualify for the study, I first had to pass a physical. It consisted of the typical routine: height, weight, blood pressure, temperature, blood and urine samples. During the physical examination, Kathryn Edwards, the professor of pediatrics who headed up the study, asked me to take off my shoes and socks. Surprised, I complied. She surveyed my hands, feet, arms and legs for any skin disorders, explaining that individuals with an existing skin condition such as dermatitis, impetigo or shingles are at greater risk when receiving the smallpox vaccine.

On vaccination day I gave another blood sample and, along with the other women, provided a urine sample for a pregnancy test. The participants all congregated in a lunch break room. We finished filling out the consent forms and nervously waited. Individuals left when called by name and then trickled back, bandages on their arms. When called to get my inoculation, I entered a small, closed-in room with a nurse and Dr. Edwards. Colorful children's posters hung on the walls. The nurse used a computer to assign randomly the vaccine stock I would receive. No one in

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the room knew which stock or dilution of the virus I received and against which my body's immune system would soon be waging war.

"One, two, three, four, five …," Edwards counted aloud while repeatedly jabbing a pronged needle in my left upper arm. At first it felt like a pinprick, but by the count of nine the jabs began to hurt. I listened to her steady counting, begging for the end to come quickly. Unlike any vaccine I had received before, Dr. Edwards then rubbed the clear liquid on my punctured skin instead of injecting it into the bloodstream. The 15 punctures were to ensure proper interaction between my body and the vaccine.

The July air hung heavy with humidity when I stepped outside Vanderbilt's Medical Center North. I clutched in my hand a diary card, care instructions, bandage change kit and digital thermometer. Every day I was to record my temperature, symptoms and any medications taken. Most important, I had to take caution not to contaminate myself or others.

One of the biggest surprises I got was the public reaction. Strangers would come up to me on the street to ask, "What happened to your arm?" One stranger went so far as to actually poke the bandage, which was not only embarrassing but quite painful.

The bandage was considerably visible when I wore short sleeves. The bright-white non-stick gauze patch was 1.5 inches square and stood out against my summer-toned skin. The clear, slightly larger, waterproof plastic sheet covering the gauze brought more attention by its sheen. Underneath the bandage, the vaccine was reacting with my skin. My body responded by forming a blister. The blister and the fluids in it contained the live virus. I couldn't remove the bandage, even for showers, because if any fluid transferred to anoth-

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er location, the virus would spread.

A week after the vaccination, my arm began to hurt—not just at the inoculation site, but throughout my shoulder. Shooting, burning pains traveled across my shoulder, back and neck. The pain hit intensely and unpredictably, producing headaches. For the first time I began to doubt my decision to participate in the study. Although informed of possible pain, soreness, redness and swelling at the vaccination site, I was surprised by the intensity of the effects. But it was too late to turn back.

On each of my return visits to the clinic, a nurse removed the bandage to measure and photograph the blister underneath. Air against my skin felt wonderful, as my skin begged to breathe underneath the shiny plastic bandage. But within a couple minutes, they sent me on my way, arm covered again. Occasionally, blood was drawn to examine antibody levels, which is the only method to determine if the vaccine dilution was strong enough to cause my body to react. About two weeks after the vaccination, all pain and headaches subsided. My blister began the process of scabbing, and with each visit I hoped the scab had fallen off. Only then could my bandage be removed permanently.

Fourteen months after my immunization, I now have a dime-sized scar on my left shoulder, antibodies in my blood, and $375 in the bank. Three small blisters resulted in an asymmetrical scar the deep-red shade of skin healing itself. Instead of being asked about the patch on my arm, people now ask me about the scar.

Discussing the personal choice I made with strangers is still awkward. Many don't understand my decision, and I struggle to explain. But I finally figured out what to tell them. Medical researchers do all they can with animal subjects, but without human volunteers they cannot bring new medicines and vaccines to market.

Last November, President Bush approved preemptive smallpox vaccination of 1 million U.S. military personnel and civilian medical workers. My involvement in the study helped to make these vaccinations as safe as possible. Although I experienced pain and discomfort, in the long run science and society gained some valuable knowledge. That is worth the inconvenience of strangers stopping me on the street.