

THE

HEART

HEALERS

The misfits, mavericks and rebels
who created the greatest medical
breakthrough of our lives

JAMES S FORRESTER



This book is filled with stories of courage in the face of adversity.

*One I do not tell is that of my oldest son, Jeffrey,
who personified this quality as he edited this book,
and my family who support him.*

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PROLOGUE

ABOUT A THIRD of the world's deaths, 15 to 20 million people annually, are due to cardiovascular disease. In just one year, heart disease claims more lives in the United States than all Americans lost in the wars of the past century. Perhaps worse, an astonishing eighty million U.S. citizens currently suffer from cardiovascular disease. Do not imagine yourself immune. No one gets a free pass because they have no symptoms of heart disease: among the nation's 400,000 annual sudden deaths, about half of the men and two-thirds of the women have no preceding symptoms. It spares no age, sex, or era. It strikes newborns and children, young athletes in their prime, and adults in apparent perfect health.

But medical statistics are patients with the tears wiped away. So let's enter this story when I did, as the first rays of dawning sun filter through the grimy windows of a medical ward in a mid-1960s hospital in Philadelphia. A thirty-eight-year-old man has been admitted in the middle of the night with chest pain. His first name is Willie; I no longer recall his real last name. As I walk onto the ward in my white pants and the starched short white coat that marks me as a doctor in training, I instantly recognize Willie from our prior meetings in the outpatient clinic.

I think back to the first time I met Willie. With only our wits and a stethoscope as our primary diagnostic tools, I was taught to be a medical Sherlock Holmes, focusing on tiny details from the moment I saw a new patient. This is what I saw: Willie was just under six feet tall, with thinning, neatly trimmed black hair speckled with gray. His rheumy brown

corneas had rims of white, as he peered cautiously out from beneath bushy graying eyebrows. His prominent well-shaven jowls reminded me of a chipmunk. Tiny blood vessels spread over his small upturned nose. Perched on an exam table with his legs dangling over the side, Willie reminded me of photos of the legendary Yankee slugger Babe Ruth. He had a barrel chest, a gut that protruded prominently over his belt, and mismatched sticklike legs that peeked from beneath a faded threadbare county-issue smock. As we shook hands, I noticed Willie's palms were flushed pink. His nails were trimmed and clean but had a dusky tinge. On his bare arms and legs I saw that he had a few raised, waxy yellow bumps. Before we spoke, I silently made my initial diagnosis: Willie was an alcoholic who was a reformed heavy smoker. He had emphysema in his lungs, cirrhosis in his liver, and atheroma in his coronary arteries.

How did I arrive at these conclusions? Willie's barrel chest and dusky fingernails suggested emphysema, almost always caused by smoking. But his fingers had no nicotine stains, so he probably had given it up. The dilated blood vessels on his nose, flushed palms, large abdomen with skinny legs, and chipmunk face were all signs of alcoholic liver disease. Most of these signs reflected failure of the liver to metabolize circulating steroids, particularly the female hormone estrogen. The white arc in the cornea in early middle age and the yellow bumps on the arms and legs (called xanthoma) were telltale signs of an inherited high level of blood cholesterol.

In an understaffed overworked hospital the lowest-ranked person in the training program often is the first to see patients and typically spends the most time with them. Willie was one of my favorite patients. He had a huge welcoming smile. He remembered the name of each doctor, nurse, and patient. Willie told hilarious stories, but he was as willing to listen as to talk. We had much in common. We had grown up in neighboring small towns in the Central Pennsylvania Dutch country. Willie loved the Phillies. I knew every player's batting average. "You call me Willie the Phillie," he'd urge. He was a reformed alcoholic, sober for three years. Willie was a traveling auto parts salesman. To me he was the incarnation of Willy Loman in Arthur Miller's classic play *Death of a Salesman*, played that year by the legendary Lee J. Cobb and two decades later in 1985 by Dustin Hoffman. Willie was the "low-man" on society's ladder, trampled by his

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boss, his former wife, his teen-age son, even his customers. Yet he retained Willy Loman's faith in the American Dream. He had an abiding faith in me as his doctor, too, since the day in the outpatient clinic when I prescribed nitroglycerin pills for his newly developed chest pain with exercise, and it worked. "When you hang out your shingle, Doc, I'll be your first patient," he'd tell me on each subsequent visit.

On the ward I greeted Willie. The night before, he had been jolted awake in the middle of the night by severe chest pain. "It felt like a vise being tightened around my chest," he said. "It squeezed the air out of me. I took a nitroglycerin. But this time nothing happened. I took another, but instead the pain just kept getting worse. I took another nitro, and felt so light-headed I couldn't even sit up. For a half hour I lay there, unable to move. Then the vise started to relax. As soon as I could, I got out of bed and drove here to the emergency room. By the time I got on the ward, the pain was gone." I knew Willie's diagnosis from the textbooks. He had what we then called preinfarction angina and now call unstable angina. Although the patient feels fine between episodes, it is often the harbinger of a full-blown, potentially lethal heart attack.

The treatment for preinfarction angina in those years was strict bed rest. Over the next two days Willie continued to have episodes of prolonged chest pain at rest, but between the episodes he felt fine. Toward the end of the third day, as I stood at his bedside chatting about the Phillies, Willie grimaced. His right hand flew to the center of his chest, and contracted into a tight fist. "The pain is coming back, Doc," he said. Small beads of sweat appeared just below his hairline. His breathing became labored. His eyes widened with fear. He looked beseechingly into my eyes. "Doc, this one is worse, I feel like I'm gonna die. Help me," he pleaded. I put a nitroglycerin under his tongue. No response. Willie was right . . . this one was worse.

I called the ward nurse to summon my medical resident, and anticipating his arrival, I told her to draw up a syringe of morphine right away. Everything now began to whirl past me at triple speed. Willie's systolic blood pressure, which was usually 140, fell to 115. I gave him another nitroglycerin. No relief. The morphine arrived, but no resident. So I gave Willie the morphine by intravenous injection. Almost immediately he began to experience relief of pain. But over the next few minutes his blood

pressure continued to slip lower . . . 110, 105, 100. I told the nurse to wheel the ward's cardiograph (ECG) machine—we had no TV monitors in those days—to his bedside. Willie's tracing showed all the ECG hallmarks of a heart attack. I felt like David facing Goliath with an empty slingshot. I was responsible for Willie's care and I had no effective therapy to offer.

We were now three or four minutes into his pain, and the resident had still not appeared. When Willie's blood pressure fell further to 90, I ordered a medication to support his blood pressure, fearing it would be of little value. As it was being infused into his intravenous line, I kept my eyes on his panicked face and my fingers on his pulse. My own heart began to pound furiously when I felt Willie's pulse rate suddenly triple and weaken further. I recorded another strip of the ECG. Willie's normal heart rhythm was gone. In its place was ventricular tachycardia—a very fast, life-threatening rhythm that often comes just before ventricular fibrillation, the rhythm of sudden death. Now in near panic I shouted Code Blue, medicine's universal message of disaster, its urgent plea for help from any nearby doctor. A few seconds later, Willie's eyes rolled to the ceiling and he lost consciousness.

In the preceding months, we had learned of a new approach called cardiac resuscitation. I had not yet seen a resuscitation; my first experience would be performing one. Behind me I heard a sudden explosion of running doctors, nurses frantically pushing carts. Someone yanked the curtain around Willie's bed, concealing all but white pant legs and white stockings. Willie's heartbeat disappeared completely. I recorded another strip of ECG. There it was: the rhythm of death, ventricular fibrillation.

A staff doctor in a long white coat charged in to assume the role of foreman. "Who's his doctor?" he asked. When no one answered, the nurse pointed to me. He swiveled toward me and shouted, "Pump!" I began rhythmically pressing on Willie's chest. A defibrillator was rolled to the bedside. Long Coat showed me where to press the two paddles on Willie, one on his upper right chest, the other on the lower left, and handed them to me. "Hands off the bed!" he shouted and nodded to me. Like Ben Franklin's key, you did not want to be touching metal when the lightning struck. I fired the defibrillator by depressing the thumb switch on the right paddle. I jumped back reflexively as Willie's whole body flexed in a vio-

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lent convulsion, like he had the sudden impulse to sit up. Then just as quickly he flopped back. To my horror I saw my intervention had left his body crumpled, head angled crazily, hair disheveled, mouth agape. My entire body recoiled as I felt—I saw—the terrible indignity of death. I dropped the paddles, and resumed pumping on Willie's chest. Someone ran another strip of the ECG. Still ventricular fibrillation.

A minute later an anesthesiologist, panting from running the hallways, shoved aside the surrounding curtains, grasping a breathing tube. I stepped aside as she flexed Willie's neck back. It took her about a minute to insert a metal flange into his mouth, pass a breathing tube into his trachea, and connect a breathing bag. I resumed pumping. After a few minutes of furious pumping on his chest I was drenched in sweat and near exhaustion. Another trainee replaced me.

Long Coat handed me a large syringe filled with a heart stimulant that we hoped might restore the heartbeat. The syringe was connected to a menacing six inch long needle. "Stick it in the fourth intercostal space," he said. "Keep going until you are inside the heart." I shoved the needle deep between Willie's ribs, almost to the hub, then pulled back on the barrel of the syringe. Blood poured into the syringe. I was inside the heart. I injected the concoction.

Over the next twenty minutes, with the rest of the ward in morbid silence, the slurp of suction tube, loud thumps, and heavy breathing rose above the turmoil from behind Willie's curtain. Above the cacophony, two terse words repeatedly declared our abject failure. "Still v fib." We could not resuscitate Willie.

By thirty minutes, the others were wordlessly looking at Long Coat for a decision. He turned to the anesthesiologist.

"What do you think?"

"I think he's gone," she said. Her words fell like a guillotine..

He turned to me. "He's your patient, Doctor. What's your call?"

His question was like a punch to my solar plexus, unexpected, stunning, painful, taking my breath away. Why me? I was still just a twenty-something kid. An apprentice. This was my friend Willie the Phillie. Was Long Coat being cruel beyond imagination? He knew I wasn't remotely qualified or prepared, and he yet he seemed to be taunting me by putting this final responsibility for Willie's death on my shoulders.

Wasn't this final responsibility clearly his, not mine? Or was he treating me with profound respect, calling me "doctor" before my time, admitting me to the fraternity of shared exhilaration and grief between doctor and patient, letting me know that although we had failed, I had done enough to earn his respect? I will always wonder and never know.

I had never come face-to-face with such a profound, wrenching decision. I felt submerged, unable to breathe. In that moment of total silence, I could only look at my shoes, engulfed in impotent failure. We had done everything to save my thirty-eight-year-old patient, yet in that moment I realized that for people with heart disease, we had almost nothing to offer. Nitroglycerin under the tongue was a mismatch worse than Crimea against the Russians. I raised my eyes to rest them on Willie's ashen face for a long moment of resignation. In that moment I accepted my responsibility. I was Willie's friend, but as he said, I was his doctor.

"We should terminate Mr. Loman's resuscitation. I will record that the patient was pronounced dead at 11:58 a.m.," I choked out, staring at the wall well above the tattered white curtains.

Long Coat delivered a final insight. "He had coronary disease. It was his time." His subtext was clear. Willie's misfortune was that he had coronary disease. With coronary disease, there was nothing a doctor could do.

Routine returned. The anesthesiologist extracted her tube, then sidled around the still closed curtain. The nurses silently, respectfully smoothed and folded Willie's sheets around him, and over his face. I slipped out from behind the curtain and, avoiding eye contact with my other patients on the ward, trudged to the nurses' station to make my final entry in Willie's chart. Trained in medicine's language of facts devoid of feelings, I wrote, "Cardiorespiratory arrest at 11:27 a.m. Unresponsive to intracardiac medications, intubation, and defibrillation. Pronounced dead at 11:58 a.m." I called Willie's next of kin, knowing that on this charity ward, typically no one would come. Watching Willie's tiny cubicle surrender his lingering identifiers and a gurney wheel his shapeless mass past unshaven men with averted eyes, I felt like a prison warden overseeing the last walk of an innocent man. As I closed his chart, I reread my note: it seemed like I was ushering Willie into eternity with neither a name nor a tear.

My impotent witness to Willie's sudden death left me staring into an

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emotional chasm, a doctor's version of post-traumatic stress syndrome. I felt that although our treatment was bankrupt, we accepted the satisfied conventional wisdom that this was the best cardiology could do. Had he survived his heart attack, my mentors would prescribe a minimum of three weeks of strict bed rest for Willie's injured heart to heal from injury, after which they would conduct an erudite discussion of when it would be safe for him to dangle his legs over the side of the bed. We needed to discover a better way. Impossibly self-delusional as I may have been, I decided to enter cardiology. And that is why I write today.

When I entered cardiology, we faced a new virulent illness. Epidemics are nothing new. In the early 1300s a new disease appeared in China, joined travelers along the Silk Road to Crimea, then moved on to Europe, carried by Oriental fleas living on black rats, the ubiquitous denizens of merchant ships that plied the Mediterranean Sea. In the half century that followed, the Black Death killed half of Europe's population, cutting the world population by an estimated seventy-five million people. For seven centuries, the plague stood as mankind's greatest scourge. At the middle of the twentieth century heart disease erupted in exactly that way, as a scourge before which we stood helpless. Heart disease began to kill five to twenty million people worldwide every single year. In my country, the United States, when I entered medicine, more lives were being lost in a single year than in all of World War II.

If you want to understand this enemy, you have to begin with the normal heart. Its principal function is to deliver life-giving oxygen to all the body's organs. To do this, the heart consists of four components. Muscle that pumps blood. An electrical system to control the pump's rate. Valves that control the flow of blood through the heart. And coronary arteries to supply oxygen to the other three components.

A glitch in any one of these four systems gives you heart disease, each with a different constellation of symptoms. Disordered muscle and valve function cause arrhythmias (abnormal heart rhythms), manifest as light-headedness, fainting, and even sudden death. Diseased coronary arteries shows up as angina (chest pain on exertion), heart attack, and sudden death.

I knew all this on that humid Philadelphia morning and still in my own heart I realized that as a doctor, I knew nothing of enduring value to

Willie the Phillie. Our medical establishment was largely bereft of effective treatment to reverse his condition. Yet today my heart sends me a different message, one of considerable hope. If I could have shared with Willie what I now know, he would have lived to see his grandchildren graduate.

FOR MUCH OF my professional career I served as director of one of the National Heart, Lung, and Blood Institute's nine multimillion-dollar Centers for Research in Ischemic Heart Disease, and later as director of the division of cardiology at one of the nation's leading medical centers. So I have been fortunate to have a role in what was and continues to be the most astonishing medical advance of our lifetime. I think I am most proud of my role as a mentor for hundreds of clinician-scientists, challenging them to think differently, to find innovative solutions to all forms of heart disease. A few years ago my efforts were honored when I was selected as the second-ever recipient of the American College of Cardiology's highest honor, the Lifetime Achievement Award. I know full well that my mentees, my mentors, my colleagues, my profession, and our patients are the ones who really deserve this honor. Our shared achievement is that we have humbled what was the scourge of the twentieth century. As I spin out the story of how our nation's number one killer, coronary artery disease (CAD), became a preventable disease, I aim to teach you how to prevent or conquer heart disease in your own and your family's lives.

Since I know personally most of the doctors in this story, I should explain why I dub them "misfits." It's fascinating to me how many of them share some unusual personality traits. They reject the common wisdom. They rely on their own intuition. In their private lives they are risk-takers. They ignore the criticism of their peers. They persist in the face of failure. Unlike most of us, they are nonconformists, iconoclasts who refuse to knuckle under to society's norms, regardless of the potential consequences. Does this tell us something about creativity? I think it does. I concur with Steve Jobs on this:

Here's to the crazy ones. The misfits. The rebels. The troublemakers. The round pegs in the square holes. The ones who see things

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differently. They're not fond of rules. And they have no respect for the status quo. You can quote them, disagree with them, glorify or vilify them. About the only thing you can't do is ignore them. Because they change things. They push the human race forward. And while some may see them as the crazy ones, we see genius. Because the people who are crazy enough to think they can change the world, are the ones who do.

Let me introduce just a few of the misfits we will meet on our journey: we will begin with a bullheaded battlefield surgeon named Dwight Harken. Along the way we will meet cantankerous heart surgeon Charles Bailey, scandalously outspoken cardiologist Mason Sones, utopian maverick Argentine surgeon René Favaloro, life-of-any-party Andreas Gruentzig, establishment-challenging Japanese biochemist Akira Endo. I suspect most readers will not recognize a single name but, today, if a family member, a friend, or you have experienced relief or been cured of heart disease, these men stand unseen behind the doctor responsible for the cure.

THAT'S THE ESSENCE of our tale: the past, present, and future of heart disease. But it's the tree without the branches. The beauty, the fascination of our chronicle, as with all stories, lies in people: the doctors and the patients who live it. Since I know most of the patients and doctors you will meet, I tell both stories from my own personal perspective. To me this drama casts an illuminating oculus on both the progress of science and on the human soul. In living these experiences, I have seen incredible risk-taking, scintillating intuition, perseverance, hubris, bullheadedness, indomitable courage, commitment, selflessness, love, and hope. And so, the story I set out to tell about my experience in medical science becomes a story about all of us. As Ecclesiastes tells us, "The race is not always to the swift, nor the battle to the strong, nor riches to men of understanding, nor favor to men of skill; but time and chance happen to us all." In the spirit of Ecclesiastes, I offer you a testament to one of the most life-altering, indeed heart-healing, stories of our times.