Another steamy gust blasts up Lothrop Street, rising fast and hard like a missile in the oppressive dusk. Pittsburgh’s weather has been torrid all weekend, a July weekend for some of family picnics, for others of air-conditioned refuge.

Brian Pettiford, Res ’01, M D ’96, knows another side of summer. He left his wife and son Saturday...
for 6 a.m. rounds at UPMC Presbyterian Hospital. After a slow day and a brisk workout, the tall and chiseled cardiac surgery fellow was looking forward to a quiet family evening at home. But then he got paged: We have a heart.

Soon, Pettiford, 32, was spending his family time flying to Grand Rapids, Michigan, harvesting the organ and rushing it back in a frigid plastic cooler for transplantation.

Tonight, Sunday, Pettiford isn’t crammed into an airplane seat, where he finds sleeping difficult. Yet, now, in the middle of a 24-hour duty shift, he won’t sleep much at the hospital, either: Another doctor is flying in another heart from Washington, D.C. It’s 7:40 p.m. A man lies on the operating table, his chest spread open, an invitation to the new heart that cardiac surgeon Larry Shears and Pettiford soon will provide. For the weekend, Pettiford has worked almost as many hours as most people accumulate in a week. And his night has just begun. This is life on the medical trainee clock, the reality of medicine. For now.

Come July 1, 2003, universal standards on resident work hours adopted by the Accreditation Council for Graduate Medical Education (ACGME) officially take effect at the 7,800 residency and fellowship programs the organization validates across the country. The standards prohibit graduate medical trainees from working more than 80 hours a week averaged over a month, or on shifts longer than 24 hours. (Residents and fellows can work an additional eight hours a week under “special circumstances” like heart transplants.)

The ACGME standards—a reaction, some say, to the very real threat of federal oversight—went into practice at Pitt this July, so that administrators could monitor compliance among its 85 accredited programs. The policy is a clarification for some programs already conforming to the standards. For others, like the surgery residencies, it’s a dramatic change. The challenge for those programs is giving trainees time outside the hospital without harming their education.

The graduate medical trainee lives a curious life. On one hand, a resident works for a hospital system. For his services he receives benefits, including malpractice insurance—for which the premiums in Pennsylvania run into the tens of thousands of dollars a year. He earns a salary, ranging at Pitt from $37,000 for first-year interns to almost $50,000 for senior fellows. That comes from the federal government, which reimburses teaching hospitals on average about $95,000 annually from Medicare for the education of one resident.

At the same time, of course, a resident is an apprentice, whose training load differs from residency to residency. A pathology resident might see an angiosarcoma for the first time and spend hours afterward reading the recent literature about it, but not until
reviewing the day’s caseload. A general surgery resident, by contrast, might treat 12 patients during a 24-hour duty shift. Then she will make rounds at 6 a.m., spend the rest of the morning and that afternoon completing paperwork, seeing patients, and watching surgeries, finally sitting down at 5 p.m. with the rest of the department for an hour’s instruction on ulcer disease.

The resident’s schedule is infamously unremitting. Surgery occurs more often at night than during the day: A heart gives out at its own pace. Some cases, an upper gastrointestinal surgery for example, come along only so often. For the medical trainee system to work correctly, so the theory goes, these residents must learn a great deal in a short time, so many are scheduled to work painfully long night shifts for hands-on training they won’t find in books. It’s not unheard of for residents to stay at a hospital after their shifts end, so they don’t miss that day’s surgery or continuity clinic, for fear of being ill-prepared to treat similar cases on their own one day.

What’s more, today’s residents treat sicker patients. In 1900, people who came into the hospital either got better or died. For decades, residents lived at the hospital not only to treat those cases but also because they were required to do so. Now, people live longer with serious diseases that require constant care. And residents still provide much of the treatment, except now they have lives outside of medicine, or at least try to.

Time was the resident experience was a brutal existence, often comprising duty shifts every other night. But in some ways it wasn’t nearly as stressful as today’s, with many residents now claiming to buckle under the pressure, according to a study in the Annals of Internal Medicine (March 2002). Today’s residents leave medical school with an average debt burden of $128,000. They are quickly required to master rapidly expanding scientific and clinical knowledge. They may feel conflicting pressures of starting a family, especially residents who are young women of childbearing age. They feel overworked, sleep-deprived, depressed, and cynical about the future. Moreover, the public fears if residents work 136 hours in a week, they will become so fatigued they’ll make mistakes that run counter to the doctor’s creed, “First, do no harm.”

Pettiford and Shears lean over their patient, heads barely touching, staring into the man’s trapezoidal chest cavity. It’s just before 9 p.m. The operation moves forward with delicacy.

Pettiford slips blue surgical thread through the aorta, transferring a curved needle back and forth between forceps. Shears, the attending, puts a handful of melting ice on the new heart. If it warms too quickly, the heart might fibrillate later, increasing the chance of ischemia, irregular heartbeat, kidney failure. The man’s old heart was a general mess. When the doctors opened him up, the heart fibrillated, wriggling like a trapped snake.
Shears and Pettiford had to shock the fist-sized muscle into submission in order to clamp off the arteries. Putting ice on the new heart should prevent it from also fibrillating.

"Sometimes you can be up most of the night taking care of the patient because of this," Pettiford says through his surgical mask. "The procedure is simple, Shears (Res ’99), not long ago Pettiford’s chief resident, says in jest. You attach the vena cavae, the pulmonary artery, the aorta. "Then I’ll go home," Shears says, nodding in Pettiford’s direction. "He has to stay and take care of the patient."

Even if he’s tired. To him, this is nothing new. Growing up in Tifton, Georgia, Pettiford wanted to be a heart surgeon. His grandmother died of a heart attack; her mother died the same way. And so, when Shears was finishing his residency two years ago and Pettiford asked him, "What’s it like?" he didn’t blink as Shears said, "Man, it’s hard."

It’s so hard that at times Pettiford admits he’s sometimes humbled. “You think, ‘Damn, will I ever learn?’” The fatigue he lives with, trained by experience to handle it, not unlike a member of an elite military unit, he says. Plus, working crazy hours is part of the job. “Do I really like being in the hospital three or four days straight? No. I don’t think anybody in their right mind would want to be here,” he says, one afternoon after surgery. "You have to put things in perspective. If I were a patient, I would want someone who had worked 100, 110, 120 hours a week [as a trainee], who had seen everything under the sun, operating on me, versus someone who had worked only 40, 50 hours a week, who maybe hadn’t seen anything.”

THE CALL FOR CHANGE IN THE TRAINING REGIMEN BEGAN SOON AFTER LIBBY ZION CHECKED INTO NEW YORK HOSPITAL–CORNELL MEDICAL CENTER ONE NIGHT IN 1984 WITH A HIGH FEVER AND TREMORS. A JUNIOR RESIDENT OBTAINED HER MEDICAL HISTORY: SHE’D TAKEN SEVERAL MEDICATIONS, INCLUDING PHENELZINE, A MONOAmine oxidase (MAO) INHIBITOR PRESCRIBED FOR DEPRESSION AND STRESS RELIEF. THE RESIDENT, IN HIS 22ND HOUR OF WORK, DIAGNOSED ZION AS SUFFERING FROM "VIRAL SYNDROME WITH Hysterical symptoms” AND ORDERED DEmerol, A DRUG CONTRAINDICATED FOR PATIENTS ON MAO INHIBITORS.

Eight hours later Zion was dead. Within five years, duty-hour limitations became part of the New York State Health Code. The regulations allow residents to work no more than 80 hours in a week and limit duty shifts to 24 hours. A surprise inspection in 1998 at 12 New York hospitals found that 60 percent of surgical residents still worked 95 hours a week.

By 1998, the Institute of Medicine concluded that as many as 98,000 people die in the United States each year because of medical errors. A year later 12,000 graduate medical trainees formed a union, the Committee of Interns and Residents. Along the way, the 30,000-member American Medical Student Association (AMSA) lobbied vigorously for federal intervention in the treatment of residents, citing the Zion case prominently.

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The call for change in the training regimen began soon after Libby Zion checked into New York Hospital–Cornell Medical Center one night in 1984 with a high fever and tremors. A junior resident obtained her medical history: She’d taken several medications, including phenelzine, a monoamine oxidase (MAO) inhibitor prescribed for depression and stress relief. The resident, in his 22nd hour of work, diagnosed Zion as suffering from “viral syndrome with hysterical symptoms” and ordered Demerol, a drug contraindicated for patients on MAO inhibitors.

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A s schools across the country try to implement the new standards, they are likely to run across few if any simple remedies for maintaining quality graduate medical education. Pitt has taken a few steps that might make its transition to the new rules smoother. Long ago administrators brought all of the University’s residency programs under one central authority, now the UPMC Office of Graduate Medical Education (GME). Pitt’s system makes the School of Medicine’s department chairs as well as program directors responsible for the education of each resident. Dennis Zerega, vice president of the office, and Kenneth S. McCarty Jr., assistant dean of GME, routinely sit down with program directors and chairs to work out problems as they arise. Pitt also has an assistance program in which medical trainees can anonymously receive counseling for such professional hazards as fatigue and financial problems. “We’re probably the most well-organized place in the country,” Zerega says.

The pressure, says McCarty, falls on program directors to ensure residents learn within the pending ACGME standards today. Program directors have been told to be on the watch for residents who are tired because they stayed at the hospital beyond their duty shift or were moonlighting, picking up extra work as a physician to earn some more money (perhaps as a trainer for a high school football team or at another hospital).

“We’re going to audit to see that no resident is scheduled to be in the hospital for 80 hours, then is scheduled to be on call on Saturday, and has scheduled himself for a moonlight on Sunday, and is supposed to be in clinic Monday morning at 8 a.m. This makes him inefficient and unable to perform his best,” says McCarty, who remembers working late into the night in the 1970s during his internal medicine residency at Duke University, not long after Duke first allowed its medical trainees to live outside the hospital. (Duke still required them to be on call 24 hours a day for five days a week. On their two days off, they could leave only when the work was completed.)

No one wants fatigued residents getting injured in car accidents or not giving the best care because they’re tired, so having the ACGME standards down in writing is good, says William Crombleholme, Pitt’s program director of obstetrics and gynecology.

But the rules make his job harder, and the ACGME has offered no guidance on how to make the adjustment. On average, most of the 34 residents in his program work about 80 hours a week. But the four residents on the oncology service sometimes work more hours, because their patients are so sick. “The people on the service, particularly the senior residents, are not going to want to leave a patient,” Crombleholme says.

He’ll need to find money in his budget to pay two or three physician assistants or nurse practitioners to offset scheduling changes in the oncology service alone. Maybe the residents won’t have as much clinical work. One thing Crombleholme firmly believes: Residents now will have fewer cases. Fewer cases means less variety in the
kinds of cases they'll learn about. In the end, he says, their education might suffer.

“It’s not the kind of thing where you can add another resident, because the caseload isn't going up. You're adding a resident to cover care and not education, and that gets beyond the mission of residency,” he says.

If you limit a resident’s experience, says John Kane (Res '98), program director for general surgery, you end up with doctors who are less prepared to care for patients. Kane, remembering his own 100-hour workweeks, has no doubt that his investment in training had a price, keeping him from his wife and children. But little has changed since: “I'm still always on-call for my patients if there's a problem. If I end up in a 14-hour operation, I don't hand it off seven hours into the surgery to somebody else and say, ‘You know what? I've got a busy clinic day tomorrow; I don't want to be up past 10 o'clock.’ For each individual patient, it’s all or nothing.”

But Kane also knows that some change is necessary. He knows that applications to general surgery programs nationwide have dropped by 30 percent during the last nine years. Medical school grads want more from life than just medicine—families, outside interests like music—and so increasingly they look for specialty training that doesn’t keep them in the hospital 100 hours a week for 10 years. He also knows the ACGME could pull his program’s accreditation. So Kane recently changed the 24-hour on-call schedule from every fourth night to once every six days for first-year interns and once a week for junior residents. He established a new buddy system where an intern and a second-year resident team up for several services to handle the caseload increase caused by giving other residents the day off. He also told his trainees to track their hours.

For Rohit Sahai, a second-year resident under Kane, the change has been significant. Last year, as an intern, Sahai likely worked 100 hours a week often, though he never counted. Since July, it's as if he has entered a new program.

By 12:15 a.m., Pettiford’s patient stabilizes. The doctors have spent hours reversing the effects of blood thinners, coaxing the new heart to beat steadily, suturing and cauterizing bleeders, sopping up blood. Shears talked with the man’s family and left for home. Pettiford stepped away from the patient, conferred with Sahai, just starting a six-week rotation in thoracic surgery under Pettiford, and now stands for a moment outside the OR, waiting to wheel the patient off to intensive care.

Pettiford feels lucky. There’s nothing else he could think of doing with his life. So many people made sacrifices for him to spend these 10 years training: his parents, who as teenagers worked in the grueling Georgia cotton fields, his baby sister, whose graduation from college Pettiford missed because he couldn't break away from training; and his dad's grandmother, who watched over him when he was a boy. When she died a few years ago, he tried to rearrange his residency schedule to make her funeral. He wound up arriving just as her casket was carried away.

Whenever Pettiford thinks he’s working too hard, he remembers them. He can’t let them down—even if it means not coming home until 10 p.m. to wake his 6-month-old son, and hold him, just for a minute, before the boy screams for his mother. Never mind that most 6-month-olds haven’t bonded with their fathers, even those fathers home for dinner every night. You can’t tell that to someone and expect it to matter if he rarely sees his family.

“If I have any regrets about going into medicine, that’s the one: time lost that I know I will never ever get back,” he says, his voice trembling ever so slightly. “That’s the stuff that hurts.”