

CRYSTAL MENACE

A ruthless drug takes its toll on users and hospitals

Tennessee is well known for country music, the Great Smoky Mountains and Elvis, but during the last few years, the state has received another distinction—one that comes with no pride: It's one of the top five states for methamphetamine-lab seizures. And where meth is made, it's used in abundance.

While the drug has been present in the area for decades, the new millennium brought a flood of methamphetamine into Middle Tennessee. In the last few years, doctors, nurses and counselors at Vanderbilt have increasingly seen the effects of the drug as it has made its way into Vanderbilt clinics, hospital rooms and operating suites. Nowhere has meth made its presence felt more visibly than at Vanderbilt's Regional Burn Center.

The exact number of patients brought to Vanderbilt University Medical Center (VUMC) for meth-related illness or injury may never be accurately tallied, but what is known is that Vanderbilt has provided millions of dollars in uncompensated critical care—surgeons, nurses, intensive-care bed space, therapists, social workers and medications for victims of meth-related explosions and fires.

The impact of this phenomenon extends far beyond meth users and those who manufacture the drug in home laboratories. It also includes the innocent victims of meth: children whose parents lose themselves in the labyrinth of its addiction; families torn apart by its ravages; others who have their lives shattered by drug-related criminal activity or by meth users driving while impaired; and, finally, the taxpayers and health-care consumers who ultimately pick up the tab for treating drug addicts who rarely have health coverage and whose bills can easily run into the hundreds of thousands of dollars.

In these pages John Howser, assistant director and media director for the Office of News and Public Affairs at VUMC, reports on the cost of Tennessee's meth epidemic in economic terms as well as human lives.



A derivative of amphetamine, which was first synthesized in 1887 by Romanian chemist Lazar Edeleanu, methamphetamine was developed in 1919 by Japanese chemist Akira Ogata, who was able to purify and distill the more powerful form of the drug simply by the reduction of ephedrine and other commonly available chemicals. Today's street chemists find recipes for meth readily available, cheap, and extremely easy to duplicate with appropriate access to key, if highly toxic, ingredients.

Methamphetamine's history was checkered from the very start. The drug was widely distributed during World War II to soldiers in Germany as a stimulant and was used heavily by Nazi SS personnel. Adolph Hitler received daily injections from his personal physician.

After World War II methamphetamine moved into commercial use. During the 1950s it was sold as the prescription drug Pervitin, which was prescribed for narcolepsy, alcoholism, depression, Parkinson's disease and obesity. Prescriptions reached a peak of 31 million in the United States in 1967.

Illegal manufacturing of meth in the United States started in Southern California in the early 1960s as a cheap, easily synthesized, effective and highly addictive stimulant. Following a west-to-east migration, the drug crossed the Mississippi River and is now a common scourge of rural American life nationwide.

A 2002 survey from the U.S. Department of Health and Human Services found that more than 12 million people in America aged 12 and older reported they had used methamphetamine at least once in their lifetime. Of those surveyed, 597,000 reported meth use during the past month.

Legally manufactured methamphetamine is a Schedule II drug under the Controlled Substance Act of 1970, which means it is accepted for medical use but has a high potential for abuse. Its use may lead to severe psychological or physical dependence.

An overdose of meth causes increased blood pressure, rapid heart rate and euphoria—even hallucinations if the dose is high enough. But perhaps the most serious consequence, leading to morbidity and mortality, are these symptoms

in concert with a significantly elevated body temperature, perhaps as high as 106 degrees, for a prolonged period.

Long-term meth use typically results in drug tolerance, requiring users to take larger doses to achieve the same effect. Chronic use of meth can lead to psychotic behavior, including intense paranoia, visual and auditory hallucinations, and rage-fueled violent episodes. Research has shown that long-term meth use can severely damage dopamine-producing cells in the brain.

"PET [positron emission tomography]-scan studies have confirmed that chronic use of methamphetamine actually decreases the amount of dopamine transported and, therefore, the amount of dopamine in your brain," says Donna Seger, Vanderbilt's chief clinical toxicologist. "That's one of the chemicals you need in your brain to feel good."

"When we see meth patients in the emergency department, it is often heartbreaking," says Dr. Corey M. Slovis, chair of the Department of Emergency Medicine. "We see broken-down young adults who look much older than their stated years. They often have really bad teeth due to a condition we refer to as 'meth mouth.' We see patients looking to detox again and again when they run out of options. This is a drug of abuse about which one cannot really say anything other than, 'What a waste to the person, the community and our society.'"

Within the Intensive Care Unit at Vanderbilt's Regional Burn Center, a patient lies motionless in her bed. Her swollen face is held together with strips of carefully placed sterile surgical tape, forming a criss-cross pattern that leaves exposed only her eyes, a small portion of each cheek, and her lips. Beneath the dressing her face resembles a horribly scorched piece of red, raw meat.

The woman was "cooking" a batch of methamphetamine when her experiment in home chemistry went horribly awry. But other than the damage to her face, which will now bear the scars of her drug addiction for the remainder of her life, she is one of the lucky ones: She will survive. Countless others have not been so fortunate.

What crack cocaine was to the nation's inner-city minorities during the late 1980s and early 1990s, methamphetamine has become to rural white America. Typically seen in powder or rock form (called "ice"), methamphetamine

can be taken orally, smoked, snorted or injected. The drug is a powerful stimulant, which in a matter of minutes overwhelms the central nervous system, producing an intense high. The "rush" from the drug is caused by the release of high levels of dopamine into the part of the brain that controls pleasure.

The ease with which methamphetamine can be manufactured is a major contributing factor to the increase in its production and use. It is easily "cooked" by anyone in makeshift labs hidden in mobile homes, warehouses or even motel rooms. No specialized equipment or advanced technical training is needed. Sparsely populated rural areas are popular sites for production because strong odors are produced during manufacture, and small, locally controlled laboratories have become more numerous, especially in the Midwest and rural South. "Mobile" labs also have begun to appear in a number of states, making seizures more complicated.

No matter the size of the lab or who runs it, processing methamphetamine is dangerous. Ignitable, corrosive, reactive and toxic chemicals can cause explosions, fires, toxic fumes and damage to individuals' health and the environment. Nationwide, the Drug Abuse Warning Network (DAWN) reports that methamphetamine-related admissions to the nation's emergency departments have been steadily on the rise since 1995. DAWN identified 17,696 meth-related emergency-department admissions in 2002.

It was in that year that Dr. Jeffrey S. Guy, associate professor of surgery in the Division of Trauma and Surgical Critical Care and director of Vanderbilt's Regional Burn Center, first began to see an influx of patients who had been horribly burned while cooking meth or while handling the volatile precursor chemicals necessary to manufacture the drug.

The burn center's patients are typically younger adults, predominantly male, almost exclusively white, and mainly

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from rural areas in and around Middle Tennessee, although some patients come from as far away as Arkansas, Mississippi and Alabama due to a lack of available burn-care beds in surrounding states.

A smaller percentage of patients are children, critically burned by being present when their parents' meth labs explode.

One patient, a 15-year-old girl, arrived at the burn center cocooned in melted plastic and burned clothing. She had been in a room with large sheets of plastic covering the walls (to hide the stench of the cooking drug) when an explosion occurred, covering 85 percent of her body with molten plastic. Thanks to the

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burn center, she survived the incident.

"Definitely, from the aspect of impact on the staff, the toughest ones we see are the truly innocent bystanders, the innocent children who are burned in structure fires from lab explosions," Guy says.

According to the U.S. Drug Enforcement Administration's Clandestine Lab Seizure System, a centrally collected database of local, state and federal records, and the Tennessee Governor's Meth Task Force, there were 1,574

meth-lab seizures in Tennessee in 2004. This placed the state second only to Missouri that year. In 2005 the FDA reported 897 such seizures through August.

When asked to describe the extent of the meth problem in Tennessee, Donna L. Seger, Vanderbilt's chief clinical toxicologist and director of the Tennessee Poison Center, simply states, "Real big."

As director of the poison center, Seger oversees a state- and federally funded 24/7 telephone triage system of trained poison information specialists who serve as a resource for civilians as well as for the state's law enforcement and emergency medical personnel.

Seger says the incidence of meth use in Tennessee is on the rise dramatically among white males in their mid-20s. She recalls a patient she met when asked to perform a medical competency evaluation to determine if he was fit to enter jail. The man told her he'd been using meth since age 13, when his father, a meth "cook," used him to deal drugs. Surrounded by meth constantly, he started using.

"He was high for several days in a row on a meth run. So he and a friend kidnapped some people and held them at gunpoint for two days while they were high," she says. "With chronic meth use, you really do lose rational thought."

Seger says that with all the clandestine meth labs currently in operation in Tennessee, many such young meth cooks are learning their craft from their parents—not just for the money, but also for their own use.

"This drug is called 'the poor man's cocaine,' and it has a very similar action to cocaine," she says. "It gives users a feeling of euphoria, and a real feeling that you can do more while on the drug."

And unlike cocaine, methamphetamine is a local drug. "It doesn't have to be brought in from some other place. It is not a drug that is traveling. This is a homegrown problem," she says.

The legal issues surrounding meth use complicate treatment and rehabilitation efforts.

"Some patients do not readily, if ever, acknowledge the cause of their burns due to concern there may be a criminal investigation," says Dan Ramage, a licensed clinical social worker at the VUMC Burn Center who helps patients and their families heal the psycho-social aspects of their injuries. "Only after we spend some time with them, and perhaps develop some trust through counseling, do some of them disclose what happened."

"Some of these patients are very ashamed of what happened to them as a result of their drug use, or the way they have been living their lives. Maybe their drug use led to

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Innocent Victims

As the pediatrician in charge of child-abuse diagnosis for the Monroe Carell Jr. Children's Hospital at Vanderbilt, Dr. Chris Greeley, assistant professor of pediatrics and medical director of the Child Maltreatment Program, routinely sees the handiwork of the worst of human behavior. Almost every day he must look into the eyes of children who are victims of willful neglect or assault at the hands of those charged with providing love and care.

To play this unenviable-yet-critical role as a detective of child abuse, Greeley has undergone specialized training to teach him how to seek out not only the obvious but also the subtle signs and symptoms of abuse in children.

Almost since his arrival at Vanderbilt Children's Hospital, Greeley has seen children who were exposed to methamphetamine by parents who were users or cooks, or babies who suffered exposure during pregnancy due to the mothers' drug use.

"Here at Vanderbilt the smaller of these two groups is the children who are exposed to meth after they are born," he says. "This is a small but quite significant population who comes in with postnatal exposure."

Typically, these children continue to be exposed to meth and other drugs in their living environments. "It's not just the meth itself, but the environment in general that's harmful."

These children are exposed not only to the finished product but also to the toxic solvents and chemicals used to manufacture it—chlorine, phosphorus, and other fertilizer-caliber materials—thus placing them in direct contact with materials that can explode or cause lung disease, burns, or cognitive and intestinal problems.

While recipes for making meth can vary, many of the essential and highly toxic base chemicals are the same. And according to the

Office of National Drug Control Policy (ONDCP), production of 1 pound of meth typically results in 5 to 7 pounds of toxic waste.

At Vanderbilt, toxicologist Donna L. Seger and the Tennessee Poison Center are working to distribute educational materials to emergency departments statewide that provide a consistent reference on how to treat children rescued from a meth-lab environment.

When children are discovered by law-enforcement officials in a dwelling used for cooking meth, no standard evacuation protocol is followed. Frequently, if children are present when a lab is discovered, well meaning law-enforcement personnel may add further emotional trauma by taking a child outside into the yard, stripping them and hosing them down. Seger says this behavior is excessive in many instances.

"When we look at a child exposed to meth manufacturing, we know what he's been exposed to in terms of broad categories of chemicals," she says. "The immediate reaction by some people is to want to take usually unnecessary action on the child. That's why we're producing a poster—so folks will have accurate information."

The other risk factor for children living in a meth environment is exposure to their parents' erratic behavior.

"Living with parents who are meth addicts exposes children to needles around the house, booby-trapped houses and guns. The parents themselves have such poor health that neglect becomes a big issue," Greeley says. "Especially when they are high, and subsequently when they crash, parents are not providing nutrition or hygiene."

More frequently than he sees meth's effects on young children and preteens, Greeley sees the end result of babies who have been exposed to meth and other illicit drugs during gestation.

"Pregnant women who are drug users, specifically meth users, have significant problems with their own health from doing drugs or trading sex for drugs, which often leads to sexually transmitted diseases," he says. "Then the baby, much like during postnatal exposure, is living in an environment inside the mother

where he is exposed to drugs and the shrapnel from the mother's lifestyle, which is poor nutrition, infections and perhaps even trauma."

Babies born from an *in utero* meth environment can suffer withdrawal symptoms, which range from subtle (being jittery or sensitive to light) to pronounced symptoms such as seizures that may require tube feeding until withdrawal symptoms pass.

Other telltale signs of exposure to meth *in utero* include prematurity and low birth weight.

As disturbing as all this sounds, Greeley says the meth problem at Vanderbilt Children's



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"It's not just the meth itself, but the environment in general that's harmful," says Dr. Chris Greeley, medical director of the Child Maltreatment Program.

Hospital is not as pronounced as in some other large children's hospitals in the Southeast, or even as pronounced as the problem in other large city hospitals in the East Tennessee cities of Knoxville and Chattanooga. And, proportionally, Vanderbilt's incidence of pediatric meth patients is likely not as prevalent as in some smaller hospitals in rural Tennessee communities being ravaged by the drug.

"During the past year it seems the incidence of the problem has reached a plateau here, at least for now," he says. "However, it's too early to call that a trend."

Over the Counter

In 2004, Tennessee legislators changed the availability of pharmaceutical products essential to the manufacture of methamphetamine—such as cold medicines containing ephedrine—from over-the-counter to behind-the-counter. Despite this change, the patients never stopped arriving at Vanderbilt's Regional Burn Center.

"Initially, before the cold-medicine ban, it got so bad that as many as 25 or 30 percent of our patient census was because of meth," says Dr. Jeffrey S. Guy, associate professor of surgery in the Division of Trauma and Surgical Critical Care and director of the burn center. "After the state's Meth Task Force banned the sale of these cold medicines over the counter, the number of meth-related patients seemed to go down, but now it's going back up again."

"Different theories are out there as to why this is occurring. I don't think people stopped using. One theory is that manufacturing moved away from home cooking and went to industrial labs south of the border. Some folks in law enforcement have told me the meth users don't like the grade of the product, that mass-produced meth doesn't have that zing they crave. So now, more are going back to home cooking."



High Behind the Wheel

For Tim and Twila Hurst, the world was looking up. Tim had just accepted a new job as publisher of the *Glasgow Daily Times* in Glasgow, Ky., and the couple was in the process of looking for a house so they could relocate from the town of Henderson.

During the course of the house hunt, Twila was riding with Glasgow real estate agent Sybil Leamon, who was driving a GMC Jimmy. The women pulled away from a rural intersection on Highway 31 East on Friday, Aug. 20, 2004.

Twila Hurst remembers nothing from that point until about four weeks later.

What others have told her is this: The vehicle in which she and Leamon were traveling was smashed head-on at high speed by a 19-year-old man high on methamphetamine. The teenager lost control while behind the wheel of his full-size Ford F-250 pickup truck, send-



ing the vehicle across the highway's center line and head-on into the front of the vehicle carrying the two women.

Sybil Leamon was killed instantly. Twila Hurst was badly injured.

The 19-year-old man who caused the accident and an 18-year-old passenger also in his truck were not hurt.

Twila and Tim credit her survival to a fortunate series of events that quickly brought emergency medical personnel to the accident scene: the staff of the community hospital in Glasgow, and then the quick-response crew of Vanderbilt's LifeFlight air ambulance.

"My head was cut from about the middle at the top, and the cut went almost completely halfway around my scalp," Twila says. "The left side of my pelvis was shattered. My right wrist was fractured. My right thumb was fractured. My right femur was shattered into two pieces. My right ankle was fractured, and my left arm was broken."

Hurst spent 10 days in Vanderbilt University Medical Center's Trauma Unit as surgeons worked to piece her broken body back together. Her recovery was followed by weeks in a physical rehabilitation facility back home in Kentucky.

Tim Hurst says his wife likely would not have survived the accident if the SUV in which she was traveling had not had a sunroof.

Twila Hurst's life was shattered when the SUV in which she was riding (below) was hit by a truck driven by a man high on methamphetamine.

"Twila's severe scalp laceration came from her head shattering the sunroof," he says. "However, the paramedic on the scene said that if the vehicle's roof had been metal instead, Twila's neck probably would have been snapped in two during the wreck."

Fortunately, after months of recovery and rehabilitation, and more than \$400,000 in medical expenses, Hurst has made a remarkable physical recovery. Today her lingering physical effects include a limp from where her pelvis and leg bones were screwed back together, and a few less-obvious physical limitations. However, her effort to remember the accident and the several weeks immediately afterward has proven futile.

"I know it would be all bad memories. But to have bad memories would be better than no memory at all," Twila says.

The young driver of the pickup pleaded guilty, receiving an eight-year sentence for manslaughter in the second degree and assault in the second degree. The Hursts believe this sentence isn't nearly enough.

"Our nightmare lasted months," says Tim.

"Twila spent 10 days in the trauma center and another 11 weeks in a

nursing rehabilitation facility because she could not use either of her legs or her right arm due to the extent of her injuries."

Tim says that while his new boss was accepting and supportive during Twila's hospitalization, the ordeal was too much for the couple—physically, emotionally and financially. The exciting new job didn't work out. After 16 months Tim resigned from the paper.

"During my exit interview my boss said, 'I just don't know what happened to the man I hired.' But I knew. Meth happened," he says. "I didn't take it. My wife didn't take it. We knew little about it. But because a young man from Glasgow thought it was a good idea to take meth and get behind the wheel of his truck, meth changed our lives forever."



divorce or to losing their children to foster care. So there is an element of shame with these patients that perhaps we don't see in others."

Ramage says many of the meth-burn victims he counsels suffer from poly-substance abuse and are in dire need of substance-abuse treatment once they are ready to be discharged from the hospital. Because virtually none of these patients has health insurance, the need for counseling poses a significant problem.

"In addition to their dependence on drugs, these patients are often disfigured as a result of their injuries," he says. "So they leave the hospital with an additional set of problems such as body-image issues coupled with related depression and social anxiety."

Ramage recalls a recent patient who is typical of the problem, a young man in his early 20s who, despite his meth use, was trying to turn his life around. The man was employed and engaged to be married.

"He told me he was trying to get off meth, and at the time of his accident was in outpatient counseling," Ramage says. "But he had not been able to stop the abuse. In the midst of all this, he has the explosion and is now out of a job, his fiancée left him, and he is living with his mother so she can care for him. He's become something of an invalid. He has no medical insurance and doesn't have any real way to get into a drug treatment program."

Surgeon Jeff Guy says the lack of community resources to address drug addiction leaves patients adrift and ready to go back to previous illegal acts.

"No community resources exist to help these people once they leave the hospital. None! So what happens is no surprise. They go back to the same risk-seeking behavior," he says. "It's a vicious cycle."

But in addition to being concerned about the well-being of his patients, Guy is worried about the financial impact to the burn center for treating uninsured meth-burn victims. Conservative estimates put the cost of care for these patients into the millions of dollars, with much of this expense borne by Vanderbilt—a financial burden that could impact the burn center's long-term mission.

"These people can cost the hospital several hundred thousand dollars each. And that's just the acute-care portion," he says. "Then comes the chronic-care portion of treatment. Do they need reconstructive surgery or ocular surgery? They all need physical rehabilitation therapy and drug counseling. In terms of insurance coverage, all of them are not eligible."

In fact, virtually none of the patients has any form of health insurance. By the time most arrive at the burn center, the drug has robbed them of every asset they ever owned.



Burn Center social worker Dan Ramage, left, and surgeon Dr. Jeff Guy say the lack of community help for substance abusers leaves patients adrift.

"They can't get TennCare [Tennessee's managed-care program for low-income individuals], they can't get Medicaid, so we wind up as their catchall for everything," Guy says. "You can't turn them away, so we do the very best we can to meet some of the other medical needs these patients may have."

Perhaps one of the meth-burn patients most exasperating to Guy was a man in his mid-30s, treated at Vanderbilt during late 2004 and early 2005, who wound up in the burn center. The total charges for the uninsured man's care at Vanderbilt

Meth-burn patients seldom have health insurance. Conservative estimates put the cost for their care into the millions. The financial burden could impact the burn center's mission.

far exceeded \$500,000. This was on top of an equally large bill Guy later learned the patient racked up at another hospital. The man survived and hasn't been back to VUMC since.

"If you had a big building on fire in your community, someone would do something about it," Guy concludes. "The local, state or federal government would step in to help. But here you've got these people's lives who are being burned up and nobody seems to be taking responsibility for it but Vanderbilt." ▼