ATUL Gawande

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Atul Gawande (b. 1965), a surgeon at Brigham and Women's Hospital in Boston and the Samuel O. Thier Professor of Surgery at Harvard Medical School as well as a writer for *The New Yorker*, is the author of *Complications: A Surgeon's Notes on an Imperfect Science* (2002), *Better: A Surgeon's Notes on Performance* (2007), the *New York Times* bestseller *The Checklist Manifesto: How to Get Things Right* (2009), and *Being Mortal: Medicine and What Matters in the End* (2014).

Gawande was named one of the world's hundred most influential thinkers by *Time* magazine. He has won a MacArthur "Genius" Fellowship and two National Magazine Awards, has been a finalist for the National Book Award, and has received the Lewis Thomas Award for science writing. He cofounded and chairs Lifebox, an international nonprofit dedicated to making surgeries safer.

A number of Gawande's books and essays take up the question of how we can best teach and learn. His book *The Checklist Manifesto* offers readers the simple checklist as a teaching and learning tool that saves lives in surgery and can help people prioritize and organize their lives. "Slow Ideas," an essay published in *The New Yorker* in 2013, poses questions about teaching and learning in relation to life-and-death innovations that are both fast and slow to take hold. In "Slow Ideas," as Gawande writes about the challenges in changing medical practices, we see him, in what is signature Gawande writing, using his examples to think on the page about the conditions of teaching and learning.

Slow Ideas

Why do some innovations spread so swiftly and others so slowly? Consider the very different trajectories of surgical anesthesia and antiseptics, both of which were discovered in the nineteenth century. The first public demonstration of anesthesia was in 1846. The Boston surgeon Henry Jacob Bigelow was approached by a local dentist named William Morton, who insisted that he had found a gas that could render patients insensible to the pain of surgery. That was a dramatic claim. In those days, even a minor tooth extraction was excruciating. Without effective pain control, surgeons learned to work with slashing speed. Attendants pinned patients down as they screamed and thrashed, until they fainted from the agony. Nothing ever tried had made much difference. Nonetheless, Bigelow agreed to let Morton demonstrate his claim.

On October 16, 1846, at Massachusetts General Hospital, Morton administered his gas through an inhaler in the mouth of a young man undergoing the excision of a tumor in his jaw. The patient only muttered to himself in a semi-conscious state during the procedure. The following day, the gas left a woman, undergoing surgery to cut a large tumor from her upper arm, completely silent and motionless. When she woke, she said she had experienced nothing at all.

Four weeks later, on November 18th, Bigelow published his report on the discovery of "insensibility produced by inhalation" in the *Boston Medical and Surgical Journal*. Morton would not divulge the composition of the gas, which he called Letheon, because he had applied for a patent. But Bigelow reported that he smelled ether in it (ether was used as an ingredient in certain medical preparations), and that seems to have been enough. The idea spread like a contagion, travelling through letters, meetings, and periodicals. By mid-December, surgeons were administering ether to patients in Paris and London. By February, anesthesia had been used in almost all the capitals of Europe, and by June in most regions of the world.

There were forces of resistance, to be sure. Some people criticized anesthesia as a "needless luxury"; clergymen deplored its use to reduce pain during childbirth as a frustration of the Almighty's designs. James Miller, a nineteenth-century Scottish surgeon who chronicled the advent of anesthesia, observed the opposition of elderly surgeons: "They closed their ears, shut their eyes, and folded their hands. . . . They had quite made up their minds that pain was a necessary evil, and must be endured." Yet soon even the obstructors, "with a run, mounted behind — hurrahing and shouting with the best." Within seven years, virtually every hospital in America and Britain had adopted the new discovery.

Sepsis — infection — was the other great scourge of surgery. It was the single biggest killer of surgical patients, claiming as many as half of those who underwent major operations, such as a repair of an open fracture or the amputation of a limb. Infection was so prevalent that suppuration — the discharge of pus from a surgical wound — was thought to be a necessary part of healing.

In the eighteen-sixties, the Edinburgh surgeon Joseph Lister read a paper by Louis Pasteur laying out his evidence that spoiling and fermentation were the consequence of microorganisms. Lister became convinced that the same process accounted for wound sepsis. Pasteur had observed that, besides filtration and the application of heat, exposure to certain chemicals could eliminate germs. Lister had read about the city of Carlisle's success in using a small amount of carbolic acid to eliminate the odor of sewage, and reasoned that it was destroying germs. Maybe it could do the same in surgery.

During the next few years, he perfected ways to use carbolic acid for cleansing hands and wounds and destroying any germs that might enter the operating field. The result was strikingly lower rates of sepsis and death. You would have thought that, when he published his observations in a groundbreaking series of reports in *The Lancet*, in 1867, his antiseptic method would have spread as rapidly as anesthesia.

Far from it. The surgeon J. M. T. Finney recalled that, when he was a trainee at Massachusetts General Hospital two decades later, hand washing was still perfunctory. Surgeons soaked their instruments in carbolic acid, but they continued to operate in black frock coats stiffened with the blood and viscera of previous operations — the badge of a busy practice. Instead of using fresh gauze as sponges, they reused sea sponges without sterilizing them. It was a generation before Lister's recommendations became routine and the next steps were taken toward the modern standard of asepsis — that is, entirely excluding germs from the surgical field, using heat-sterilized instruments and surgical teams clad in sterile gowns and gloves.

In our era of electronic communications, we've come to expect that important innovations will spread quickly. Plenty do: think of in-vitro fertilization, genomics, and communications technologies themselves. But there's an equally long list of vital innovations that have failed to catch on. The puzzle is why.

Did the spread of anesthesia and antisepsis differ for economic reasons? Actually, the incentives for both ran in the right direction. If painless surgery attracted paying patients, so would a noticeably lower death rate. Besides, live patients were more likely to make good on their surgery bill. Maybe ideas that violate prior beliefs are harder to embrace. To nineteenth-century surgeons, germ theory seemed as illogical as, say, Darwin's theory that human beings evolved from primates. Then again, so did the idea that you could inhale a gas and enter a pain-free state of suspended animation. Proponents of anesthesia overcame belief by encouraging surgeons to try ether on a patient and witness the results for

nemselves — to take a test drive. When Lister tried this strategy, however, he made little progress.

The technical complexity might have been part of the difficulty. Giving Lister's methods "a try" required painstaking attention to detail. Surgeons had to be scrupulous about soaking their hands, their instruments, and even their catgut sutures in antiseptic solution. Lister also set up a device that continuously sprayed a mist of antiseptic over the surgical field.

But anesthesia was no easier. Obtaining ether and constructing the inhaler could be difficult. You had to make sure that the device delivered an adequate dosage, and the mechanism required constant tinkering. Yet most surgeons stuck with it — or else they switched to chloroform, which was found to be an even more powerful anesthetic, but posed its own problems. (An imprecise dosage killed people.) Faced with the complexities, they didn't give up; instead, they formed an entire new medical specialty — anesthesiology.

So what were the key differences? First, one combatted a visible and immediate problem (pain); the other combatted an invisible problem (germs) whose effects wouldn't be manifest until well after the operation. Second, although both made life better for patients, only one made life better for doctors. Anesthesia changed surgery from a brutal, time-pressured assault on a shrieking patient to a quiet, considered procedure. Listerism, by contrast, required the operator to work in a shower of carbolic acid. Even low dilutions burned the surgeons' hands. You can imagine why Lister's crusade might have been a tough sell.

This has been the pattern of many important but stalled ideas. They attack problems that are big but, to most people, invisible; and making them work can be tedious, if not outright painful. The global destruction wrought by a warming climate, the health damage from our over-sugared modern diet, the economic and social disaster of our trillion dollars in unpaid student debt — these things worsen imperceptibly every day. Meanwhile, the carbolic-acid remedies to them, all requiring individual sacrifice of one kind or another, struggle to get anywhere.

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The global problem of death in childbirth is a pressing example. Every year, three hundred thousand mothers and more than six million children die around the time of birth, largely in poorer countries. Most of these deaths are due to events that occur during or shortly after delivery. A mother may hemorrhage. She or her baby may suffer an infection. Many babies can't take their first breath without assistance, and newborns, especially those born small, have trouble regulating their body temperature after birth. Simple, lifesaving solutions have been known for

Many solutions aren't ones you can try at home, and that's part of the problem. Increasingly, however, women around the world are giving birth in hospitals. In India, a government program offers mothers up to fourteen hundred rupees — more than what most Indians live on for a month — when they deliver in a hospital, and now, in many areas, the majority of births are in facilities. Death rates in India have fallen, but they're still ten times greater than in high-income countries like our own.

Not long ago, I visited a few community hospitals in north India, where just one-third of mothers received the medication recommended to prevent hemorrhage; less than ten per cent of the newborns were given adequate warming; and only four per cent of birth attendants washed their hands for vaginal examination and delivery. In an average childbirth, clinicians followed only about ten of twenty-nine basic recommended practices.

Here we are in the first part of the twenty-first century, and we're still trying to figure out how to get ideas from the first part of the twentieth century to take root. In the hopes of spreading safer childbirth practices, several colleagues and I have teamed up with the Indian government, the World Health Organization, the Gates Foundation, and Population Services International to create something called the BetterBirth Project. We're working in Uttar Pradesh, which is among India's poorest states. One afternoon in January, our team travelled a couple of hours from the state's capital, Lucknow, with its bleating cars and ramshackle shops, to a rural hospital surrounded by lush farmland and thatched-hut villages. Although the sun was high and the sky was clear, the temperature was near freezing. The hospital was a one-story concrete building painted goldenrod yellow. (Our research agreement required that I keep it unnamed.) The entrance is on a dirt road lined with rows of motorbikes, the primary means of long-distance transportation. If an ambulance or an auto-rickshaw can't be found, women in labor sit sidesaddle on the back of a bike.

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The hospital delivers three thousand newborns a year, a typical volume in India but one that would put it in the top fifth of American hospitals. Yet it had little of the amenities that you'd associate with a modern hospital. I met the physician in charge, a smart and capable internist in his early thirties who had trained in the capital. He was clean-shaven and buzz-cut, with an Argyle sweater, track shoes, and a habitual half smile. He told me, apologetically, that the hospital staff had no ability to do blood tests, to give blood transfusions, or to perform emergency obstetrics procedures such as Cesarean sections. There was no electricity during the day. There was certainly no heating, even though the temperature was barely forty degrees that day, and no air-conditioning, even though summer temperatures routinely reach a hundred degrees. There were two blood-pressure cuffs for the entire facility. The nurse's office in my neighborhood elementary school was better equipped.

The hospital was severely understaffed, too. The doctor said that half of the staff positions were vacant. To help with child deliveries for a local population of a quarter of a million people, the hospital had two nurses and one obstetrician, who happened to be his wife. The nurses, who had six months of childbirth training, did most of the deliveries, swapping shifts year-round. The obstetrician covered the outpatient clinic, and helped with complicated births whenever she was required, day or night. During holidays or sickness, the two nurses covered for each other, but, if no one was available, laboring women were either sent to another hospital, miles away, or an untrained assistant might be forced to step in.

It may be surprising that mothers are better off delivering in such places than at home in a village, but studies show a consistently higher survival rate when they do. The staff members I met in India had impressive experience. Even the youngest nurses had done more than a thousand child deliveries. They've seen and learned to deal with countless problems — a torn placenta, an umbilical cord wrapped around a baby's neck, a stuck shoulder. Seeing the daily heroism required to keep such places going, you feel foolish and ill-mannered asking how they could do things better.

But then we hung out in the wards for a while. In the delivery room, a boy had just been born. He and his mother were lying on a cot, bundled under woollen blankets, resting. The room was coffin-cold; I was having trouble feeling my toes. I tried to imagine what that baby must have felt like. Newborns have a high body-surface area and lose heat rapidly. Even in warm weather, hypothermia is common, and it makes newborns weak and less responsive, less able to breast-feed adequately and more prone to infection. I noticed that the boy was swaddled separately from his mother. Voluminous evidence shows that it is far better to place the child on the mother's chest or belly, skin to skin, so that the mother's body can regulate the baby's until it is ready to take over. Among small or premature babies, kangaroo care (as it is known) cuts mortality rates by a third.

So why hadn't the nurse swaddled the two together? She was a skilled and self-assured woman in her mid-thirties with twinkly eyes, a brown knit hat, and a wool sweater over her shalwar kameez. Resources clearly weren't the issue — kangaroo care costs nothing. Had she heard of it? Oh, yes, she said. She'd taken a skilled-birth-attendant class that taught it. Had she forgotten about it? No. She had actually offered to put the baby skin to skin with the mother, and showed me where she'd noted this in the record.

"The mother didn't want it," she explained. "She said she was too cold."

The nurse seemed to think it was strange that I was making such an issue of this. The baby was fine, wasn't he? And he was. He was sleeping sweetly, a tightly wrapped peanut with a scrunched brown face and his mouth in a lowercase "o."

But had his temperature been taken? It had not. The nurse said that she had been planning to do so. Our visit had disrupted her routine. Suppose she had, though, and his temperature was low. Would she have done anything differently? Would she have made the mom unswaddle the child and put him to her chest?

Everything about the life the nurse leads — the hours she puts in, the circumstances she endures, the satisfaction she takes in her abilities — shows that she cares. But hypothermia, like the germs that Lister wanted surgeons to battle, is invisible to her. We picture a blue child, suffering right before our eyes. That is not what hypothermia looks like. It is a child who is just a few degrees too cold, too sluggish, too slow to feed. It will be some time before the baby begins to lose weight, stops making urine, develops pneumonia or a bloodstream infection. Long before that happens — usually the morning after the delivery, perhaps the same night — the mother will have hobbled to an auto-rickshaw, propped herself beside her husband, held her new baby tight, and ridden the rutted roads home.

From the nurse's point of view, she'd helped bring another life into the world. If four per cent of the newborns later died at home, what could that possibly have to do with how she wrapped the mother and child? Or whether she washed her hands before putting on gloves? Or whether the blade with which she cut the umbilical cord was sterilized?

We're infatuated with the prospect of technological solutions to these problems — baby warmers, say. You can still find high-tech incubators in rural hospitals that sit mothballed because a replacement part wasn't available, or because there was no electricity for them. In recent years, though, engineers have produced designs specifically for the developing world. Dr. Steven Ringer, a neonatologist and BetterBirth leader, was an adviser for a team that made a cheap, ingenious, award-winning incubator from old car parts that are commonly available and easily replaced in low-income environments. Yet it hasn't taken off, either. "It's in more museums than delivery rooms," he laments.

As with most difficulties in global health care, lack of adequate technology is not the biggest problem. We already have a great warming technology: a mother's skin. But even in high-income countries we do not consistently use it. In the United States, according to Ringer, more than half of newborns needing intensive care arrive hypothermic. Preventing hypothermia is a perfect example of an unsexy task: it demands painstaking effort without immediate reward. Getting hospitals and birth attendants to carry out even a few of the tasks required for safer childbirth would save hundreds of thousands of lives. But how do we do that?

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The most common approach to changing behavior is to say to people, "Please do X." Please warm the newborn. Please wash your hands. Please follow through on the twenty-seven other childbirth practices that you're not doing. This is what we say in the classroom, in instructional videos, and in public-service campaigns, and it works, but only up to a point.

Then, there's the law-and-order approach: "You must do X." We establish standards and regulations, and threaten to punish failures with fines,

suspensions, the revocation of licenses. Punishment can work. Behavioral economists have even quantified how averse people are to penalties. In experimental games, they will often quit playing rather than risk facing negative consequences. And that is the problem with threatening to discipline birth attendants who are taking difficult-to-fill jobs under intensely trying conditions. They'll quit.

The kinder version of "You must do X" is to offer incentives rather than penalties. Maybe we could pay birth attendants a bonus for every healthy child who makes it past a week of life. But then you think about how hard it would be to make a scheme like that work, especially in poor settings. You'd need a sophisticated tracking procedure, to make sure that people aren't gaming the system, and complex statistical calculations, to take prior risks into account. There's also the impossible question of how you split the reward among all the people involved. How much should the community health worker who provided the prenatal care get? The birth attendant who handled the first twelve hours of labor? The one who came on duty and handled the delivery? The doctor who was called in when things got complicated? The pharmacist who stocked the antibiotic that the child required?

Besides, neither penalties nor incentives achieve what we're really after: a system and a culture where X is what people do, day in and day out, even when no one is watching. "You must" rewards mere compliance. Getting to "X is what we do" means establishing X as the norm. And that's what we want: for skin-to-skin warming, hand washing, and all the other lifesaving practices of childbirth to be, quite simply, the norm.

To create new norms, you have to understand people's existing norms and barriers to change. You have to understand what's getting in their way. So what about just working with health-care workers, one by one, to do just that? With the BetterBirth Project, we wondered, in particular, what would happen if we hired a cadre of childbirth-improvement workers to visit birth attendants and hospital leaders, show them why and how to follow a checklist of essential practices, understand their difficulties and objections, and help them practice doing things differently. In essence, we'd give them mentors.

The experiment is just getting under way. The project has recruited only the first few of a hundred or so workers whom we are sending out to hospitals across six regions of Uttar Pradesh in a trial that will involve almost two hundred thousand births over two years. There's no certainty that our approach will succeed. But it seemed worth trying.

Reactions that I've heard both abroad and at home have been interestingly divided. The most common objection is that, even if it works, this kind of one-on-one, on-site mentoring "isn't scalable." But that's one thing it surely is. If the intervention saves as many mothers and newborns as we're hoping — about a thousand lives in the course of a year at the target hospitals — then all that need be done is to hire and develop similar cadres of childbirth-improvement workers for other places around the country and potentially the world. To many people, that doesn't sound like

combat the many antisepsis-like problems in the world, that's exactly what has worked. Think about the creation of anesthesiology: it meant doubling the number of doctors in every operation, and we went ahead and did so. To reduce illiteracy, countries, starting with our own, built schools, trained professional teachers, and made education free and compulsory for all children. To improve farming, governments have sent hundreds of thousands of agriculture extension agents to visit farmers across America and every corner of the world and teach them up-to-date methods for increasing their crop yields. Such programs have been extraordinarily effective. They have cut the global illiteracy rate from one in three adults in 1970 to one in six today, and helped give us a Green Revolution that saved more than a billion people from starvation.

In the era of the iPhone, Facebook, and Twitter, we've become enamored of ideas that spread as effortlessly as ether. We want frictionless, "turnkey" solutions to the major difficulties of the world—hunger, disease, poverty. We prefer instructional videos to teachers, drones to troops, incentives to institutions. People and institutions can feel messy and anachronistic. They introduce, as the engineers put it, uncontrolled variability.

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But technology and incentive programs are not enough. "Diffusion is essentially a social process through which people talking to people spread an innovation," wrote Everett Rogers, the great scholar of how new ideas are communicated and spread. Mass media can introduce a new idea to people. But, Rogers showed, people follow the lead of other people they know and trust when they decide whether to take it up. Every change requires effort, and the decision to make that effort is a social process.

This is something that salespeople understand well. I once asked a pharmaceutical rep how he persuaded doctors—who are notoriously stubborn—to adopt a new medicine. Evidence is not remotely enough, he said, however strong a case you may have. You must also apply "the rule of seven touches." Personally "touch" the doctors seven times, and they will come to know you; if they know you, they might trust you; and, if they trust you, they will change. That's why he stocked doctors' closets with free drug samples in person. Then he could poke his head around the corner and ask, "So how did your daughter Debbie's soccer game go?" Eventually, this can become "Have you seen this study on our new drug? How about giving it a try?" As the rep had recognized, human interaction is the key force in overcoming resistance and speeding change.

In 1968, *The Lancet* published the results of a modest trial of what is now regarded as among the most important medical advances of the twentieth century. It wasn't a new drug or vaccine or operation. It was basically a solution of sugar, salt, and water that you could make in your kitchen. The

researchers gave the solution to victims of a cholera outbreak in Dhaka, the capital of what is now Bangladesh, and the results were striking.

Cholera is a violent and deadly diarrheal illness, caused by the bacterium *Vibrio cholera*, which the victim usually ingests from contaminated water. The bacteria secrete a toxin that triggers a rapid outpouring of fluid into the intestine. The body, which is sixty per cent water, becomes like a sponge being wrung out. The fluid pouring out is a cloudy white, likened to the runoff of washed rice. It produces projectile vomiting and explosive diarrhea. Children can lose a third of their body's water in less than twenty-four hours, a fatal volume. Drinking water to replace the fluid loss is ineffective, because the intestine won't absorb it. As a result, mortality commonly reached seventy per cent or higher. During the nineteenth century, cholera pandemics killed millions across Asia, Europe, Africa, and North America. The disease was dubbed the Blue Death because of the cyanotic blue-gray color of the skin from extreme dehydration.

In 1906, a partially effective treatment was found: intravenous fluid solutions reduced mortality to thirty per cent. Prevention was the most effective approach. Modern sewage and water treatment eliminated the disease in affluent countries. Globally, though, millions of children continued to die from diarrheal illness each year. Even if victims made it to a medical facility, the needles, plastic tubing, and litres of intravenous fluid required for treatment were expensive, in short supply, and dependent on medical workers who were themselves in short supply, especially in outbreaks that often produced thousands of victims.

Then, in the nineteen-sixties, scientists discovered that sugar helps the gut absorb fluid. Two American researchers, David Nalin and Richard Cash, were in Dhaka during a cholera outbreak. They decided to test the scientific findings, giving victims an oral rehydration solution containing sugar as well as salt. Many people doubted that victims could drink enough of it to restore their fluid losses, typically ten to twenty litres a day. So the researchers confined the Dhaka trial to twenty-nine patients. The subjects proved to have no trouble drinking enough to reduce or even eliminate the need for intravenous fluids, and none of them died.

Three years later, in 1971, an Indian physician named Dilip Mahalanabis was directing medical assistance at a West Bengal camp of three hundred and fifty thousand refugees from Bangladesh's war of independence when cholera struck. Intravenous-fluid supplies ran out. Mahalanabis instructed his team to try the Dhaka solution. Just 3.6 per cent died, an unprecedented reduction from the usual thirty per cent. The solution was actually better than intravenous fluids. If cholera victims were alert, able to drink, and supplied with enough of it, they could almost always save their own lives.

One might have expected people to clamor for the recipe after these results were publicized. Oral rehydration solution seems like ether: a miraculous fix for a vivid, immediate, and terrifying problem. But it wasn't like ether at all.

To understand why, you have to imagine having a child throwing up and pouring out diarrhea like you've never seen before. Making her drink

on the handle. But these would be costly; most people couldn't read the recipe; and how were the spoons to be replaced when lost? Eventually, the team hit upon using finger measures: a fistful of raw sugar plus a three-finger pinch of salt mixed in half a "seer" of water — a pint measure commonly used by villagers when buying milk and oil. Tests showed that mothers could make this with sufficient accuracy.

Initially, the workers taught up to twenty mothers per day. But monitors visiting the villages a few weeks later found that the quality of teaching suffered on this larger scale, so the workers were restricted to ten households a day. Then a new salary system was devised to pay each worker according to how many of the messages the mothers retained when the monitor followed up. The quality of teaching improved substantially. The field workers soon realized that having the mothers make the solution themselves was more effective than just showing them. The workers began looking for diarrhea cases when they arrived in a village, and treating them to show how effective and safe the remedy was. The scientists also investigated various questions that came up, such as whether clean water was required. (They found that, although boiled water was preferable, contaminated water was better than nothing.)

Early signs were promising. Mothers seemed to retain the key messages. Analysis of their sugar solutions showed that three-quarters made them properly, and just four in a thousand had potentially unsafe salt levels. So BRAC and the Bangladeshi government took the program nationwide. They hired, trained, and deployed thousands of workers region by region. The effort was, inevitably, imperfect. But, by going door to door through more than seventy-five thousand villages, they showed twelve million families how to save their children.

The program was stunningly successful. Use of oral rehydration therapy skyrocketed. The knowledge became self-propagating. The program had changed the norms.

Coaxing villagers to make the solution with their own hands and explain the messages in their own words, while a trainer observed and guided them, achieved far more than any public-service ad or instructional video could have done. Over time, the changes could be sustained with television and radio, and the growth of demand led to the development of a robust market for manufactured oral rehydration salt packets. Three decades later, national surveys have found that almost ninety per cent of children with severe diarrhea were given the solution. Child deaths from diarrhea plummeted more than eighty per cent between 1980 and 2005.

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As other countries adopted Bangladesh's approach, global diarrheal deaths dropped from five million a year to two million, despite a fifty-per-cent increase in the world's population during

the past three decades. Nonetheless, only a third of children in the developing world receive oral rehydration therapy. Many countries tried to implement at arm's length, going "low touch," without sandals on the ground. As a recent study by the Gates Foundation and the University of Washington has documented, those countries have failed almost entirely. People talking to people is still how the world's standards change.

Surgeons finally did upgrade their antiseptic standards at the end of the nineteenth century. But, as is often the case with new ideas, the effort required deeper changes than anyone had anticipated. In their blood-slick, viscera-encrusted black coats, surgeons had seen themselves as warriors doing hemorrhagic battle with little more than their bare hands. A few pioneering Germans, however, seized on the idea of the surgeon as scientist. They traded in their black coats for pristine laboratory whites, refashioned their operating rooms to achieve the exacting sterility of a bacteriological lab; and embraced anatomic precision over speed.

The key message to teach surgeons, it turned out, was not how to stop germs but how to think like a laboratory scientist. Young physicians from America and elsewhere who went to Germany to study with its surgical luminaries became fervent converts to their thinking and their standards. They returned as apostles not only for the use of antiseptic practice (to kill germs) but also for the much more exacting demands of aseptic practice (to prevent germs), such as wearing sterile gloves, gowns, hats, and masks. Proselytizing through their own students and colleagues, they finally spread the ideas worldwide.

In childbirth, we have only begun to accept that the critical practices aren't going to spread themselves. Simple "awareness" isn't going to solve anything. We need our sales force and our seven easy-to-remember messages. And in many places around the world the concerted, person-by-person effort of changing norms is under way.

I recently asked BetterBirth workers in India whether they'd yet seen a birth attendant change what she does. Yes, they said, but they've found that it takes a while. They begin by providing a day of classroom training for birth attendants and hospital leaders in the checklist of practices to be followed. Then they visit them on site to observe as they try to apply the lessons.

Sister Seema Yadav, a twenty-four-year-old, round-faced nurse three years out of school, was one of the trainers. (Nurses are called "sisters" in India, a carryover from the British usage.) Her first assignment was to follow a thirty-year-old nurse with vastly more experience than she had. Watching the nurse take a woman through labor and delivery, she saw how little of the training had been absorbed. The room had not been disinfected; blood from a previous birth remained in a bucket. When the woman came in — moaning, contractions speeding up — the nurse didn't check her vital signs. She didn't wash her hands. She prepared no emergency supplies. After delivery, she checked the newborn's temperature with her hand, not a thermometer. Instead of warming the baby against the mother's skin, she handed the newborn to the relatives.

When Sister Seema pointed out the discrepancy between the teaching
ıd the practice, the nurse was put out. She gave many reasons that steps
re missed — there was no time, they were swamped with deliveries, there
.s seldom a thermometer at hand, the cleaners never did their job. Sister
ema — a cheerful, bubbly, fast talker — took her to the cleaner on duty
.d together they explained why cleaning the rooms between deliveries
ıs so important. They went to the medical officer in charge and asked for
thermometer to be supplied. At her second and third visits, disinfection
emed more consistent. A thermometer had been found in a storage closet.
ıt the nurse still hadn't changed much of her own routine.

By the fourth or fifth visit, their conversations had shifted. They
ıared cups of chai and began talking about why you must wash hands
ven if you wear gloves (because of holes in the gloves and the tendency
) touch equipment without them on), and why checking blood pressure
ıatters (because hypertension is a sign of eclampsia, which, when un-
:eated, is a common cause of death among pregnant women). They
:arned a bit about each other, too. Both turned out to have one child —
ister Seema a four-year-old boy, the nurse an eight-year-old girl. The
ıurse lived in the capital, a two-hour bus ride away. She was divorced,
iving with her mother, and struggled with the commute. She'd been frus-
rated not to find a hospital posting in the city. She worked for days at a
;tretch, sleeping on a cot when she got a break. Sister Seema commiser-
ıted, and shared her own hopes for her family and her future. With time,
.t became clearer to the nurse that Sister Seema was there only to help
and to learn from the experience herself. They even exchanged mobile-
phone numbers and spoke between visits. When Sister Seema didn't have
the answer to a question, she made sure she got one.

Soon, she said, the nurse began to change. After several visits, she was
taking temperatures and blood pressures properly, washing her hands,
giving the necessary medications — almost everything. Sister Seema saw
it with her own eyes.

She'd had to move on to another pilot site after that, however. And
although the project is tracking the outcomes of mothers and newborns,
it will be a while before we have enough numbers to know if a difference
has been made. So I got the nurse's phone number and, with a translator
to help with the Hindi, I gave her a call.

It had been four months since Sister Seema's visit ended. I asked her
whether she'd made any changes. Lots, she said.

"What was the most difficult one?" I asked.

"Washing hands," she said. "I have to do it so many times!"

"What was the easiest?"

"Taking the vital signs properly." Before, she said, "we did it haphaz-
ardly." Afterward, "everything became much more systematic."

She said that she had eventually begun to see the effects. Bleeding
after delivery was reduced. She recognized problems earlier. She rescued
a baby who wasn't breathing. She diagnosed eclampsia in a mother and

Many of the changes took practice for her, she said. She had to learn, for instance, how to have all the critical supplies—blood-pressure cuff, thermometer, soap, clean gloves, baby respiratory mask, medications—lined up and ready for when she needed them; how to fit the use of them into her routine; how to convince mothers and their relatives that the best thing for a child was to be bundled against the mother's skin. But, step by step, Sister Seema had helped her to do it. "She showed me how to get things done practically," the nurse said.

"Why did you listen to her?" I asked. "She had only a fraction of your experience."

In the beginning, she didn't, the nurse admitted. "The first day she came, I felt the workload on my head was increasing." From the second time, however, the nurse began feeling better about the visits. She even began looking forward to them.

"Why?" I asked.

All the nurse could think to say was "She was nice."

"She was nice?"

"She smiled a lot."

"That was it?"

"It wasn't like talking to someone who was trying to find mistakes," she said. "It was like talking to a friend."

That, I think, was the answer. Since then, the nurse had developed her own way of explaining why newborns needed to be warmed skin to skin. She said that she now tells families, "Inside the uterus, the baby is very warm. So when the baby comes out it should be kept very warm. The mother's skin does this."

I hadn't been sure if she was just telling me what I wanted to hear. But when I heard her explain how she'd put her own words to what she'd learned, I knew that the ideas had spread. "Do the families listen?" I asked.

"Sometimes they don't," she said. "Usually, they do."

QUESTIONS FOR A SECOND READING

1. Gawande's essay proceeds as a series of case examples. He begins with a case in which he compares the spread of anesthesia and antisepsis. Why do you think he begins with these? What does his introduction of these two case examples allow him to do before he goes on to the longer cases involving childbirth and cholera?

2. After you've read the essay, go back to it for a second reading with Gawande's question from his first paragraph in mind: "Why do some innovations spread so swiftly and others so slowly?" Take notes or annotate the essay as you reread. Now that you've had an opportunity to reread "Slow Ideas," what would you say to someone who hasn't read it about how to speed ideas that don't spread quickly? What solutions does Gawande offer after his explanations of the four examples—anesthesia, antisepsis, childbirth, and