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Strategic Communication, Design,
Writing, Editing, Web Development

writing portfolio

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Help for Honduras

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As their yellow school bus crawled up the Honduran mountainside, the passengers could see the line from a half mile away.

Outside the walls of a school, more than 400 people had gathered on this early Tuesday morning. Many of them were children. Many of them were suffering from scabies, lice, or neglected wounds. All of them were suffering from a general lack of medical care.

The place they called home, Los Pinos, is an impoverished community that largely did not exist until 1998, when Hurricane Mitch devastated the nearby Honduran capital of Tegucigalpa and turned this area into a refuge for about 10,000 displaced people. Los Pinos did not have the infrastructure to support its new residents, and even now, more than a decade later, it still does not have running water, sewer, or proper septic systems.

This was not the typical destination for a busload of college students on spring break, but for 11 second-year students from the UNC Eshelman School of Pharmacy, spring break 2009 was anything but your typical fun-in-the-sun getaway.

The students were part of a medical relief mission from the University of North Carolina at Chapel Hill. The group, consisted of students, faculty, and volunteers, provided aid to underserved communities in and around Tegucigalpa from March 5 to 13. They treated more than 1,700 people, distributed about a ton of medical supplies, delivered food to more than thirty-five needy families, and provided school supplies, book bags, clothes, and toys to hundreds of children.

“This is something I wanted to do before I got to



Photo courtesy of Compassion Med International

pharmacy school,” says Yunji Kim, one of the pharmacy students who went on the trip. “I was just glad that there was an opportunity for us to do it.”

“They need me down there”

Honduras is the third poorest country in Latin America and the Caribbean, with more than half of its people living in poverty. In the rural areas, where more than 50 percent of Hondurans reside, about a quarter of the population has no access to safe drinking water and 45 percent lack adequate sanitation facilities.

“The division between the haves and have-nots is very striking,” says Christine Walko, PharmD, an assistant professor at the UNC Eshelman School of Pharmacy who went on the mission as a volunteer pharmacist. “You would have the large president’s house right next to a tiny little shack. They do have a mall. They do have prosperous sections, but it’s just odd because it’s interspersed with these very, very poor areas that don’t even have running water.”

Honduras' healthcare situation reflects the country's financial problems and sharp social-economic divide. Its per capita expenditure on health is about 3.5 percent of what the United States spends. More than 80 percent of the population is uninsured, and about 30 percent receives no health care at all. Even for the people who can afford treatment, the care they receive at hospitals and clinics is subpar due to a shortage of medical supplies, equipment, and personnel.

The students on the relief mission got a first-hand look at the state of Honduran health care when they visited two hospitals in Tegucigalpa.

"I went into an oncology ward for men, and it was something you see in a horror movie, where you just see a bunch of beds in a room, and people look like they are there waiting to die," Kim says. "We asked them, 'Do you know what kind of cancer you have?' and they said, 'I don't know. I just know I have cancer.' One of the patients, we asked him, 'When do you think you'll be leaving?' He said, 'I don't know, but I'm leaving tomorrow to practice my goodbyes.'"

"I think a lot of patients kind of knew what their outcomes were, and they couldn't afford any more medicine."

As bad as the conditions are in Honduras, they are actually an improvement from 2000, when Jean Davison, MSN, RN, FNP-C, visited the country for the first time. She was a masters student in the UNC School of Nursing at the time, and the surgeon she worked with on one of her clinical rotations invited her on a relief mission to Honduras. Upon arrival, she found a country whose infrastructure had been devastated two years before by the 180 mph winds of Hurricane Mitch, the deadliest Atlantic hurricane in almost 220 years. The hurricane killed more than 11,000 in Central America, including 7,000 in Honduras, and left the country with \$3.8 billion of damages.

Comparing the Standard of Health Care

	Honduras	USA
Physicians per 10,000 people	6 (2000)	26 (2000)
Pharmaceutical personnel per 10,000 people	1 (2000)	9 (2000)
Nursing and midwifery personnel per 10,000 people	13 (2000)	94 (2000)
Per capita total expenditure on health	\$91 (2005)	\$6,350 (2005)
Percentage of GDP spent on health	7.5% (2005)	15.2% (2005)
Life expectancy at birth (male/female), in years	67/73 (2006)	75/80 (2006)
Healthy life expectancy at birth (male/female), in years	56/61 (2003)	67/71 (2003)
Probability of dying under 5 (per 1,000 live births)	27 (2006)	8 (2006)

Source: World Health Organization

"I remember when I first came back, it was almost like I was depressed because I thought, 'They need me down there,' " says Davison, now a clinical assistant professor at the School of Nursing. "It was like being taken out of a society where you knew you were making a difference in these people's lives."

Davison didn't stay away for long. She has been part of six relief missions to Honduras since then, first as a student, later as a volunteer, and now as a team leader. She has also led missions to other needy parts of the world, including Romania, the West Bank of Israel, and post-Katrina New Orleans. In 2002, she created the nonprofit organization Compassion Med International to make it easier to find funding and volunteers for

the trips. In 2003, the first year Davison led a team to Honduras, she had a group of seven, all medical professionals. That number has grown steadily since. She took students with her for the first time in 2007, when she began offering the Honduras mission as part of an independent-study course in the School of Nursing.

Walko joined the mission for the first time in 2008 as one of three pharmacists in the group. It was the first time she had been to a third-world country, and the experience left such a strong impression on her that not only did she volunteer for the trip again this year, she also took time at the end of her lectures to tell her pharmacy students why they should give up their spring break and pay about \$1,500 to sign up for the mission.

“She was telling us about it and left some pamphlets about it,” says Megan Fontana, one of the students who signed up for the trip this year. “I was incredibly interested from that moment. I kind of got hooked right from there.”

Fontana wasn't the only one. In fact, pharmacy stu-

dents made up the majority of the 20 students who went on the trip, and Davison had to turn away a few who wanted to go so that she would have enough nursing students in the group. She ended up taking a team of 34, consisted of students and volunteer doctors, nurses, nurse practitioners, and pharmacists.

“Actually, I couldn't take more than 34 people because we go everywhere in a bus, and that's the limit you can fit in a bus,” Davison says.

The large number made it possible to split the group into two teams to serve two communities each day. In addition, Davison says having so many pharmacy students made life easier for the volunteer pharmacists, who usually have to fill four or five prescriptions for every sick patient that comes to the clinic.

“In the past, the pharmacists always ran the pharmacy, but they worked with volunteers that acted as pharmacy techs that were not really trained,” Davison says. “So both the pharmacists said this year that the trip was so much easier for them and so much more enjoyable.”

This year's group was also able to provide more pharmacy consultation because several of the pharmacy students spoke Spanish. That added dimension also enriched those students' experience. For instance, Sherif El-Refai got the chance to spend some time working in triage, talking to patients to find out what their ailments were, an aspect of health care he doesn't get much exposure to at the School. His Spanish skills also enabled him to chat more with patients.

“Most of the time, I would be in the pharmacy and I give them something and tell them, ‘This is your medicine and this is what you need to do,’ and then they'll just keep talking because they just want to chit-chat,” he says. “This one elderly woman, she was just telling me about her kids, how her daughter is going to engineering school, and how she's going to miss her.”



Photo courtesy of Compassion Med International

Pharmacy student Yunji Kim (left) and assistant professor Chris Walko, who was a volunteer on the trip, prepare medications.

“They will line up and they will wait patiently”

This year’s relief team brought to Honduras more than 60 suitcases of medicines and supplies, which the students helped collect through donation drives at the School and from other sources. Once in Tegucigalpa, the group set up base in a church that is tightly intertwined with the surrounding community. The pastor, Moises Chino, moved to Honduras from Mexico to preach and to teach. His ministry, Iglesia Misionera de Cristo, operates a clinic offering affordable care. He also runs a nutrition program for malnourished children, a feeding program for poor families, and a micro-lending program to help women who want to stay in Honduras

but have no income start small businesses.

Davison first met Chino in 2000 on her first relief mission to Honduras, and he has played a key role in helping her with the logistics of setting up relief operations in Tegucigalpa. Women from the church cooked food for the relief workers every day, and Chino used his connections to help ensure the group’s safety, a top priority in a high-crime city.

“He knows a lot of the local gang leaders, as well as the police, so they kind of looked out for us the whole time that we were there and made sure that we stayed safe,” Walko says.

The clinics usually ran from 9:00 a.m. to about 5:00 p.m.



Photo courtesy of Compassion Med International

Hundreds of people wait in line for the relief team at the impoverished community of Los Pinos.

Patients would first go to a triage area, where workers determined whether they needed to see a doctor or if they were just there to get the free vitamins and anti-parasitic medications, which the team gave out to everyone. The patients then received their prescriptions on note cards and proceeded to the pharmacy area, where the volunteer pharmacists and pharmacy students had their suitcases of drugs laid out, ready to dispense medications.

Davison says that kind of crowd isn't atypical for really needy areas such as Los Pinos.

"When the people in these communities hear that somebody is coming, they will line up and they will wait patiently until they are seen," she says. "If we get there at 7 o'clock, 8 o'clock in the morning, many times there's a line all the way out that just keeps going and going. So you walk in to set up, and you are already overwhelmed because you know there are so many people that need to be seen."

Aside from the number of patients, relief workers also had to cope with the lack of supplies at the clinic sites. They usually operated out of a school or a church that was, in Walko's words, "pretty much just a cement building that they clear everything out of." At some places, the workers didn't have scales, so they had to estimate children's weight to determine the right dose.

"There were places where we didn't have running water, where we had to bring all our own water to dissolve the medication in," Walko says. "There would be dogs running around the pharmacy. That was not the best situation. It was pretty rustic, but the patients make it quite worthwhile for us."

Memorable experiences

The relief workers brought back plenty of stories and pictures of the patients they treated: the woman in Los Pinos with a year-old leg injury that had turned into a giant ulcer because she didn't have access to medical care; the 2-year-old, asthma-stricken boy in Nuevos



Photo courtesy of Compassion Med International

Horizontes who got better instantly and fell asleep in his mother's lap when Walko treated him with a nebulizer; the paraplegic with bedsores and infected wounds who couldn't make it to the clinic (so the relief workers went to him); the woman who wept when she received a home visit because she didn't expect anyone would bring help to her doorstep; the toothless old lady who flashed a big gummy smile and hugged the pharmacists and students after they ground up her anti-parasitic medication for her.

The students' time outside the clinics proved memorable as well. On their fourth day in Tegucigalpa, each relief worker adopted a child from a poor family for a day. They went out to lunch at either McDonald's or Pizza Hut — a special treat for the kids — and bonded over hamburgers and pepperoni-and-cheese pizzas.

"A lot of them saved food for their brothers and sisters," pharmacy student Cindy Arocena says. "They stopped eating after a while, and then when we asked them, 'Are you full?' there was one kid that said, 'No, I want to take this to my sister.'"

Later that day, the relief workers went to the communities that many of their kids were from to deliver food to needy families. They delivered more than 35 food packages — large plastic bags that contained \$30 worth

of food, including a lot of raw ingredients such as rice, sugar, and flour, which was enough to feed a family of five for a week.

“One of the food packets that went out in one of these really rural, very poor areas, the woman, when she saw the students bringing the packets, said they were angels because she had run out of everything to eat, and she had four children,” Davison says. “And she just burst out crying. It made such a difference in that family’s life to now have a week’s supply of food.”

The experience had a powerful impact on the students as well as they saw up close the poverty in which their adopted kids lived: tiny, crowded one-room shacks made of thin sheets of tin or wood, often smaller than a 10-by-12-foot office and some without running water. In one such house, El-Refai found a single mother with 10 kids.

While many students on the trip were shocked to see such poverty, it was a familiar sight for El-Refai. He lived in Cairo, Egypt, before moving to New York in second grade. He has made frequent trips back to Egypt and has also been to other countries, including Saudi Arabia and Palestine. Those experiences exposed him to the kind of poverty he witnessed in Tegucigalpa, or even worse. In fact, he signed up for the Honduras mission in part because he wants to set up similar relief efforts in Egypt after he graduates and thought this trip would help prepare him for that undertaking.

“Even if it’s a different language and culture, the needs are still the same; people are still trying to get enough food to feed their families,” El-Refai says. “They are very sick. They try to find help but don’t have the means to get it. It’s the same type of situation.”

Arocena also was no stranger to what she saw in Tegucigalpa, having grown up in a poor family in the Philippines. She remembers being one of the kids receiving free supplies from missionaries. On the Hondu-

ras mission, she found herself playing the opposite role.

“In the Philippines, we also have missionaries that come there,” she says. “When I was younger, I didn’t really understand what’s going on, why they are here. I always just thought of it as free stuff.”

“But in Honduras, it was a different thing. Knowing that we were actually doing something for them that they need, that they would never have otherwise, it was just amazing.”

Despite the living conditions, however, the students say the spirits of the people they encountered in Honduras, particularly the kids, did not reflect the poverty that surrounded them.

“The poverty, you can see it based on the physical features and how much people actually have, but you don’t see it in their spirits, which is really interesting,” Fontana says. “They are not constantly like, ‘Oh, woe is me.’ They have a good spirit about them, so you don’t instinctively think they are in poverty.”

Later in the week, the relief workers helped with the church’s feeding program for malnourished kids and gave clothes to the children who came, including many of the ones they had adopted. At the end of the trip, when the kids showed their appreciation with a song-and-dance show, a lot of them were wearing the clothes they had received from the relief team.

“So it was kind of like coming full circle, and it made you realize what an impact you had just on this one child and their life,” Davison says. “And what was fun about that was that the kids were just so grateful. They were so appreciative. During the program, when they weren’t singing, they would run up and sit on the lap of the person who had adopted them.”

“When they were doing their program, I was crying,” Arocena says. “I was bawling because this might be the last time I’m ever going to see this kid again.”

After the trip

Just as Arocena thought about what would happen to her adopted kid after she left, many of the other relief workers also wondered about the future of the people they met.

In Walko's case, she's doing something to help improve the future for one of those people. While delivering food packages during the 2008 mission, she met Rosa Gomez and her 13-year-old daughter, Paola. She saw them again on this year's trip, and she stays in touch with them through Chino, who has access to e-mail.

"[Paola] has a speech impediment and doesn't speak a whole lot, but she would always try to sit next to me and just look at me and smile," Walko says. "I couldn't say much in Spanish. I offered her chocolate once, and she looked at me and said, 'Thank you.' I said, 'Aha, I caught you! You know some English!'"

Paola's father was an alcoholic — "Every time we saw him, he was passed out in a corner in the middle of the day," Walko says — so Rosa did what she could to take care of the family, but they could not afford further education for Paola, who has to go to a special school because of her speech impediment.

"It's \$27 a month, so I said, 'I'll pay for it,'" Walko says. "That's something easy that I can do that will make an impact for them."

Providing for a child's education is just one way Walko is trying to help the Honduran people beyond the relief mission. Instead of trying to revamp the entire system in Honduras, she looks for realistic ways she can help make an

impact. For instance, she wants to find a way in the future to make HPV vaccine available to the people there, as cervical cancer is a common cause of death among Honduran women, mainly due to the lack of screening and vaccination.

Walko will also get a chance to see Paola again as she has decided to continue volunteering for the Honduras mission. Whenever she goes to the grocery store now, she keeps an eye out for sales on supplies for the next trip.

"It touches everyone in a different way," Walko says about the experience in Honduras. "How you decide to keep it a part of your life — whether it's telling someone else or being a part of it in the future

— is up to each individual. I think I kind of got sucked in now. It's what I'm going to do every year. I think it's a great thing to offer to our students. I already have a lot of people who are excited about it next year."

Walko is not alone in her endeavor to do more to help. Just as Davison's first trip to Honduras prompted her to keep going back, this year's mission had a similar impact on many of the first-timers. Arocena says she and another student have talked about going back to Honduras in four years to try to find their adopted kids again. Walko says some of the students have gotten involved in groups that help Honduran children. Many of the students intend to sign up for future relief efforts, and they are spreading the word about Davison's mission trips.

"Anybody who is able to do it, I really recommend it," El-Refai says. "Before I went, even though I was really excited to go, I was like, 'When I do this, I'm not going to have a spring break.' But honestly, it was probably one of the most fun, memorable spring breaks I've had." ♦



Photo courtesy of Compassion Med International

Wiping Out Hazardous Drug Contamination

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Date: 2013

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On February 20, 2008, William Zamboni, PharmD, PhD, had been at the UNC Eshelman School of Pharmacy for barely a week. He didn't have a lab or even a computer yet, but he already had an opportunity knocking on his office door.

In came Stephen Eckel, PharmD, MHA, the assistant director of pharmacy at UNC Hospitals and an adjunct assistant professor at the School. Eckel pitched an idea for a collaboration: creating a reference lab to measure the level of chemotherapy contamination on surfaces in places that worked with anticancer drugs, such as hospitals, pharmacies, clinics, and labs.

Zamboni was confident that they could develop a way to detect the contamination, but he had some doubts about what they would find.

"Initially, I wasn't a believer," says Zamboni, an associate professor at the School. "I didn't think the level of chemotherapy contamination was a problem. I knew we could measure it, but I didn't know if the level would be detectable or, even if we detected exposure, if the level would be relevant."

Nonetheless, Eckel's proposal piqued Zamboni's interest and they embarked on a partnership that, in the four years since their initial meeting, has made a true believer out of Zamboni and spawned a successful spinoff company, ChemoGLO LLC, which offers products and services to detect and clean up surface contamination of anticancer agents and other hazardous drugs.

"It was almost like the perfect storm," Zamboni says. "I had the expertise. Stephen had the idea, the vision, and the connections. And UNC, because of the way



Photo by John Zhu

William Zamboni (left) and Stephen Eckel began their partnership in 2008, shortly after Zamboni arrived at UNC.

they think about creating companies, really fostered the collaboration and development and helped us do this."

A Better Alternative

Eckel, a leading expert on the issue of chemotherapy contamination in the workplace, says studies have found that people who prepare and administer chemotherapy drugs are at risk of developing complications from exposure to those drugs. Despite the harmful effects, however, he says the issue has only started to receive more attention in recent years.

"I've given talks all over the world on cancer-drug contamination and the risks associated with it for employees, and every time when I walk away, somebody would come up to me and say, 'I never knew that was a concern,'" Eckel says.

"So part of the problem is just the need for education, and part of the solution is to keep people aware of

the problem. It's ok to prepare chemotherapy—obviously people need it—but we need to make sure that people are doing it in a safe environment that minimizes risks to both patients and employees.”

Part of the safeguards involves conducting periodic surface wipe tests to measure the level of contamination in the workplace. At UNC Hospitals, Eckel and his colleagues had been sending their test samples to a company overseas for analysis, which required shipping with dry ice and waiting three to four months to get the results. That cumbersome process got Eckel thinking about creating a better alternative.

“Around the same time, the UNC Eshelman School of Pharmacy was hiring faculty, and oncology was a big focus, so I started wondering, ‘Why can't we do this?’” Eckel says.

He took the idea to Howard McLeod, PharmD, the director of the School's Institute for Pharmacogenomics and Individualized Therapy, and McLeod introduced him to Zamboni, who had just joined the School and the institute.

Using a grant from Carmel Pharma Inc., Eckel and Zamboni set up a reference lab and a series of research projects within Zamboni's lab. By April 2010, they had developed ChemoGLO, an easy-to-use kit and analytical reference lab for measuring surface contamination of five anticancer drugs.

Eckel and Zamboni say ChemoGLO offers several advantages over other surface wipe tests. A single kit can be used to measure multiple types of anticancer agents. Clients can ship their samples to the reference lab at room temperature, which means they are not constrained by the limited lifespan of dry ice and thus can

ship from anywhere in the world. Also, the reference lab can deliver a report in two to three weeks, a considerably faster turnaround. In addition, clients receive an enhanced analysis that shows how their levels compare with all other sites that have used the kit, along with suggestions on how to reduce contamination.

Converting Skeptics

Over the past three years, ChemoGLO has been used in more than one thousand studies at more than three hundred hospitals around the United States. In addition, the kit has been used in three hospitals in Japan, and the lab has been contacted by sites in the United Kingdom and Asia.

Eckel and Zamboni say that eighty to ninety percent of the sites they've tested showed detectable levels of contamination. The results of early tests wiped away Zamboni's doubts as the samples from many sites showed contamination levels that were ten to a hundred times higher than the concentration needed to kill

cancer cells *in vitro*.

“I never thought the levels of exposure would be this high,” Zamboni says. “It's in many different places at high levels. It's in the hood. It's on the floor. It's on tables. It's on door knobs. It's on computers. It's in the transfer trays. It's even outside of where they are mixing the chemotherapy.”

Many of the clients were similarly surprised by the high levels at their sites and followed up with Eckel and Zamboni on how to reduce the contamination. However, the ChemoGLO team also had to win over some skeptics. Occasionally clients would send them blank

“**I can tell you, none of this would've happened at many other places because they don't have that entrepreneurial spirit and mentality, and they certainly don't have the same level of expertise, infrastructure, and mentoring that UNC has.**”
William Zamboni

samples without telling them so as to test the validity of their kit. Zamboni and Eckel say that ChemoGLO has been up to the challenge and that these occasions have even offered opportunities to educate clients about chemotherapy contamination.

“Someone at one notable site actually decided to collect a blank sample from his desktop in his office, which was not near where the chemotherapy was prepared,” Eckel says. “The sample came back positive, so he challenged us and said, ‘I’m not sure this is really good science.’ We talked to him about how you can actually transfer contamination from the preparation area to other areas from your lab coat. Since his experience with ChemoGLO, he has become a believer based on this education.

“As people have seen the data and recognized that there is a lot that goes into trying to minimize contamination, they have become more reliant on our routine monitoring.”

Branching Out

By 2012, the ChemoGLO operation had outgrown its original setup in Zamboni’s lab, but Eckel and Zamboni were prepared. In February of that year, they licensed the technology from UNC and turned ChemoGLO into a private spinoff company. Less than a year after its creation, ChemoGLO LLC is already turning a profit.

The company has also developed a new product to help wipe out contamination. Test results from ChemoGLO’s repeat clients showed that while implementing best practices after the initial test reduced detectable contamination, it did not completely eliminate it. So the ChemoGLO team started working on a way to get rid of the remnant.

“This contamination is very difficult to clean up because these drugs have very different solubilities,” Zamboni says. “If you use just alcohol or just water, or even

a mixture of the two, you can’t clean up the drugs.”

The solution the team came up with was Hazardous Drug Clean (HDClean), a packet of two towelettes, each containing a novel mixture. When used in sequence, the towelettes can remove all detectable surface chemotherapy contamination. Zamboni says the form factor was inspired in part by his brother-in-law, who owns a company that makes towelettes for cleaning industrial respirators.

ChemoGLO has signed a licensing agreement with UNC-Chapel Hill for the technology behind HDClean and will begin offering the product in February 2013.

“The idea for HDClean is that it would clean up, at the end of the day or the shift, any remnant that wasn’t mitigated through best practices,” Eckel says. “HDClean should not be used in place of best practices, but it provides one more solution to minimize the contact an individual has with hazardous drugs.”

Hospitals had previously used a cleaning product that was not specifically designed for chemotherapy contamination. The company that makes that product, Zamboni says, has never published data demonstrating that it removes drugs from surfaces. Furthermore, the product had a foul odor and left oily residues.

“We worked through a bunch of different mixtures and ingredients to come up with towelettes that can clean a wide variety of drugs,” Zamboni says. “We wanted to be able to clean up many different types of drugs, and we didn’t want any strong odor or oily residue. HDClean achieves all of those goals.

“Since we had the surface-contamination reference lab, we could also prove that our towelettes worked.”

Positioned to Grow

Having the reference lab also positions the company to explore other opportunities, Zamboni says. For

instance, the reference lab has the capacity to test for anticancer drugs other than the five currently detected by ChemoGLO, as well as antibiotics and immunosuppressants. Also, aside from regular monitoring services, the lab can be used for research and development, such as helping companies test new products or methods for eliminating contamination.

The opportunities aren't limited to the business side. On the research front, the ChemoGLO team has participated in studies of surface contamination in the US and Japan. Also, the researchers are planning to investigate the effect of ingesting chemotherapy contamination.

"I feel quite lucky that this came about," Zamboni says of the collaboration that gave birth to ChemoGLO.

"It's a prime example of the things that make UNC such a great place to work. One is the collaborative nature of the people that work here. A second thing is the support: We couldn't have done this without the research infrastructure from the School, the UNC Lineberger Comprehensive Cancer Center, and Carolina Kickstart; the mentoring and advising from people at the School, the hospital, and the University; and the support from the Office of Technology Development.

"I can tell you, none of this would've happened at many other places because they don't have that entrepreneurial spirit and mentality, and they certainly don't have the same level of expertise, infrastructure, and mentoring that UNC has." ♦

An Advocate for Safe Medication Disposal

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In the summer of 2008, a preceptor at Bryan Pharmacy in Carrboro, North Carolina, showed PharmD student Sherry Yang an article about medication disposal and asked her to develop a handout on the subject for the pharmacy's patients. It was the first time the issue had come to Yang's attention.

Less than two years later, Yang, now in her fourth year at the UNC Eshelman School of Pharmacy, has become a passionate advocate for more attention and action on the issue. She has studied the problem, published papers, made presentations, helped with medication-return programs, and even successfully lobbied for curriculum changes.

"I'll probably become known as the person who won't shut up about medication disposal," she says.

Getting SMARxT about Medication Disposal

Pharmacies try to avoid overstocking medicine, and when they do have unused medications, most are able to send them back to the manufacturers for credit. That option, however, is not available for patients with leftover medicines. Under Drug Enforcement Administration regulations, controlled substances — including many prescription medications — can only be transferred among DEA registrants, which include everyone in the drug-distribution chain from manufacturers to pharmacists. Patients, however, are not DEA registrants. Therefore health-care professionals are not allowed to take back controlled prescription drugs from patients.

"Patients might pass away or they might get changed to different medications, and they don't know what to

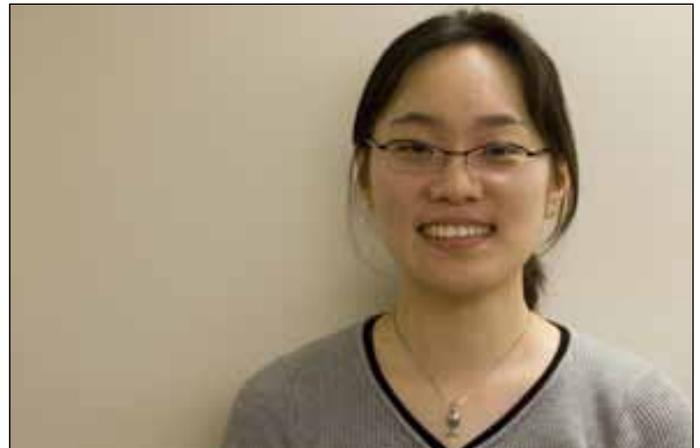


Photo by John Zhu

UNC pharmacy student Sherry Yang

do with their leftover medicines," says Kelly Scolaro, PharmD, a clinical assistant professor at the School. "When they come to the pharmacy, they ask, 'Can you take this back? Can you throw this away for me?' It's a lot of confusion on the consumers' part and the pharmacists' part, and nobody knows what to do.

"It is a problem, especially with controlled substances because the way the laws are written and the way we are obligated to obey those laws. You can try to help someone but then you might put your license in jeopardy even though you are trying to do the right thing."

To add to the problem, unless patients specifically ask about it, they almost never get information about medication disposal when they pick up their prescriptions, says Stefanie Ferreri, PharmD, a clinical associate professor at the School who also practices at Kerr Drug.

"There is a huge need for education about proper medication disposal for this very reason," Ferreri says.

Flushing had traditionally been a recommended way for patients to dispose of unused medication on their own because it's easy and it keeps the drugs out of the wrong hands. However, medications that are flushed or poured down the drain can end up in the water system. In 2002, the U.S. Geological Survey published a study that reported low concentrations of chemicals, including hormones, steroids, and other human and veterinary drugs, in 80 percent of the 139 streams studied.

The article that Yang got from her preceptor at Bryan Pharmacy discussed an alternative — SMARxT Disposal, a campaign to discourage people from flushing their medicines. SMARxT guidelines recommend crushing most medications; mixing them with kitty litter, sawdust, or coffee grounds; sealing them in a plastic bag; and putting them in the trash.

Developing the handout about SMARxT piqued Yang's interest in the issue, so she went online to see if there were any medication-disposal programs in North Carolina. She found nothing.

“That's how I started to know about medication disposal being an issue,” she says.

Part of the reason Yang had never heard about medication disposal being a problem before was because it wasn't covered in class. The topic has traditionally received little attention in the classroom, says Scolaro, who directs the School's Pharmaceutical Care Lab, where students acquire skills through hands-on activities and interactions.

“Ten years ago, when I was in school, we never talked about it, and I think it was because we didn't really think of it as a problem,” Scolaro says. “People were just flushing their meds down the toilet if they didn't want them. There were so many other things we had to learn about in the curriculum, and medication disposal just wasn't considered important enough to make time in the curriculum for it.”

That has begun to change at the School, thanks in

SMARxT Disposal Guidelines

Pour medication into a sealable plastic bag. If medication is a solid (pill, liquid capsule, etc.), crush it or add water to dissolve it.

Add kitty litter, sawdust, coffee grounds (or any material that mixes with the medication and makes it less appealing for pets and children to eat) to the plastic bag.

Seal the plastic bag and put it in the trash.

Remove and destroy ALL identifying personal information (prescription label) from all medication containers before recycling them or throwing them away.

— More information at
<http://www.smarxtdisposal.net>

large part to Yang's advocacy. She made a presentation about the issue at a faculty meeting in the summer of 2008, which caught the attention of Scolaro and fellow faculty member Lisa Dinkins, PharmD, both of whom have been advising Yang on her work since.

“Lisa and I have been helping Sherry with her publications, but she made us both say, ‘Wait a minute, we need to teach this.’” Scolaro says.

Since fall 2008, Dinkins and Scolaro have adjusted their Pharmaceutical Care Lab courses for first-year PharmD students to add more emphasis on medication disposal. For instance, during role-play exercises, students playing the part of the pharmacist are now expected to tell the patients what to do with leftover medication. Also, Scolaro and Dinkins are pointing students to online resources, such as the SMARxT guidelines, which they can reference when they are out in practice.

“Lisa and I are both very committed now that Sherry has opened our eyes,” Scolaro says. “Really, Sherry was the impetus for this.”

Take-Back Programs Slowly Moving Forward

The fall after Yang's stint at Bryan Pharmacy, one of her instructors pointed her to the Maine Benzodiazepine Study Group. Yang attended the group's International Symposium on Pharmaceuticals in the Home and Environment in November 2008 and was the only person from the Southeast who attended the track focusing on drug return and disposal.

"I learned a lot when I was there, hearing what the other states are doing and learning what kind of campaign effort has been done nationwide on medication disposal," Yang says. "I felt like if other states can do it, why can't we do it? And we always pride ourselves on being a pharmacy-progressive state. We are very progressive on a lot of pharmacy issues, but somehow, I feel, medication disposal is an issue that we've lagged on in the state."

When she got back from the conference, Yang began talking to more people and doing more research. She published an article in the winter 2009 issue of *North Carolina Pharmacist*, explaining the issue of medication disposal, examining local and national efforts to solve the problem, and making suggestions on what can be done in North Carolina. She has another paper, titled "Raising Awareness of Medication Disposal in Professional Schools," slated for publication in the March/April 2010 issue of the *Journal of the American Pharmacists Association*. In addition, Yang will present a poster of her work at the American Pharmacists Association Annual Meeting and Exposition in March.

There is no statewide medication-return program in North Carolina, and a 2008 white paper by Avalere Health found only thirty-some permanent and one-day

medication take-back programs in the United States, along with a couple of mail-back programs. Part of the challenge is finding sustainable funding, but one of the biggest hurdles is the DEA regulations that prohibit health-care professionals from taking back medications from patients.

Yang says the DEA recognizes this problem and is working to tweak the policy, though she expects changes to be slow in coming. In the meantime, many of the take-back programs get around the problem by getting law-enforcement officers and local DEA branches involved in their events.

"It's a little different in every state even though the DEA is a federal agency," Yang says. "Right now there is not a guideline on how to run a medication-disposal program, so every state has to figure out a way that will be legal and follow the DEA regulations.

"I think that's one of the reasons why a lot of states aren't focusing on this issue. Because there's no guideline or policy, if you want to do that, you are kind of on your own, and some states would rather not touch it and just wait till the federal government has something firmer and clearer."

In the absence of a statewide program, local one-day take-back events have popped up around North Carolina in the last couple years, and Yang has been an active participant. In October and November of 2009, she volunteered at take-back events in Chapel Hill, Charlotte, Mars Hill, and Wilmington. The events allowed people to bring their unused medications to a designated site, where organizers collected them and took them to an incinerator to be destroyed.

"Whenever someone came in, they usually had a big

“**When I started looking at medication disposal, it was just a one-page handout, and now it's become a much bigger project. I see it almost as a career.**”
Sherry Yang

bag or a box,” Yang says. “They are always very grateful to have that kind of place to get rid of their medication. So there’s definitely a need.”

Some of these events also gathered data on the medication they receive. Yang is hoping such information will help shed more light on why people have significant amounts of leftover medication in the first place.

“I feel that right now, what we are seeing on medication disposal is just the tip of an iceberg,” she says. “There’s a whole issue hiding behind it: Why do we even have that much medication left? Because we don’t have that data, we don’t really know where exactly these medications are from and why they are left over.”

While doing rotations in different parts of the state during her PY4 year, Yang has discovered more take-back programs, but they are all one-day events and very localized, which she says limits the amount of coordination and information exchange among the organizers.

“I would like to see not a bigger but a more connected effort and take what we are doing in the state and bring to it a nationwide perspective,” Yang says. “Other states are doing other things, and it would be great if we can learn from them and they can learn from us.”

Growing Awareness

Reports about pharmaceuticals in the water have generated a lot of buzz in the last couple years as the focus shifted from rivers and streams to drinking water. In 2008, the Associated Press reported that the drinking water of at least 41 million Americans contained minute concentrations of an array of antibiotics, sedatives, sex hormones, and dozens of other drugs.

Those findings spurred government action in 2009. The Environmental

Protection Agency listed 13 pharmaceuticals — mostly sex hormones — as candidates for regulation in drinking water. The agency also began a survey to check for 200 contaminants — including 125 pharmaceuticals or related chemicals — at water-treatment plants around the country. The National Toxicology Program is also conducting research on the human health effects of drugs at low levels in the environment.

As the spotlight shines on the quality of drinking water, the issue of medication disposal has received greater attention as well. The Food and Drug Administration has updated its list of waste drugs that should be flushed and has stated that it wants to work toward the return of all unused medications. The White House Office of National Drug Control Policy also revised its guidelines to put more emphasis on medication disposal.

“Instead of one line about medication-return programs, it has a paragraph,” Yang says of the ONDCP guidelines. “They are working their way up a little bit at a time. It’s actually a big breakthrough on the regulation part. The federal government is seeing a lot of states doing their small, localized medication-disposal programs, and now they’ve actually started recognizing that as a way for safe disposal. So even though it’s just one paragraph in the regulations, it’s a big step.”

While the environmental concerns are making headlines, Yang sees them as only a secondary issue when it comes to medication disposal. For one thing, flushed medications are hardly the only source of pharmaceu-



ticals in the water. The AP reported in 2009 that U.S. manufacturers, including major drugmakers, have legally released at least 271 million pounds of pharmaceuticals into waterways in the last twenty years, and Yang says it is difficult to tell which portion of the pharmaceuticals in the water came from which sources. Also, even alternative disposal methods such as SMARxT could result in pharmaceuticals eventually seeping through landfills and into the water supply.

The way Yang sees it, even though SMARxT is an imperfect solution, it is better than flushing and it accomplishes one important goal — getting unused medications out of the house and reducing the chances that they will end up in the wrong hands. For her, that should be the main focus of medication disposal.

“When I first started learning about medication disposal, my whole perspective was from the environmental perspective,” Yang says. “But now I feel like medication disposal in the community has two parts. There’s the environmental part — you do not want pharmaceuticals getting into the water — and there’s also the part about medication safety. And if you really look at medication disposal itself, I really feel like it’s more about medica-

tion safety than environmental. There are environmental implications in there, but I think the bigger part is about medication safety — about not accumulating medication in your house.”

Yang, who has applied for hospital residencies, says she has developed an interest in medication safety and would like to pursue that topic in her career. And of course, she will continue working to raise awareness about medication disposal.

“When I started looking at medication disposal, it was just a one-page handout, and now it’s become a much bigger project. I see it almost as a career,” she says. “I think somebody should do it. It’s a problem, and we have to deal with it.

“When I go to those medication-disposal events, I ask the police officers and the people there why they do it. There are a lot of reasons — it’s a good public service, it’s a good opportunity to talk to the people — but when you boil everything down, it’s just the right thing to do. It’s like ‘Why do we turn off the lights when we leave the room? Because it’s the right thing to do.’ I feel that this is the right thing to do.” ♦

Using Second Life to Help Students in Real Life

Published: UNC Eshelman School of Pharmacy website

Date: 2010

Read it online: <http://www.john-zhu.com/portfolio/writing/secondlife>

PharmD student Aaron Webb was waiting to greet the next faculty member who came to see his research poster. He was dressed to impress in his crisp white shirt, gold tie, and black suit.

Then Dean Bob Blouin appeared out of nowhere — donning a white T-shirt, washed-out jeans, and sandals — and started talking to Webb about his research. When they were done, Blouin vanished into thin air again.

Oh, and Webb's poster was three stories high and hung in a room hovering a few hundred feet above Beard Hall.

Obviously, this wasn't real life. It was Second Life, and Webb was participating in an experiment at the UNC Eshelman School of Pharmacy to use the virtual-reality application to help students prepare for poster presentations in the real world.

“What was funny was that we made the students dress up their avatars in professional attire, but I hadn't thought to get the dean into Second Life earlier so we could work on his outfit,” says Pete Koval, PharmD, the clinical associate professor who hatched the idea of doing a virtual poster presentation. “So I said, ‘Let's not worry about that,’ and he was cool with it and went up to talk to students in his jeans and T-shirt.”

Casual clothes and levitating venues aside, Koval says one of the project's aims was to simulate a real poster-presentation environment. The other goal, he says, was just to show that a poster presentation can be successfully pulled off in Second Life.

“I hope the poster project allowed faculty and stu-

dents to get a glimpse of how this technology can enable us to have people interact without spending travel dollars or registration fees, yet provide a similar, synchronous learning experience,” says Koval, the assistant director of pharmacotherapy, education, and research at the Greensboro Area Health Education Center.

“It's not identical to a real poster session, but it's very similar.”

The project, Koval says, is part of the School's effort to explore new approaches and environments for learning.

“Our attitude at the School has been that there will be an educational evolution of other dynamic learning environments, including virtual spaces and simulation technology,” he says. “The dean and I have discussed the reality that it is not going to be just one thing — it's not going to be only Second Life or only something else. We're probably looking at a variety of technologies moving forward.”

Preparing Students for NCAP

With funding from a Lenovo Innovation grant and help from Second Life developer Larry Taylor, Koval created a virtual setting where students can do a trial run of their presentations with synchronous participation and feedback from faculty. For the project, he enlisted students from the School's Clinical Scholars Program, who present posters about their research each year at the spring meeting of the North Carolina Association of Pharmacists. Koval says this is often the first professional presentation of research data for many students.

To gauge the effectiveness of the Second Life project, Koval surveyed students both after the virtual session,

which was held in March 2010, and after the NCAP meeting in April to see if they felt the trial run made them more prepared. He also compared responses from the eight students who took part in the Second Life project with responses from the fourteen students who presented at NCAP but did not participate in the virtual presentation.

The survey asked the students whether they felt unprepared for the NCAP presentation. Of the fourteen students in the control group, three were neutral on the subject and two said they felt unprepared. On the other hand, all eight of the students who participated in the Second Life project said they felt prepared. Moreover, all eight also said they felt confident in their ability to present a poster.

Koval also surveyed the faculty who took part in the Second Life presentations and found consistent agreement among them that the medium could be a reasonable way to evaluate posters in situations where they cannot travel. He also notes that all the faculty members and students completed the orientation on how to use Second Life in less than an hour — a relatively small learning curve considering none of them had used the program before.

Where Two Lives Diverge

As both Koval and the student participants point out, there are some key differences between Second Life and real life, such as having a more difficult time pointing to a particular section of the poster while talking and the lack of nonverbal communication.

“One disadvantage is that there’s no body language or posture to interpret,” Koval says. “But with this project, we are trying to train the students on their verbal communication and their physical poster. We wanted to see if we can give them feedback on the major aspects of the poster, but not every aspect.”

On the other hand, there’s an upside to not being exactly like real life.

“One of the biggest advantages was being able to be seated and be comfortable presenting my poster,” Webb says. “Usually you are standing in front of your poster for an hour or two, lock-kneed, not breathing very well, and just feeling uncomfortable, maybe because of the environment. Being in Second Life gives you more of a laidback feel, and it probably makes it an easier environment in which to present your poster.”

Holding the presentation online also allowed faculty from all around the state to attend, something that Koval says is rare in real life.

“For instance, Bruce Canaday from Wilmington and Mollie Scott from Asheville both attended the virtual poster session,” he says. “So we had two faculty members from the opposite ends of the state who got to participate in the review of posters, and they were home in time for dinner.”

Students say one of the biggest positives of the virtual session was being able to present their work to faculty other than their own AHEC mentors.

“It was very nice to hear from faculty that I had met only a couple of times,” Webb says. “Without this opportunity, I don’t know if I would have ever gotten feedback from them. So this allows more people to come and see the work you’ve done and give you more constructive criticism.”

Kathryn Merkel, the first student to use the virtual environment, says it was helpful to be able to present to people from many different disciplines.

“Most of the time, we go to a pharmacy meeting, but I have taken my poster to another meeting where there were people who weren’t pharmacists, and those people had different questions,” she says. “So having faculty from many different backgrounds and disciplines participate made me have to think about different ways in which to talk about my research.” ♦

Community Pharmacy Residency Grooms MTM Innovators

Published: UNC Eshelman School of Pharmacy website

Date: 2011

Read it online: <http://www.john-zhu.com/portfolio/writing/mtm>

When a patient told Sara Dawson, PharmD, during a medication review that she couldn't afford the \$42-a-month blood-pressure medication her doctor had prescribed, Dawson talked to the doctor, made a recommendation for a cheaper substitute, and offered to monitor the patient's blood pressure for the first two weeks of the new regimen.

It's the kind of patient-care work the people at Clinic Pharmacy have been doing for decades, but before Dawson got there in 2010, chances were they probably didn't know they could have gotten reimbursed for those services.

That's where the training Dawson received during her community pharmacy residency through the UNC Eshelman School of Pharmacy paid off. During her residency at Kerr Drug, she got to work with three different platforms for medication therapy management. She also had the opportunity to provide MTM services not only at the pharmacy where she was based, but also at other Kerr Drug locations that didn't have clinical pharmacists.

When she became a pharmacist at Clinic Pharmacy, a small independent community pharmacy in Durham, North Carolina, Dawson drew upon her residency experience to design MTM services and educate the pharmacists at the store about what kind of patient-care services they could bill for.

"I think the biggest moment where I realized that the residency training had come into play was when I was educating our pharmacists on what you can bill for under the different MTM platforms and they said, 'We've been doing that for thirty years and never getting paid for it.



Photo by John Zhu

“Residency not only teaches you the clinical aspect, but also the business aspect, so you learn how to build a business model around these kinds of different services.”

Sara Dawson, PharmD

We can get paid for this now?’ ” says Dawson, who completed her residency after graduating from the School's PharmD program in 2009.

“I think if I had gone straight into this situation right out of school, I would have had a bigger learning curve in starting these services.”

Dawson doesn't have to look far for someone who shares those sentiments. Twenty minutes down the road in Morrisville, Katie Zimmerman — Dawson's friend,

former classmate, and fellow resident — has also been expanding the MTM services at Morrisville Pharmacy and Compounding. Like Dawson, Zimmerman has been relying on the MTM training she received during her residency.

“Community pharmacy is shifting away from primarily a drug-dispensing role, so we really need to fill in our revenue gap with patient-care services, and that’s where MTM has really come into play,” says Zimmerman, who moved to Tennessee in the summer of 2011. “I’ve been able to expand some of the MTM services they have here. I’ve also found that MTM opens the door to providing other services as well, such as immunizations or other disease state-specific education. So it’s a good gateway to meeting with patients and getting them to take part in other services as well.

“I feel like my knowledge and expertise from the residency were really valuable when I first started here because I was able to bring those things I had learned and those experiences I had to the pharmacy here.”

The growing emphasis on MTM in community pharmacies has triggered a corresponding emphasis on teaching the subject in pharmacy schools. It has only been a couple years since Dawson and Zimmerman graduated, but in that time, MTM has gone from a new idea that didn’t make it into the curriculum until their third year —

and then only as an elective — to being integrated into the Pharmaceutical Care Lab, a key part of UNC’s PharmD curriculum in which students learn skills through hands-on activities and interactions.

“During my residency, I got to teach lab for the second-year students, and they are making MTM a big point of emphasis in the lab situation now, having the students review a patient’s profile and asking what interventions or recommendations they would make,” Dawson says. “In the short time I’ve been out of school, I’ve seen the MTM curriculum really grow at UNC.”

While Dawson and Zimmerman didn’t have the benefit of such a curriculum while they were students, the School’s community pharmacy residency program not only helped fill in the gap, but also equipped them with the knowledge and skills to bring something new to their pharmacies.

“I worked at Clinic Pharmacy while I was in pharmacy school, and I did the residency because I knew that I liked independent pharmacies and I wanted to come back here and work, and I knew the residency would provide me with the kind of training that would allow me to bring new programs into this pharmacy,” Dawson says.

“Residency not only teaches you the clinical aspect, but also the business aspect, so you learn how to build a business model around these kinds of different services.” ♦

Liu Receives \$1.2M FDA Grant to Modernize Heparin Quality Control

Published: UNC Eshelman School of Pharmacy website

Date: September 27, 2013

Read it online: <http://www.john-zhu.com/portfolio/writing/liu>

Heparin is a widely used blood thinner given to patients to prevent blood clots. However, the drug is sometimes its own worst enemy, as some of its components can cause the very thing it is supposed to stop.

Jian Liu, PhD, a professor at the UNC Eshelman School of Pharmacy, has received a grant to help the Food and Drug Administration sniff out those potentially dangerous components in heparin. Liu says the research could help improve the drug's safety, which has been a hot-button issue since a contaminated supply of heparin caused more than eighty deaths and hundreds of adverse reactions in 2008.

"The FDA is paying a lot of attention to heparin because of its safety issues," Liu says. "The research supported by this grant could help modernize the quality control of heparin and improve its safety."

Identifying the Culprits

Natural heparin, which is extracted from animal tissues, is a mixture of compounds. Not all of these components have anticoagulant properties. Some of them—it is not known which ones—could even trigger the opposite effect and cause heparin-induced thrombocytopenia, where the body develops an immune response to the drug and produces blood clots through a mechanism different from the one that heparin is designed to stop. About 0.2 to 5 percent of patients receiving heparin for more than four days develop HIT. The condition can be life-threatening and often leads to amputations.

Liu's FDA grant will provide up to \$1.2 million over five years to support efforts to identify structural com-

ponents of heparin that are likely to cause HIT. Liu will tackle the task with two collaborators.

- Liu's lab will chemically synthesize individual molecules of heparin fragments with defined structures.
- Robert Lindhardt, PhD, a Senior Constellation Professor at Rensselaer Polytechnic Institute, will verify the structures of those fragments.
- Gow Arepally, MD, an associate professor of medicine and pathology at Duke University, will test whether those heparin fragments cause HIT.

Screening for the Culprits

Once the FDA knows which components might cause HIT, it needs to be able to screen for their concentrations in heparin mixtures. That is difficult to do, Liu says, because the components of a natural heparin mixture cannot be easily disentangled and measured.

"It's like if you mixed Tylenol and aspirin, it would be very hard to tell which part of that mixture comes from Tylenol and which part comes from aspirin," Liu says. "When you're dealing with a mixture, you can only determine an average structure."

Liu says this project could provide a tool to paint a more precise picture of the makeup of heparin mixtures. The heparin fragments created by his lab will carry distinct molecular fingerprints. The FDA could use those fragments as references and look for those fingerprints in a heparin mixture.

"If you see a specific fingerprint, then you know it's coming from a particular fragment," Liu says. "Potentially, these references will help the FDA determine what percentage of a heparin compound is made up of which fragment."

Discovery by Jin, Roth Could Lead to Better Schizophrenia Drugs

Published: UNC Eshelman School of Pharmacy website

Date: October 24, 2011

Read it online: <http://www.john-zhu.com/portfolio/writing/jin>

Scientists led by researchers at the UNC Eshelman School of Pharmacy have discovered three first-in-class chemical compounds that could lead to safer, more effective medications for schizophrenia and related disorders.

Schizophrenia is typically treated with antipsychotic medications, but the medications do not adequately treat a high percentage of patients. The drugs don't address the negative and cognitive symptoms of schizophrenia, and all current antipsychotics can lead to serious side effects such as cardiovascular conditions and weight gain with chronic use.

The new compounds, which UNC has patented, will help address these problems by enabling researchers to better study which key signaling pathways in the body are essential to the effectiveness and side effects of antipsychotics, says Jian Jin, PhD, one of the study's corresponding authors and the associate director of medicinal chemistry at the pharmacy school's Center of Integrative Chemical Biology and Drug Discovery.

"These compounds are unprecedented," says Jin, who spearheaded the medicinal chemistry portion of the research. "They give biomedical researchers a powerful tool for studying the relationship between signaling pathways and the efficacy and side effects of antipsychotic medications. That understanding will help us design better treatments. "At the same time, these novel compounds themselves could be developed into clinical candidates for treating schizophrenia and related disorders, with improved efficacy and fewer side effects. So this discovery is highly significant."

The study's findings are described in a paper to

be published during the week of October 24 in the online Early Edition for the journal *Proceedings of the National Academy of Sciences*, USA. Jin and Bryan Roth, PhD, MD, led a team that included researchers from Duke University and Columbia University. Roth, who directed the pharmacological component of the study, is a Michael Hooker Distinguished Professor in the UNC School of Medicine and the pharmacy school.

There are two major types of signaling pathways for this drug target. One type is mediated by a class of proteins called G proteins, while the other is controlled by a different group of proteins, including a prominent one called beta-arrestin. The new compounds activate the beta-arrestin pathways but not the G protein-mediated pathways, allowing researchers to study them separately.

"This discovery provides a completely new approach for treating schizophrenia and related disorders with greater efficacy and fewer side effects," says Roth, who directs the National Institute of Mental Health Psychoactive Drug Screening Program at UNC-Chapel Hill.

Jin and Roth are also working to identify compounds that would activate only the G protein-mediated pathways. Jin said that only a very limited number of functionally selective compounds — compounds that selectively activate one signaling pathway over the other — have been reported to date.

"Prior to our study, there had been very little purposeful attention devoted to creating and annotating novel compounds that show functional selectivity," Jin says. "Our approach, which combines comprehensive medicinal chemistry and pharmacological profiling, provides a

successful proof-of-concept for how such compounds can be discovered and validated.”

The study was supported by funding from the National Institutes of Health and the NIMH. The co-first authors are John A. Allen, PhD, and Vincent Setola, PhD, from Roth’s lab and Julianne M. Yost, PhD, from Jin’s lab. Other researchers who worked on the project include

- From Roth’s lab: Maria F. Sassano, PhD; Prem N. Yadav, PhD; Xi-ping Huang, PhD; and Niels H. Jensen, PhD
- From Jin’s lab: Xin Chen, PhD
- From the CICBDD: center director Stephen V. Frye, PhD
- From the Duke University Medical Center: James B. Duke Professor Marc G. Caron, PhD; associate professor William C. Wetsel, PhD; Meng Chen, PhD; and Sean Peterson
- From the College of Physicians and Surgeons at Columbia University: professor Jonathan A. Javitch, MD, PhD; and Bo Feng, PhD
- From the Center for Combinatorial Chemistry and Drug Discovery at Jilin University in China: professor Xu Bai, PhD, and Xin Che, PhD ♦

Williams Schools Foes with Smart Play to Win 2nd Offensive Player of the Year Award

Published: *The Herald-Sun* (Durham, NC)

Date: 12/25/1999

Read it online: <http://www.john-zhu.com/portfolio/writing/andrewilliams>

Listening to Andre Williams talk, one can easily see why he is a godsend for public-relations directors and a nightmare for sportswriters.

Speaking in a soft voice not much above a loud whisper, Northern's star running back uses the word "team" more often than most people use conjunctions. He thanks all the right people for his success -- his teammates, coaches, parents and, of course, God.

He talks about how important a good education is in case he suffers a career-ending injury. And whenever he fields a question about one of Northern's football records that he broke, rather than talk about his impressive combination of size and speed (he bench-presses 380 pounds and runs a 4.5 in the 40), Williams quickly defers the credit to his offensive unit.

"The way I look at it is I may have a lot of records at Northern ... but when it comes down to it, it wasn't just me," said Williams, a senior. "It was my offensive line blocking, my wide receivers blocking, my quarterback checking into the right formation for me to be able to get the ball into the end zone.

"In a way, it's a shame that only my name goes down in the book. I accept it and I like that I broke all these records and goals, but I make sure that I tell people that it wasn't just me doing it. It was a team effort."

Williams' words might sound cliché, but somehow, the easy-going young man dressed in a black leather jacket and wearing a crucified-Christ pendant on his gold necklace doesn't seem like just another athlete



Photo by *The Herald-Sun*

quoting company policy.

He knew his grade-point average (3.3) better than his yards-per-carry from this past season (8.1). And when asked which one of his records he was proudest of, the top football prospect in the state paused briefly before responding with a chuckle, "I don't even know the records I broke."

For the record, he is the Knights' career leader in rushing (5,328 yards), touchdowns (74) and points (444). Included in those numbers are the 2,146 yards and 36 touchdowns this past season, numbers that earned him offensive player of the year honors from *The Herald-Sun* for the second straight year.

"I'd say I'm proud of all of them," he said. "To me, the records, I'm proud of them but they really don't mean that much right now because we didn't reach the goal I wanted to reach [a state championship]. The records ...

are a team effort. It shows how we did as a team. I didn't get the records, it's the team who got them."

While Williams did not get to play in Kenan Stadium for the state title during his high school career, he'll get plenty of opportunities to play in Chapel Hill the next four years as a member of the North Carolina football team. Williams picked the Tar Heels over programs such as Michigan State, Georgia Tech, Clemson, South Carolina and Northwestern.

"They're committed to winning," Williams said. "You could just tell by the facilities. I also like the education they put out there on the table. That might be one of the main reasons: the university itself. Being able to play for Chapel Hill is a childhood dream."

That will be just one more item on a checklist of childhood dreams that have come true for Williams. Having grown up in Durham and played football at Carrington Middle School, located right down the road from Northern, Williams said he had always wanted to play for the Knights.

What he didn't anticipate, however, was the amount of success he would have.

In fact, Williams said he was happy with just making varsity his freshman year.

Northern coach Gary Merrill, however, knew better the first time he saw Williams.

"I thought he was going to be a very good player," said Merrill, who had known about Williams even while he was still playing at Carrington. "You could tell, even at a very young age, his athleticism was excellent for that age. Plus, when I got to know him as a person, I knew that was going to give him a real good chance to be a very good player.

"He knows what's important and what's not important. He can filter through all that other stuff. Some of that stuff with stats and how many yards you had, that's

some other stuff. The most important thing is getting yourself ready to play and doing what you can to help us win the football game, and that's what he does really good."

Williams attributes that mentality to his parents. Williams said his father, who did not play football because he could not find enough free time between school and working to help support the family, has provided him "out-of-sight" support while making sure that he doesn't lose sight of his priorities.

"In the family I'm from, grades are first, books are first, sports are second," Williams said. "I'm using football to have a good education at Carolina. I'm proud of that. I think my parents are very proud that I'm going to have a scholarship next year, but they always focus on grades first.

"People ask why I think the way I think and certain things I do, like my manners -- yes sir, no sir. I was raised like that. My parents instilled that in me."

The on-the-field values instilled in Williams might be best summed up by two plaques hanging near the door in the Knights' locker room. As he entered for a photo session, Williams smacked each of the plaques a couple of times, just like he and other Northern players do whenever they enter or exit the room.

One of the plaques read: "Play like champions."

Some of the letters on the other sign have faded away because of the repeated beating the plaque has taken over the years, but by now, Williams knows the message by heart: "It's amazing how much can be accomplished if no one cares who gets the credit." ♦

It's Fun and Games for Top Rookie

Published: *The Herald-Sun* (Durham, NC)

Date: 8/2/1999

Read it online: <http://www.john-zhu.com/portfolio/writing/joshhamilton>

BURLINGTON — When Josh Hamilton was 12, his family took him to a baseball game between the Detroit Tigers and Cleveland Indians. He eagerly waited to get an autograph.

“They were standing outside waiting to get an autograph, and [the players] kind of just walked by like ‘We don’t have time for you,’ ” said Linda, Josh’s mother. “I think that’s one thing he has remembered.”

Maybe that’s why six years later, the No. 1 overall pick in the 1999 draft makes every effort to accommodate his fans.

More than a month after he was drafted by Tampa Bay, Hamilton, who graduated from Raleigh’s Athens Drive High School in June, still is receiving autograph requests in the mail ranging from postcards to baseball bats -- and he signs all of them.

His consideration for the fans extends to the ballpark as well. For instance, he signed autographs for almost an hour Sunday before his Princeton Devil Rays took on the Burlington Indians at Burlington Athletic Stadium.

“I don’t intend to walk by,” Hamilton said. “They watch the game and they think that much of you to ask for your autograph, you should give it to them.”

That’s just one of the signs that a \$3.65-million signing bonus, the largest in baseball history, hasn’t changed the 18-year-old’s perspective on life and the game.

“He loves to play baseball,” Princeton manager Bobby Ramos said. “He probably would’ve played the game for free, but they paid him.”

Hamilton played quite well Sunday night, his first

game in North Carolina since he signed and began playing in the rookie-level Appalachian League. He went 2-for-4 in front of 2,135 fans in Princeton’s 4-2 victory. He singled in the third and stole a base. He later doubled with two outs in the eighth and scored on a single to break a 2-2 tie.

While most of his classmates are getting ready to leave home for college this month, Hamilton has been away from home since the middle of June. Familiar faces, however, never have been far away.

His parents rented a house in Princeton, W.Va., for the summer and have been to every game.

His mother said they intend to accompany him to St. Petersburg, Fla., in September when he plays in the instructional league.

“My parents are with me now,” Hamilton said. “They come to all the games, so it’s like I’m not away from home really. It’s been fun. I know sooner or later I’m going to have to break away and be my own self, but right now I think it’s good.”

Still, there are some familiar things even his parents can’t provide.

“On my off days, I go home and get Grandma’s cooking,” Hamilton said. “Last off day, I went home for spaghetti, sweet tea and French bread. They don’t know what sweet tea is [in West Virginia].”

While Hamilton still is getting used to food away from home, he has feasted on pitching around the Appalachian League.

Heading into Sunday’s game, he was hitting a team-

high .331 with six homers and 27 RBIs. He ranked in the top five in the league in batting and hits.

“I’ve been hitting with wooden bats for a year and a half, but I’ve never faced live pitching with a wooden bat,” Hamilton said. “I think I like wood more than I like aluminum bats; it’s more natural. It just feels like that’s the way the game should be played, with a wooden bat.”

Ramos, who in his 27 years in professional baseball has coached major-leaguers such as Kenny Lofton and Darryl Kile, said Hamilton could be a star if he stays healthy.

“He’s a five-tool player,” Ramos said. “He can hit, hit for power. He’s a good fielder. He can run and he can throw. He’s got a chance to be special.”

Hamilton said his No.1-pick status hasn’t affected his relationship with other players on the team.

The rest of the team has taken him in as one of the guys.

And that applies both in the clubhouse and at the dinner table. Hamilton set the ground rule early on - he will not pick up the tab every time the players eat out.

“I’m like, ‘I’m on the regular minor-league salary. I make just as much as y’all do,’ ” he said

Except most guys in the minor leagues don’t drive a Firebird TransAm.

While Hamilton hasn’t splurged too much since signing -- he still owns only two pairs of shoes -- he did purchase his dream car last Wednesday.

Even that expense, however, served as a reminder that Hamilton was still 18 -- he asked his parents for permission before buying the car.

“That’s my dream car for the past four years,” Hamilton said. “We were driving by and I saw it and I was like, ‘Stop the car!’ ”

Now he’s driving the dream and living the dream. ♦

Schools to Update on Grade Altering

Published: *The Herald-Sun* (Durham, NC)

Date: 9/29/2000

Read it online: <http://www.john-zhu.com/portfolio/writing/grades>

The Durham Public Schools will hold a news conference today to report on its investigation into alleged grade-changing at Hillside High School, allegations that Hillside football coach Lewis Owens disputed Thursday.

School board attorney Kenneth Soo began the investigation Aug. 25 after Sheila Brandon-Williamson accused Hillside Principal Richard Hicks of changing failing grades this summer to keep her son Michael eligible to play football.

The school board met in closed session for nearly two hours Thursday night to discuss a personnel issue. Board members declined to comment, citing personnel-privacy laws. The school system will release an update of the investigation today at an 11 a.m. news conference in the Board of Education Meeting Room in the Fuller Building.

Brandon-Williamson gave a public statement before the meeting and said that she was told Sept. 19 that the investigation had been completed, but that she had been denied access to the findings despite numerous attempts.

In her statement, Brandon-Williamson expressed dismay at the “refusal, reluctance and rejection which I have encountered as I have tried to put my son’s education back on track.”

Brandon-Williamson said that her son, who transferred to Southern High School this summer, has not been told whether he is a sophomore, junior or senior because official school documents conflicted with report cards and transcripts in her possession.

“In attempting to determine my son’s status, I have been bewildered by vague and misleading information relating to his official grades, teachers’ grade books not

coinciding with transcript grades and grades not being consistent with academic performance,” she said.

Michael, a starting offensive lineman at Hillside for two seasons, is not eligible to play football this season.

“My 16-year-old son is the victim of practices that serve no useful end,” Brandon-Williamson said. “Yet, so far, my son alone has had to bear the full burden of this fiasco.”

Soo said Thursday that he expects to have the investigation wrapped up by mid-October, although he did not specify a deadline. Superintendent Ann Denlinger has asked him to look at not only Michael’s grades, but several other students’ as well, he said. “I know that Dr. Denlinger wants to learn [the results of the investigation] as soon as possible,” Soo said. “It’s taken a little longer than I thought it would.”

Soo added that no allegations similar to Brandon-Williamson’s have surfaced since the investigation began.

Brandon-Williamson told *The Herald-Sun* that after Michael failed Algebra II and Spanish I in the spring 2000 semester, Hicks used his discretion to change each grade to 70 during the summer so Michael would remain eligible to play this school year, his senior season.

At that time, Brandon-Williamson already had decided to transfer Michael to Southern because she believed Hillside teachers were not doing all they could to help him in the classroom. However, she said Hicks didn’t know about the transfer when he changed the grades.

Brandon-Williamson said that after Hillside coaches saw Michael playing for Southern on Aug. 12 at the Pigskin Preview in Raleigh, Hicks changed the Algebra II

second-semester grade back to its original failing score, 56, making Michael ineligible.

A copy of Michael's transcript shows that he received a 70 in Spanish for both semesters of the 1999-2000 school year. Copies of his report cards and progress inquiry/update, however, show that he had received a 53 for the first semester and a 40 in the second. The second-semester Algebra II grade on both was a 56.

Owens said Thursday that he was aware of only one grade change: the Spanish grade. He said Hicks changed the grade on the condition that a teacher test Michael and certify that he is proficient enough to pass Spanish I. During her interview with The Herald-Sun, Brandon-Williamson said that she obtained the necessary certification from a teacher at Southern.

Owens added that Hicks told him that he refused Brandon-Williamson's request to change the Algebra II grade. Owens said he believed that Hicks was changing the Spanish grade to keep Michael on track to graduate this year, but not to play football.

Owens also refuted Brandon-Williamson's claim that coaches told Michael he only needed to pass English and did not have to worry about other classes.

"We have 11 [academically ineligible] kids that should've been out here, Michael included, that are not out here," Owens said. "We provided all the opportunities for them to be successful in the classroom by setting up the study halls.

"Whether they take advantage of that or not, it's the old saying, 'You can lead a horse to water, but you can't make him drink.' That's pretty much the case with all 11 of those guys. They had opportunities to get their work done, but they just didn't do it."

Brandon-Williamson said she suspected her son might not be earning his grades because of the unusual number of 70s he received. Michael did not receive any 70s his freshman year, when he did not play football. His transcript shows that during his sophomore and junior

years, when he played for Hillside, he received seven 70s.

Brandon-Williamson said that after her transfer request was granted, Toreyon Hester, a senior on the Hillside football team, told her that Hicks had changed three of his grades to make him eligible to play football, which prompted her to meet with Hicks about Michael's grades.

"I've never said that," Hester said Thursday. "She made it up."

Southern athletics director Pete Shankle said the Spartans allowed Michael to practice in preseason while they tried to find out whether he was eligible.

Part of the confusion stemmed from the fact that the two schools are on different scheduling systems. At Hillside, students take six classes each semester, including the same core classes both semesters. Southern uses a block schedule, in which students take four different classes each semester.

Under the Hillside system, a student must pass five classes each semester to remain eligible, while Southern students have to pass four.

Shankle said that after he found out Michael needed to pass five classes, he called Hicks after the Pigskin Preview and was told that Michael had not passed enough classes to be eligible.

"It's our job to find out if each student at Southern is eligible to play sports," Shankle said. "We didn't have an official transcript [when preseason began]. So it was my recourse to call Hillside High School and ask about his grades."

Owens said he and the Hillside players have not paid much attention to the allegations.

"I hadn't concentrated on that, because I know what the situation is," he said. "We've got everything above the law. We were well within our eligibility rules. That doesn't really concern me.

"I'm just focused on our kids and who we are playing. The other stuff, that's outside our family. I don't lose any sleep about it. I know what the truth is, so it doesn't bother me." ♦

Gymnast's Long on Passion for Sport

Published: *The Herald-Sun* (Durham, NC)

Date: 7/3/1999

Read it online: <http://www.john-zhu.com/portfolio/writing/specialolympics>

For Andy Ullom, a Special Olympics artistic gymnast from Fayetteville, the biggest challenge may not be doing tricks on the rings, but simply grabbing them.

At 4'2", the 10-year-old Ullom was one of the shortest competitors at Friday's gymnastic competition. When Ullom prepared to tackle the rings, his coach had to stack four mats together so he could raise Ullom high enough to hold on to the rings.

Despite that little obstacle, Ullom said the rings are his favorite event.

"I like to pull on them," he said. "It's fun."

The boy has been doing gymnastics since he was 6 and has competed since age 8, the youngest age possible for a Special Olympics athlete. Since he got involved in the sport through programs at his elementary school, Andy has won gold, silver and bronze medals at local and state-level competitions.

"His sister likes to make fun of him," his mother, Patricia, said. "This is something he can do that she can't. It helps his self-esteem a lot.

"In North Carolina, they have a really good program introducing the kids to all activities. They have something all year long for the kids. In the beginning of the year, we get tons and tons of forms saying he's going here, he's going there. He's always going somewhere."

The support for Special Olympics athletes in Fayetteville doesn't just stop there. Before its three athletes left for the games, the city held a dinner for them and presented them with medals. When the Ulloms' car broke down the day before the Special Olympics began, a local

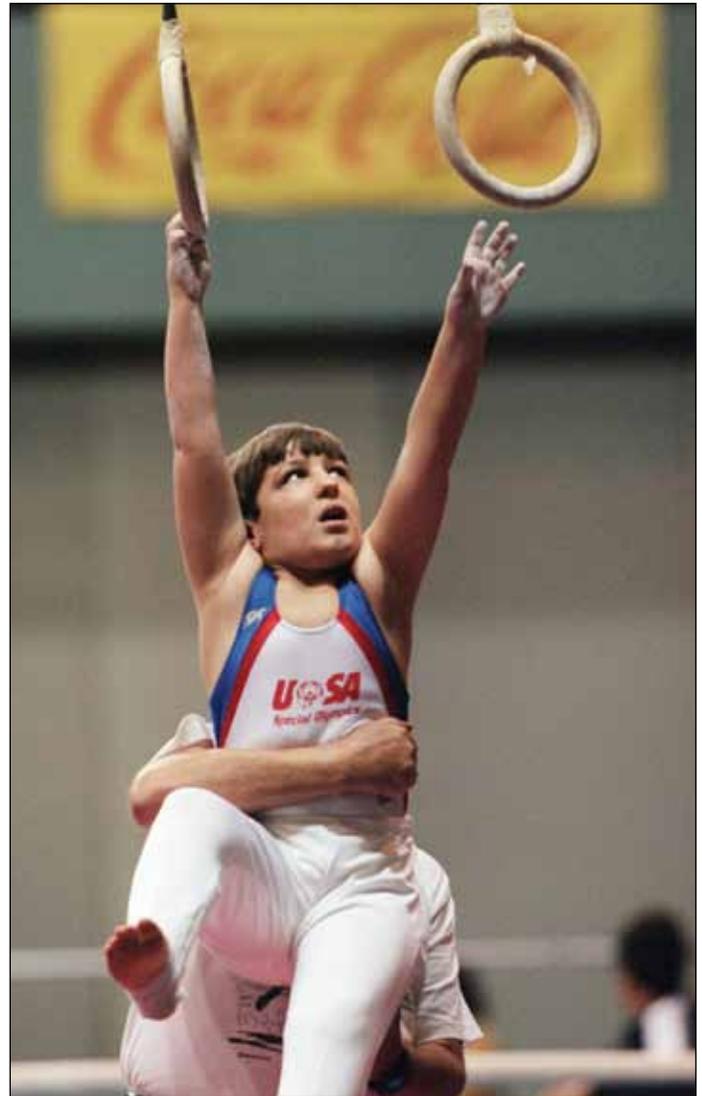


Photo by *The Herald-Sun*

car dealer arranged a vehicle for Andy's mother to drive to the competition.

His mother has been there every day, driving from Spring Lake to the Triangle each morning with Andy's

aunt, Galeana Blevins, and his older sister, Monica.

“We’re his rooting section,” she said. “We drive down from Fayetteville every day. It’s dark when we leave, and it’s dark when we get home. The only time he’s ever left home is two days for competition. When they don’t compete, he’s got to sit here by himself. So we come down and spend time with him so he won’t feel like he’s alone.”

Away from the mat, his life is that of a typical 10 year old. He fights constantly with his sister, who is 11 months older. He also gets an attitude in training sometimes and refuses to practice more, his mother said.

“Sometimes they try to motivate him, make him mad and get him to practice more,” she said. “But it doesn’t work. We have to come up with a bribe.”

Other growing pains have also affected his performance. Having grown six sizes in six months, he has to deal with a constantly changing body.

“The problem is, he’s put on a lot of weight,” his mother said. “He went from size six to size 12 in six

months. All of the sudden he has all this extra weight and he doesn’t know how to work it yet. It’s going to take him a little practice to get back up to where he needs to go.

“He’s got a little booty on him now. He used to have a flat butt and no tummy. Now, I’m like, ‘Boy, you need to get that belly off.’ ”

The mother said although her son is shy, he has been reaching out to other athletes at the Special Olympics. The soccer team that he is staying with, for instance, has adopted him as its unofficial mascot. His family has been reaching out, too, collecting 75 trading pins for him.

And if his experience at the World Summer Games hasn’t been pleasant enough, Ullom has another reason to stay away from home -- his sister.

“They have a tendency to horse around,” his mother said. “She has fingernails and she claws him. She told him, ‘When you get back, you’re getting it.’ ” ♦

NCAA Takes Measures to Drain Power from Bats

Published: *Daily Tar Heel* (Chapel Hill, NC)

Date: 2/9/2000

Read it online: <http://www.john-zhu.com/portfolio/writing/bats>

Something about aluminum bats has always irked baseball purists, whether it is the loud ping generated when one of these metallic bastardizations catches hold of a baseball or the bloated scoring that has accompanied the resounding pings.

The ping will continue to be a thorn in the side of purists at college games this season. But if a new NCAA bat regulation serves its intended purpose, at least the scoreboard won't be as much of an aggravation.

Taking another step to bring offenses under control, the NCAA approved a standard in September to make metal bats perform more like their wood counterparts. Under the new regulation, the exit velocity of a ball hit by non-wood bats cannot exceed 97 mph, the highest average exit speed obtained in tests with Major League Baseball-quality, 34-inch, solid wood bats.

The exit-velocity standard, which went into effect Jan. 1, comes on the heels of regulations implemented in 1999 that reduced the bat diameter and the difference between the bat's weight and length.

"Basically technology has taken over and made making a bat a completely different thing," said Ty Halpin, liaison to the NCAA Baseball Rules Committee.

"It was the feeling of our committee that the game was being changed drastically by how hard you can hit the ball and how fast it gets off the bat. The 1998 World Series championship game was 21-8. That's more a football score than a baseball score. Not that we're trying to take offense out of the game, just curb it."

North Carolina baseball coach Mike Fox applauded



the changes. Fox, who played at UNC from 1976-78, noted that today's bats generated much more power than the first aluminum bats, which were introduced while he was in high school.

"I think moving the distance of the mound, or something like that, would probably be a little too radical," Fox said. "I think something had to be done about the bats, and this is the most logical."

The numbers back up the NCAA's concerns about the imbalance in the game. Offensive statistics in Division I have steadily increased since the NCAA switched to aluminum bats in 1974. In 1998, Division-I teams set records in batting average, runs per game and home runs per game. Their collective ERA jumped to a record 6.12 that year, the first time the number had surpassed 6.00.

After teams in the 1998 College World Series hit 62 home runs to shatter the previous record of 42 (set in '96), the NCAA limited bat diameter to 2 5/8 inches and reduced the weight-length ratio from five units to three

(meaning a 34-inch bat can't weigh less than 31 ounces).

"Two ounces doesn't sound like much, but day after day it has an impact," Fox said. "I think the weight of the bat probably had more of an impact on the smaller type of players who had to get the bat through the zone against a lively fastball."

Those changes resulted in a slight decrease in the 1999 offensive output but not enough for the NCAA to stop experimenting with the bats.

Dr. Bryan Smith, a member of the Baseball Research Panel, which recommended the exit-velocity standard, said player safety also was a factor. Smith, who is UNC's head team physician, said balls hit with metal bats before the new regulation often reached 105 mph, creating excessive risk to pitchers and fielders.

"There's a certain degree of risk one takes when playing baseball," Smith said. "It's now more within that expected risk."

The NCAA has imposed a three-year moratorium on regulations so it can collect data on bat performances. The committee also set up a laboratory at the University of Massachusetts-Lowell to test and certify bats from manufacturers.

As of Jan. 31, 48 bat models had been certified for the 2000 season. Five models used last year were also approved, but they must carry a "BESR (Ball Exit Speed Ratio) Certified" sticker to be legal.

If UNC's performance in the season-opening Disney Baseball Blastoff was any indication, curbing the exit velocity won't necessarily curb the scoring. The Tar Heels tallied 26 runs in three games en route to a 3-0 start, and Fox and his players said they had not noticed any significant difference in their bats.

"The difference isn't that drastic," UNC outfielder Tyrell Godwin said. "If you're a home run hitter, you're going to hit them out with these bats, too."

Of course, the bats aren't solely responsible for the increasing offensive fireworks.

"You've got to realize it doesn't matter if it's wood, aluminum or plutonium. If they can't hit it, it doesn't matter," UNC pitcher Derrick DePriest said. "If you're a good enough pitcher, you can throw it where they can't hit it no matter what they have in their hands."

That has been part of the problem. With many top high school hurlers opting for the Major League draft, there aren't enough pitchers in the college game who can put the ball where the batters can't hit it. That, along with stronger hitters as a result of better conditioning programs, has contributed to fewer pitches landing in the catcher's mitt and more balls touching down beyond the fence.

Besides, even with a new exit-velocity standard equaling that of the best Major League bats, players said aluminum still clearly outperformed wood.

"They're toned down a lot, but wood's wood," UNC catcher Dan Moylan said. "To hit with a wood bat, you've got to be strong and compact, and you've got to be mechanically sound. With the metal bat, you can get away with some flaws. That's the difference. They're not even close to wood bats."

Halpin said manufacturers and coaches had been cooperative in meeting the new standards, partly because they had more time to prepare for the change than before the 1999 season.

The Tar Heels, however, did not receive their new bats for this season until last month, although the models they used last year were certified for this season.

"One day they come in and say, 'You're going to use these bats,' and two weeks later there's a vote, and we change over," Godwin said. "It's kind of frustrating because you never know approaching the season what you're going to be using. You want to have everything in order." ♦