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THE REITH LECTURES 2014: THE FUTURE OF MEDICINE
Reith Lecturer: Atul Gawande
Lecture 4: The Idea of Well-Being

SUE LAWLEY: Hello and welcome to the last of this year's BBC Reith Lectures. Today we're in New Delhi at the India International Centre, one of the country's best known cultural institutions.

India is where our lecturer's roots lie. Although he was born and brought up in America, his parents were doctors who came from here. His grandfather, I can reveal, lived in this country until the age of 109 - an inspiration perhaps for a grandson who's written a book called *Being Mortal*.

In this series of lectures, he's been discussing the future of medicine - looking at why doctors fail, at how improving systems can improve healthcare across the world, and at the difficult issues of ageing and death.

The title of this final lecture is *The Idea of Well-Being*. Ladies and gentlemen, please welcome the BBC Reith Lecturer 2014, Atul Gawande.

(APPLAUSE)

ATUL GAWANDE: Thank you, thank you for the chance to be here to deliver this final Reith Lecture. Returning lets me bring our family story full circle because that story reflects the progress of global health - and also the lack of it. My father grew up in a rural village in central India, in Maharashtra, where he was one of 13 brothers and sisters. But his parents nearly died before any of the children were born. His father, Sitaram, was 18 years old and newly married when his own father died after the harvest failed one year when the monsoon rains didn't come. Sitaram inherited his father's debts to moneylenders and therefore was forced into indentured labour, farming just two acres of land. At one point, the only food he and my grandmother could afford was bread and salt. They were starving to death.

But he prayed, he stayed at the plough, and his prayers were answered. The harvest was spectacular. He could put food on the table now and pay off the debts. He started a family and before long my father was born. My grandmother died when he was hardly more than 10, however - from malaria. Chloroquine had been discovered by this point, a treatment for malaria, but it hadn't made it to India yet. And this was what made my father want to become a doctor. He'd never seen a doctor as a child,

in a rural village, but he had watched his mother slowly die and he knew somehow, he knew the knowledge existed in the world that might have saved her. And he wanted to have it.

My parents followed very different paths towards becoming a doctor. He was in a village which didn't have a high school, an advanced education, so he had to move to another village where there were extended family members and worked his way through until he got to the city of Nagpur where he went to medical college. My mother, who's here, Sushila, was a big city girl from Ahmedabad where her parents put her in an English-language private school. And after they both finished medical schools in very different parts of India, both had done well and so they were offered opportunities to do specialty training abroad. And so it was that they met, of all places, in New York City in 1964. Scandalously, they fell in love and married without their parents' permission - this is the 1960s, it's still scandalous today sometimes - and they settled in the US where they had me and my sister.

Now meanwhile, their families back home would turn out to benefit more and more from the knowledge of the 20th century - the knowledge that had added 30 years to the life expectancy of people who lived in the west, and some of that knowledge began moving here. The key advances were actually very simple ones, available with only modest economic development. Clean water and irrigation stabilised the income and food supply, and therefore the nutrition, for the people in my father's village in Maharashtra. They found that they could get ready access to basic antibiotics, to vaccines and to treatment for diarrheal disease. And so in a demographic shift that's now being seen all across the world, my family members began living remarkably longer than past generations. My father's older sisters lived into their 90s. My grandfather lived, as you heard, to almost 110.

There was also a major change in pattern of disease. The people in the village are now more likely to suffer from diabetes and hypertension than from malnutrition, though ... though malnutrition can be there. And indeed, around the world, cardiovascular conditions like heart attacks and strokes have displaced respiratory illness and diarrhea as the top killers. This is our sign of progress. But in many countries, including India, the economy and the infrastructure have not yet advanced enough to enable reliable care for either the conditions of older age that we get to experience or of the infectious diseases and dangers of childbirth that are still claiming massive numbers of young lives.

When we think about the transformation of human health that's occurred during the last century, we tend to focus on the discoveries - on the new drugs and the new procedures. Julio Frenk, who's the dean of the Harvard School of Public Health, points out that there was another major contribution during this past century: the emergence of complex, specialised institutions for delivering those discoveries to people - hospitals, clinics, professionals who could staff them. Health care has now grown to being 10 per cent of the global economy and rising. It created new forms of employment for millions, including 8 million doctors worldwide - among them my

parents and me. My sister became a lawyer. But the advancement of human well-being requires understanding how to build and sustain such institutions effectively. And we are only in the infancy of that knowledge.

We know a few things, however. The opportunity to achieve a long and healthy life depends on certain structures. For one, we need - nearby, near where we live - a basic primary care capacity to help with the acute conditions that can arise in the course of all our ... all of our lives (from eye problems to foot problems). We need also help with primary care for the management of chronic conditions (like diabetes or depression), with the management of prevention itself (getting your vaccinations or the prenatal care that you might need). Good primary care provides what some have called the four C's: a point of Contact for you; Continuity to follow you over time; Comprehensiveness of the services; and Coordination with other expertises, like lab testing, imaging, or a good place for you to deliver your child.

Now the four Cs, they're commonly lacking even in the richest parts of the world. In the United States and England, for instance, half of people report that they cannot get access to a doctor or nurse within a day when they are sick or need help. When they do get access, half receive incomplete or inappropriate care.

In countries with lower incomes, the circumstances are understandably worse. There are many fewer doctors. And when you get in to see one, the quality of care can be astonishingly poor. The World Bank conducted a series of studies directly observing the care of tens of thousands of patients around the world. And the results were shocking. Here in Delhi, for instance, they found that a typical visit to a primary care doctor for a serious chest pain, for example, was just three minutes long, involved three questions or less and almost no examination. Doctors nearly always had the equipment to take a blood pressure, pulse, and temperature, but they took these basic vital signs less than one percent of the time. They provided no diagnosis. Yet they prescribed three medicines on average - most of them wrong for the patient's condition. Between countries and within countries, primary care could be somewhat better than this or somewhat worse than this. But what we see is that everywhere you cannot find care that you can count on.

Now besides primary care, we also need safe hospital systems that are ready to help us with the more complex needs we all encounter in the course of our lives - for instance, when we undergo childbirth. Childbirth is dangerous. Ten percent of babies are born not breathing. Another 10 to 15 per cent of women in labour become obstructed or develop life-threatening bleeding. Safe delivery requires hospitals where equipment and techniques to address those kinds of problems are available to you.

Yet when childbirth began shifting to hospitals in the early 20th century in the west, what happened? Did mortality rates suddenly plummet? They did not. They hardly improved. Why? Well a century ago in the United States and Europe, investigations uncovered that the answer was just the care was poor - infection control practices,

for example, were terrible. And today, in advancing economies like India where the same shift is occurring, we are finding the same. People are shifting to delivery in hospitals in massive numbers out of the hope, out of the knowledge that there is this kind of better capability coming available. But it's not yet making any clear difference in survival.

I lead a health systems research laboratory, and in our work here we have measured care in community health centres very much like the ones where the people in my father's village go when they need to deliver a child. And we find in these places still large gaps in knowledge, in equipment, in management, in the motivation of the people there. We found, for instance, that less than 5 percent of birth attendants are using proper hand hygiene before a vaginal examination or delivery - you know washing their hands with soap and water. Less than 5 per cent are getting the rescue equipment ready before birth that a child might need for when they are not breathing. Less than 5 per cent are providing the medications that are properly needed to prevent haemorrhage of the mother.

I believe, however, that a roadmap for closing these kinds of gaps is possible. But, again, we're just learning, we're only just learning what it might be. In an earlier lecture, I discussed the idea that devising systems as simple as a checklist could help caregivers manage the tasks involved in doing their jobs well. So, working with the World Health Organisation to do for childbirth what we did for surgery, we devised a checklist of the key lifesaving practices from the moment a woman arrives in labour to when they leave with their newborn baby for home. Now a checklist can help in a lot of ways. It can help improve the birth attendants' awareness and memory of what to do and their organisation for when to do it. At a system level, it also gives hospital leaders some clarity about say the supplies that they need to make sure are maintained on hand and about the need for a focus on quality.

But just because you have a roadmap does not mean anyone is going to follow it. There are barriers to overcome to execute even the simplest step, and those barriers differ from place to place. In one health centre, staff may not wash hands because they don't know it's important; in another, because they don't have sinks or running water in the delivery rooms; and in another, because they simply have not made it their habit and no one cares.

That last phrase I think is the critical one: if no one cares when someone takes the trouble to do things right, nothing changes. And the overwhelming message to the people who work at the frontlines of care around the world is that no one notices excellence and no one cares. That is the biggest source of burnout and discouragement for health care workers everywhere.

My research group, therefore, has been working with partners in north India, here in the state of Uttar Pradesh, to devise and test a programme we've called BetterBirth aimed to try to change these circumstances. And what we've done, we've formed teams that visit birth attendants and hospital leaders one-on-one, where

they work, try to create a relationship with them, visit them over time and coach them in how to use a checklist to identify and close gaps in care. It's not a programme to, you know, run classes and just teach them stuff. It's a programme to go where they live and say what are the gaps, what are the problems, why can't you wash your hands? And the solutions they end up finding are fascinating. They're ... they're not complicated. In one place without running water, for instance, the frontline staff realised that they could simply ask the sweepers to bring a fresh basin of water with soap when they clean the room after a delivery. In another, the medical officer in charge realised that he could order an alcohol hand hygiene, hand sanitiser for the birth attendants to use. The key was coaching them to notice when each other were successful or not successful - and to care.

Now can that kind of approach succeed at large scale in kind of massive populations that we have to deal with in the world? Well we will have to let you know in a couple of years when we know the results from our work there where we're trying to achieve it in more than a hundred birth centres, working with people who are overseeing and delivering more than 100,000 deliveries. We know gains are hard to produce, hard to sustain. They take time. But in our initial pilot sites, the effects that we've had already are transformative. We've seen marked improvements in the standards of child delivery - the basics, the hand washing. And eventually what we see is that you can build on that to bring more sophisticated capabilities that we will need to see reach wider scale: for instance, blood transfusion capability and the capacity to provide emergency caesarean sections. Making health institutions work can be difficult but it is necessary for us to have long and healthy lives and it can be done.

As countries traverse the path of building functional health systems, they are also, however, encountering an unexpected, flipside difficulty: how to use those systems appropriately. We're seeing this as a problem that comes up around the world. For example, sticking with the example of childbirth, the world seems to do either way too few c-sections, way too few caesarean sections, or way too many. From the United States to Italy, from Mexico to Iran, between one-third and one-half of child deliveries are now done through a surgical procedure, through c-section. In private hospitals, we see places where the rates are exceeding 80 per cent. We're medicalising childbirth around the world to the point of actively causing harm and we're even seeing it in facilities in India and China once they put surgical capabilities into place. Within our very own cities, you can have places that don't have enough caesarean sections and then way too much, and yet nowhere in between.

It is a general phenomenon, I think: that once we have high-tech capacity, we have trouble using it wisely. Overuse of antibiotics globally is producing deadly epidemics of resistant infection. Overuse of imaging technologies and procedures is exploding health care costs. Health systems themselves are becoming a threat to society's well-being. And they're becoming a threat to individual well-being, too.

In my last lecture, I described the over-medicalisation of mortality that has occurred over the last fifty years. In the late 1940s, in the west, most people died in their homes. By the late 1980s, however, more than 80 per cent died in medical institutions, most often alone, in the hands of strangers. And this pattern is emerging in transitioning economies now, too. In Botswana, research has found that the identical shift has already occurred in the cities and towns there, and I've seen it in the cities and towns here, as well.

It's important to understand why this is happening. My grandfather had the kind of old age that we are often nostalgic for. He spent the last twenty years of his long life needing around-the-clock support for his frailties from his family. But it didn't matter. He lived with my uncle, and he was revered in his old age. When the family ate, he sat at the head of the table and he was served first. He was consulted on marriages, land disputes, business decisions. He remained in the bosom of the family to his death. And that's the way we all want it, right?

But this kind of traditional path is made possible only by tethering, even enslaving, the young to the needs and demands of the old. It is especially true of young women. And you can imagine how my uncles felt reaching their old age still wondering when they'd inherit their land.

Economic progress - the relief of poverty - ultimately depends on giving young people freedom - freedom to live where they want, work where they want, marry whom they want. But the cost is the break-up of the multigenerational family. As the young follow opportunity, it is often with guilt. You know my mother and my father, when they left the family behind, it was with some guilt. For we have no plan for how to address the needs of ageing parents left behind, so we see all over the world, the elderly are increasingly alone.

Now here's the really interesting thing: often they prefer it that way. As countries advance enough to start providing pensions, you start seeing a certain pattern. The very first thing the aged do with their economic freedom is they move out. They do not want to live under their sons' and daughters' rules, and the children don't want to live under theirs either. We prefer to live at what sociologists call "an intimate distance" - near one another but not too near. But what happens when our parents begin having trouble with memory or their strength or with chronic illness - when they need help and we're far away?

When my father came to the United States, he embraced virtually every aspect of American culture. He gave up vegetarianism. He became a tennis enthusiast, president of the local Rotary Club and teller of bawdy jokes. But one thing he could never get used to was how people treated the old and frail in America - bouncing them between nursing homes and hospitals, a series of anonymous facilities, to spend the last of their lives with attendants who barely knew them. In India, he said, they would never treat their elders this way.

We're proving them wrong, I think, recently. I've seen the same pattern emerge in Asia - in the high-end retirement complexes and corporate hospitals sprouting up for the wealthy, the pay-and-stay rooming houses and small private hospitals for the middle class, and the Dickensian old age homes and government hospitals with their rows of poor elderly. Everywhere I see the mistake of ignoring that people have priorities in their lives besides merely surviving another day. Even in severe illness or frailty, people desire connections to others and to purposes of their own choosing.

I think we've been wrong, I think we've been rather limited about we think our job is in building systems of care for human existence. We think our job is to insure health and survival. But really it is larger than that. It is to enable well-being - and well-being is ultimately about sustaining the reasons one wishes to be alive.

Creating the systems required for the fundamentally transformed needs of human existence is, I know, a tall order. We have no magic solutions. But I do think we have a path, and that is to invest in a science of exploration and discovery of how our systems succeed and fail just as we have invested in a science of how our bodies' systems do. Because when we pull back the curtain, we find not only knowledge. We also find hope.

I visited one of the charities here in Delhi that take in the destitute elderly people who are abandoned in parks or in the hospitals. The Guru Vishram Vridhashram old age home is a converted warehouse deep in a South Delhi slum, with more than a hundred disabled people on cots and floor mattresses pushed up against one another like a sheet of postage stamps. The youngest resident there was 60 years old. The oldest was past 100.

And among them was an 82-year-old widow whom I met. She sat cross-legged on her cot, a brown shawl over her shoulders, a green knit cap on her head, and her teeth like lonely pebbles in her mouth. A cardboard box held her few possessions - she had some costume jewellery, a few photos, and two changes of clothes. She had severe heart disease and, at times, troubling shortness of breath. Her son and daughter had died young, she told me. As her health worsened, she lost the home that she had. She wasn't able to work to keep the payments. And so she had to take to the streets. And that's where she was found, near death, her legs swollen and weeping from maggot-infested ulcers.

That old age home took her in. They survive on donations and they were chronically short of staff and supplies. But the staff managed her. They cleaned her wounds and administered antibiotics. They fed her and bathed her. They somehow found supplies of the medicine that she would need for her heart. The care was remarkably dedicated and systematic. And because of that, she recovered. She pulled up her sari to show me the scars on her legs where the wounds had healed. She'd since become well enough to work in the kitchen, along with five or six other

residents that they relied on to do all of the cooking since they were so short staffed, and she had lived there now more than a year.

“They saved me”, she said. Even more, by letting her help and have responsibility, they’d given her a purpose in her old age. “This is my home now,” she told me. It would be the place she lived to the end of her days. And although the struggles were many, it was where she wanted to be.

The facility did not have doctors or technology, and, there is no question, I saw people suffering dearly for that lack. It was in many ways the most frightening place I think I have ever been. And yet the people there understood the essentials of well-being and how to provide for it. And that - in our future of medicine - is something for all of us to learn from.

Thank you.

SUE LAWLEY: Well I wonder what our audience here at the India International Centre in New Delhi think about what they’ve been hearing. Are we capable of offering that sense of well-being that Atul advocates? I’m going to take some questions from the audience.

NAGESH RAO: Nagesh Rao, President and Director MICA. I have a quick preamble question before the question. Who was your first health care provider?

ATUL GAWANDE: My mother, right? *(laughter)*

NAGESH RAO: And I ...

ATUL GAWANDE: She was a paediatrician. I had her as my paediatrician till I was 21 years old.
(laughter)

NAGESH RAO: *(over)* That’s ... Yeah.

ATUL GAWANDE: It’s not always the best plan.

NAGESH RAO: And Sushila/Sushianti (ph) is here, so my love and respect for her. But I ask this question all over the world and that’s the first response I get from all over the world. And I think when we think about mothers, a question for you is today we provide medical care and not health care. So if you think about mother as a health care provider, where is the holistic integrated notion of health with the human compassion that you mention, but it’s also segmented and specialised that a notion, if you will, of the physical, psychological and integrated dimensions of health is completely out of the picture or relatively out of the picture. How do we respond to that?

ATUL GAWANDE: Well I think this is really important. We know 5 million children a year used to die from diarrhoeal disease and the solution ended up being the discovery that oral rehydration salts, that giving fluids by mouth, it was kind of against medical dogma but that this would actually save kids' lives. And then when it came to figuring out how to move it out into the world, the medical community said too complicated for mothers to learn about; we have to bring the kids to see the doctors. And it just wasn't happening. You had 5 million more dead the next year and 5 million more dead the next year. And in Bangladesh, they then sent teams of coaches who would go to the villages and work with the mothers, help them figure out how to change this most fundamental thing. You know a mother believes they know what to do for my child who is sick with diarrhoea. Now there were mistakes, right? So the mothers would stop feeding the child because they'd say well they're throwing up and they wouldn't give them fluids and they had to be taught how to make the sugar and salt solution, to give it to the child even if they're vomiting, to keep on giving it to the child. And it cut the death rate 95 per cent. I mean it was a massive success. And it succeeded because of that holistic view, that you could provide the skills to people at the village level and in the cities for the mothers and fathers to know what the right thing to do was. So that now it's less than 2 million children per year who die from diarrhoeal illness. That kind of holistic perspective is the one that we're needing to bring to childbirth and to the needs of old age as well.

SUE LAWLEY: What about the lady in the front row here?

NINA JAY GUPTA: I'm Nina Jay Gupta. I was formerly at the University of Delhi. I would like to ask you that since your grandfather lived up to 109 and there was no doctor in the village, what about the state of the indigenous health system? I think that was a very strong system. What do you think about it being used now because the private hospitals and the government hospitals have varying levels of delivering health care?

ATUL GAWANDE: The classic tale we have about access to care is that there's not enough people, that the clinics are not available, that people don't have anywhere to go. But when you map and you see in a village – you know the World Bank, for example, has done this work in India – that people have within reach about eleven different providers in a place where the classic look says well there's only one government clinic there and no one's there half the day anyway. But people do go to those indigenous providers. They may be what some people call the “quack” doctor, they may be Ayurvedic doctors. They also will go to private clinics and travel some distance in order to get there and receive the care. So people are finding care. I think the second myth that is turning out to be the case is that those doctors are overrun and incredibly busy. In the primary care clinics, it's extremely variable. The average clinic is seeing less than half a dozen people per day, so they're spending very little time with the patient and yet there are these long expanses in between, and understanding how we are better with motivation, with getting knowledge to people and creating a greater sense of community among professionals and people working together on their behalf, I think is really important.

SUE LAWLEY: I'll take a question over there.

KAMAL JEET: My name is Kamal Jeet. I am a journalist. I would like to bring you something called medicines. Now all these medicines now – the advanced ones, the new ones are being made by large corporates, the Godzillas, you know, and those medicines are very, very extremely costly and they don't reach these poor people and the old people. How to deal with them? Please tell us. How do those medicines reach the poor and the elderly?

ATUL GAWANDE: We're in the middle of a fascinating battle now, right? It's over patents and over the idea of what people have called "secondary" patents. You know there's been general agreement in India or elsewhere that a patent on a brand new novel idea - that it's critical to have that to encourage innovation, to give reward to people who come up with new ideas. But the secondary patent is the idea that I'll make a small change in the drug. Maybe I'll change the way that it is dosed, so now it's going to be twice a day instead of three times a day, or that I'll make a subtle change that suddenly takes a drug that would go off patent, become generic, become cheaper, could be manufactured here in India, in Brazil, elsewhere, and move around the world, and I'm re-patenting it so now that basic asthma drug can't become available. And that is a serious problem because it is shutting off access to discovered medications that could save huge numbers of lives and I think that it is right for people here to be contesting that kind of effort to shut down the access to medications.

VICTORIA HOLBROOK: I'm Victoria Holbrook. I'm from Istanbul. I'd like to come back to what I found most troubling – this question of nobody cares – and I was wondering if you could say more about that. If nobody cares about delivering a good burger king hamburger, that would seem normal; but when it comes to medicine, you wonder why nobody cares.

SUE LAWLEY: Atul?

ATUL GAWANDE: I think this is really important because I think that feeling of being at the very frontline is that nurse responsible for you know a thousand deliveries in a year and that no one cares if you're doing a great job or you're doing a poor job; that you're only going to get your hand slapped if you have some trouble along the way - you shouldn't ask questions, etcetera. That is common. Overcoming it is what we're finding can happen by bringing someone from the outside who says let's look and see do you want to be washing your hands better, do you believe in what's on this checklist, how can we begin to achieve making it work? And the fascinating thing is that the process of having the nurse speak to the sweeper to say can you bring a basin of water and soap every time you clean that room, it was creating communications and interlinking, it was creating a system that had literally not been there before.

SUE LAWLEY: I'm going to move on. Question here.

RAMANAN LAXMINARAYAN: Ramanan Laxminarayan. I'm from the Public Health Foundation of India. What's the natural sort of you know sequitur from your excellent

book? So you're talking about all of these sort of procedures that are slippery slope once you sort of get into it and then you're sort of left to die at the very end you know at ... after having gone through you know multiple procedures that didn't really do very much for your quality of life. Do we need an absolutely serious re-think of what medical research really constitutes now – the 30 odd billion that go into the US National Institutes of Health, large amounts of money that go into medical research here – to be reorienting in some thoughtful way towards well-being as opposed to sort of a blind averting of debts, which is really what we're all about now in terms of that pathway of medical research?

SUE LAWLEY: That cuts to the heart of this issue really, doesn't it?

ATUL GAWANDE: You articulated it beautifully. We'll spend billions to have a one per cent possible stent opening success in an artery in your heart without having any investment in what are the most effective systems to make sure that your cardiac disease is well taken care of, to prevent it from progressing, to take care of you if it has progressed, and then to make it possible for you to continue to live the life you want to lead as you go along. Now that means ...

SUE LAWLEY: (*over*) So you can legislate for well-being is really ...

ATUL GAWANDE: You can. And it ...

SUE LAWLEY: You can get it into the system?

ATUL GAWANDE: And it only comes out of the science of recognising that there are skills to walk through, and to make sure that the system has, for how to make these decisions. That includes the skills of successful conversations between family members and patients, skills of doctors and nurses, and to build on those skills and make them progress.

SUE LAWLEY: Do you want to come back briefly on that?

RAMANAN LAXMINARAYAN: So, Atul, if you were made the head of the US NIH, for instance, and you had that \$30 billion to sort of reallocate in some way, what's a fundamental rethink that you might think might help you know from the very disease specific cut in which we allocate resources?

ATUL GAWANDE: Well the first thing I'd say is that we've been already cutting our basic science research block in ways that are crazy. You know I mean there are still problems to solve with Alzheimer's disease and other conditions that severely impair the quality and length of people's life. So the first thing I would do is I would go to congress and say we've got to double this funding. We used to double funding. Every dollar has come back and paid huge dividends. I would be putting half of our investment towards how we make systems that are successful in driving better care. So you know the kind of study we're doing in India now, which says we know people need to wash hands. What's

the most effective way of feeding people information? Giving them report cards, does that work? We've discovered in recent years that just paying people to do better doesn't actually work. I think it has to do with giving them feedback and community where you know you have colleagues who care about the best results. Could be totally wrong. It's a sliver of work that's paying for the kind of work that I do, the kind of work you do at the Public Health Foundation of India, and this is needed at every level around the world.

SUE LAWLEY: The finances of doing that are incalculable, aren't they, I mean in a place like India where you've got 1.25 billion people, in China where you've got nearly 1.5 billion people? In the west we haven't succeeded with fewer people and perhaps more money until recent years to deliver the kind of caring, compassionate, individual health care that you're advocating. How is it going to happen here?

ATUL GAWANDE: Well you know before you get all pessimistic on me, let me point out a couple of things. We have cut the maternal death rate from child delivery by about a third in the world and in a country like this; we have seen substantial progress in the longevity of my own family's life; we have seen the ways that in this country polio was completely eradicated by being able to make information about where polio had cropped up widely available and then been able to drive teams to be able to go there and respond to it. My whole reason I got to be here today on this stage - when I was born I got my first smallpox vaccine and I had a terrible reaction to it. I ended up developing a brain reaction, encephalitis, and that banned me from being able to get smallpox vaccination again, which meant I was never allowed to come to India. When India eradicated smallpox in 1979, that was when I got to come and I am here because of success. And a success that people say are not possible. And it is ... And what I will tell you is we've made those systems functional around vaccination. We are learning how to make them functional at these other stages. It just might take you longer than you might be happy with, Sue.

SUE LAWLEY: I was going to say, we've said this before in this series, it's a long game. How long a game is it? Do you think that you can begin to see brought about what you're advocating in your lifetime?

ATUL GAWANDE: Yes. Bill Gates has a quote that sticks with me: "We always overestimate what we can accomplish in two years, but underestimate what we can accomplish in ten." In surgery, we started in 2006 with bringing a basic system of checklists to try to make the world of surgery function better. We're at over two thirds of operating rooms around the world now using that system closing in on a decade later, and it's a dramatic transformation that we're beginning to see around the world. We haven't made that happen in childbirth, we haven't made it at the end of life with care. But I suspect if we think about the human lifespan, it's how you come into the world, it's some of the dangerous things that we need in the course of care, and it's how you leave the world. And I think by being systematic about it, let's come back in a decade and have this conversation again, Sue

SUE LAWLEY: We shall do that.

ATUL GAWANDE: We will be better.

SUE LAWLEY: But we have to end there this memorable series. It will live on through the Reith website, which you can find via the BBC website. Lots more information there. All of Atul's lectures with videos, features and transcripts, plus our huge archive which ranges from Aung San Suu Kyi and Grayson Perry, back to the very first lecturer in 1948 – the philosopher Bertrand Russell. But now, our thanks here to our hosts at the India International Centre in Delhi and a special thank you of course to the BBC Reith Lecturer 2014, Atul Gawande.

(APPLAUSE)