

## The art of medicine

### How should we tell the stories of our medical miracles?

One morning in early 2007, a bureaucrat named Calvin Myint walked through the L'Enfant Plaza station of the Washington, DC Metro during rush hour. Ironically, his iPod was playing The Cure's 1987 hit *Just Like Heaven*, about a man's inability to see the truth and beauty dangling clearly before him. Like so many other commuters on their way to work, Myint walked past a nondescript 39-year-old street musician in jeans and a baseball cap playing the violin without giving him a second thought. As the *Washington Post Magazine* later recounted, only two people all morning bothered to stop and listen.

That's too bad, since the man in jeans was the renowned violinist Joshua Bell, who just earlier that week played his US\$3 million Stradivarius to a sold-out crowd at Boston's Symphony Hall and soon would accept the Avery Fisher Prize for being his nation's best classical musician. The only person to recognise the famous musician later said, "It was the most astonishing thing I've ever seen in Washington. Joshua Bell was standing there playing at rush hour, and people were not stopping, not even looking, and some were flipping quarters at him! Quarters!"

It's tempting—even seductive—to believe that extraordinary things are occurring regularly all around us. If we all just opened our eyes, we'd suddenly take notice. Recently, I called Alain Taieb, who is the chief of dermatology at a referral centre in Bordeaux, France. A few years ago, he'd been using oral corticosteroids to treat a newborn baby for a massive haemangioma that almost swallowed up the face and right eye. Despite treatment, the child's tumour enlarged and soon compressed the trachea. By 2 months of age, the infant also developed high-output cardiac failure. To treat the heart failure, oral propranolol was initiated. That's when the dermatology team noticed something extraordinary. The haemangioma began to shrink, almost in front of their eyes. With a week, the infant was able to open the eyelid spontaneously. After 6 months of propranolol, the disfiguring mass simply melted away. Taieb was astonished. Was it really possible that large capillary tumours, which had previously been managed imperfectly with toxic pharmaceuticals, could really respond miraculously to a simple  $\beta$  blocker?

Over the following year, Taieb and his team successfully used propranolol to treat a dozen children with disfiguring haemangiomas and recently reported their series in *The New England Journal of Medicine*. I later spoke with Ilona Frieden, the director of paediatric dermatology at the University of California San Francisco, who told me that she's "pretty cynical" about supposed miracle cures. And yet, she says, she couldn't help but have a "wow response, which is a very cool thing", upon hearing Taieb's data.

These kinds of stories are told and retold by medical professionals and the lay public, and adhere to a specific

motif. John Cade fortuitously noticed that lithium salts that calmed guineapigs could treat mania; Edward Jenner invented vaccination when he realised that milkmaids exposed to cowpox never got smallpox; Alexander Fleming discovered penicillin when he observed that one of his bacterial cultures was contaminated by a fungus that seemed to kill bacteria. Louis Pasteur once lectured, "In the fields of observation, chance favours only the prepared mind." Such medical figures enjoyed lasting fame and gratitude; they all had found diamonds in the rough. These are the heroes of our medical legends, regularly featured in movies and newspapers. In short, myth-making medical stories are almost exclusively about the pursuit of serendipity—finding the miracle cure that has escaped notice from all others, and is ripe for the taking for the relentless doctor or patient who defies conventional practice.

And yet, the truth is that the most important advances in health care today depend on painstaking, incremental steps instead of sudden revelations. A few years ago, I spoke with Stephen Sallan, the chief of staff of the Dana-Farber Cancer Institute in Boston. He explained that from the 1970s to the 1990s, the survival rates for children with leukaemia surged from less than 20% to over 80%. Was there a new miraculous drug discovered in the Amazon rainforests? No. Did a new genetic discovery occur? No. In fact, not a single new chemotherapeutic agent was introduced into the paediatric leukaemia protocol during that time.

The heroes instead were those with patience who scratched out progress in less dramatic ways. In the course of over a dozen clinical trials, paediatric oncologists refined the use of doxorubicin and asparaginase, carefully tested the benefits of intrathecal administration of chemotherapeutics, and studied the optimum duration of therapy in children with apparent remission. Building on small improvements in survival, the doctors inched forward, with gradually better and better drug combinations, sites of injection, and dosages. Every few years, survival crawled ahead by a few percent. And after two decades, almost three in five children with leukaemia who used to die were instead living productive lives.

In the modern era, the story of leukaemia epitomises how medicine really advances. From 1980 to 2000, mortality from heart disease fell by 50%, almost entirely via refinements of existing preventive and treatment strategies. In the past 30 years, similar decreases in death from diabetes occurred with widespread use of aspirin, flu vaccines, and smoking cessation among men. No blockbuster drug was responsible.

The world's complexity has grown. Gone are the days when garage tinkerers like Steve Wozniak and Steve Jobs could rig together a new computing device and suddenly change the world. The new paradigm is embodied by the car

manufacturer Toyota, with its 60-year-old culture of kaizan, or continuous improvement. Toyota's standardised production processes are the polar opposite of the swaggering dealings ascribed to our legendary medical mavericks, and yet they are the modern templates for the innovations that have saved countless lives from cancer and heart disease. For cars as well as for people, painstaking clinical trials designed with broad input from workers refined the standardised procedures and culminated in a higher quality product.

This contrast between medicine's mythology and reality isn't simply an academic distinction. Today, medicine stands at a crossroads. Some doctors predict the dawn of a new era in personalised medicine: individualised genome maps for everyone, unfettered access to generalist and specialist physicians of one's choice paid for by personal health savings accounts, and freedom from oppressive clinical algorithms and rules imposed by regulatory bodies or governments. Taken to its extreme, this view of medicine is responsible for fears that additional funding for "comparative effectiveness" research (which in fact was so effective in improving leukaemia survival) would somehow translate to governmental "death panels" for the elderly or infirm. Why, after all, should people shackle the swashbuckling, entrepreneurial spirit of their doctors, if that's what has propelled medicine ahead for ages?

Others see a different path ahead. Medicine is simply too complicated, and now requires extraordinary coordination among numerous entities, including specialists, home care providers, nurses, generalist physicians, and other health providers. And every year, tens of thousands of new research papers overwhelm practitioners. As Atul Gawande eloquently points out, the era of the "Master Builder" is over. No one expects a rugged individual to build a skyscraper or fly a complex aircraft alone. Performing cardiac bypass surgery, chronically treating severe childhood asthma, or treating major depression all arguably require the same commitment to continuous improvement. The cornerstone isn't further decentralisation and more serendipitous searches for miracle cures, but standardisation and organisational discipline. Gawande argues for wider use of checklists, which is just the beginning of a broader recognition that medical care is best delivered not by skilled artisans, but by integrated collectives.

That is why we need to recast the images of our medical heroes to inspire a new generation of clinicians and researchers. From ancient times, great poets and bards inspired their young with epic poems of heroism—from the *Bhagavad Gita* to the *Odyssey* to *Beowulf*—because they understood that these narratives planted and cultivated the seeds of ambition. What we glorify is what we encourage—and in medicine today, we are failing to properly glorify our most stunning achievements. Who, after all, can imagine a Homeric epic about a group of statisticians and clinicians designing multicentre clinical trials? I, for one, can. When my own father was diagnosed years ago with a rare lung disease,



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I appreciated that men and women whom he had never met had devoted their lives to studying and characterising the minutiae of the biochemistry and physiology of lungs. Others had spent countless hours with regulatory agencies to push promising drugs into clinical trials. And still others had created extraordinary social programmes so he would not suffer excessively at home during his chronic illness. Of course there was grace and compassion from individuals. But there was a larger narrative here, in which a decades-long, coordinated humanitarian mission was being undertaken to benefit one man: my father. As in many tragedies, he died despite their help. Yet like the grain of sand that elicits constant inflammation, the experience later formed a sort of pearl in my soul. And now I am a part of a similar coordinated mission, though in a different specialty.

What I'd like to see are stories that don't end simply with, say, Fleming's remarkable observation of the funny growth pattern in the culture dishes. Let us tell the tales with a greater measure of complexity. How on earth were the drugs isolated and purified, and rendered fit for human use? How were the drugs distributed and paid for in the early stages? How did people work out the biochemistry? Those are all amazing narratives, rarely told to young doctors in training, and are critical to dramatise the interdependent nature of medical care. Sure, there was serendipity. But that was only the tiniest spark, which required fanning from dozens or hundreds of others who were unsung heroes who deserve their due.

By all means, then, we health professionals should keep looking for renowned violinists the next time we enter the subway. But we shouldn't forget that, with a slight change in perspective, the best opportunities to appreciate wonder might be at our workplace already, happening every day.

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