THE REITH LECTURES 2014: THE FUTURE OF MEDICINE
Reith Lecturer: Atul Gawande
Lecture 2: The Century of the System

SUE LAWLEY: Hello and welcome to the second of this year's BBC Reith Lectures. A double welcome, in fact, because today we're in the home of the Wellcome Collection in London.

Sir Henry Wellcome was a medical pioneer. He died in 1936, but his legacy, the Wellcome Trust, lives on. Its vision (and I quote) is "to achieve extraordinary improvements in human and animal health", so we couldn't really be in a better place to listen to this year's lecturer on the subject of the future of medicine.

Last week, he described how and why doctors fail. This time he's discussing systems. If they can be better designed, he says, healthcare the world over can be completely transformed. His title today is *The Century of the System*. Ladies and gentlemen, please welcome the BBC Reith Lecturer 2014: Dr Atul Gawande.

(AUDIENCE APPLAUSE)

ATUL GAWANDE: Well what a great pleasure. Thank you.

Every country is struggling with delivering effective medical care to their populations. They're struggling for a variety of reasons. You know we blame the problem as on money, we blame the problem on too much regulation in healthcare, we blame the problem on too much business in healthcare. We battle it out over all of these kinds of issues. It becomes political everywhere – rich, poor and in between, across the world.

But what I think is the central challenge underlying those battles is that the problem of making care better everywhere is ultimately a problem of complexity, the extreme complexity of what we're trying to do. And I'm going to start by describing to you a case report that I read. It came out in 1999 and it was how I learned what to do to take care of somebody who's drowned.

So this was a case report that laid out the treatment from following a case of a 3 year old girl. She'd been in a small town in Austria and there her parents – it had been a winter day – her parents had gone out on a walk with her. And it was one of those terrible things: the parents lost sight of their little girl just for a moment and the next thing, they looked and she was out on the surface of this icy fishpond and then she fell through the ice under the water and was gone.

They ran, jumped in after her, and they could not find her. It was more than 30 minutes before they finally felt a limb at the bottom of this pond, pulled her up to the surface, got her to the shore, and she was of course not breathing.

The parents called the local emergency services from their mobile phone and the operator on the phone gave instructions to tell them how to begin doing cardiopulmonary resuscitation, CPR. So they began doing chest compressions and a team was dispatched. The rescue team arrived 8 minutes later and they took the first vital signs at the scene. The girl's temperature was just 66 degrees Fahrenheit, more than 30 degrees below normal. She had no pulse, she had no respirations. And most ominously, when they shined a light in her eyes, her pupils were what they describe as "fixed and dilated" meaning they did not react to light. The pupils were just stuck wide open. And what that means is the brain is gone.

But nobody wants to give up on a little child and so they continued to do the chest compressions, the CPR. She was loaded into a helicopter. They took her to the nearest hospital. There they bypassed the emergency room and went straight to the operating room and what they wanted to do was begin warming her. The most effective way to do that with someone who has no heartbeat, no respirations was to put her onto a heart lung bypass machine. That's no small matter. In order to do that, you have to cut down over the groin and expose the femoral vessels. You have to plug in in-flow and out-flow lines to the cardiopulmonary bypass machine. They have to prime the pump, start the flow going, and then gradually you had a machine now taking over for her breathing and her circulation.

By this point, it had been more than an hour and a half since the last time she had taken a breath. They gradually warmed her blood and her body. You can't warm too fast or you're going to end up rupturing the red cells, and so it was two hours before they could raise the temperature just 10 degrees. But at that point, her heart began to beat in a normal rhythm, and what they realised was they had one organ back.

Over the next 6 hours, they raised her temperature in her body, warming her gradually, gradually, until it came up to the normal 98.6 degrees. And then at that point they thought they would try to see if they could put her on a ventilator that would breathe for her; that would push oxygen down through her … through her windpipe. And they found that that did not work. The oxygen wasn't getting through because her lungs were too full of pond water and debris, they found, for the oxygen to penetrate to her bloodstream.

The cardiopulmonary bypass machine was made for heart operations. It wasn't meant to be something, it wasn't made to be something that people could stay on for long periods of time, so they had to bring in a different machine. It's an artificial lung called an extracorporeal membrane oxygenator (or ECMO). Now this machine had to be plugged in in an entirely different way. For this, they had to open her chest with a saw. They had to plug the in-flow and out-flow lines directly into her aorta and the right atrium of her heart. They had to remove the other pump from her groin and repair those vessels. But now, with this machine turned on, they now had an artificial lung for her that could bring oxygenated blood into her bloodstream and her heart would keep on pumping.

Now with this machine, they had to pull a big sterile drape over her open chest and wheel her on her table with this machine out of the operating room and into an intensive care unit where she could be managed. For the next day, every hour they took a bronchoscope and suctioned out the fluid that was in her lungs. They tried to wash all that debris out. And 24 hours later, when they tried to put her onto a mechanical ventilator, they found the oxygen got through. Two organs back.

And this was the way it went. They worked on every part of her body – how to bring her kidneys back, her liver back, her gut back. And after two days, they found that all the organs were back except one: her brain.

But she was stabilised enough that at this point they transported her out of the ICU, downstairs to the radiology suite where they could do a CT scan of her brain and look to see whether there was any damage there. And what they found that was … was that her brain had swelled to the limits of her skull, but there were no dead zones that they could see and so they decided to keep going. They called the neurosurgery team. Because of the pressure they saw on the brain, the neurosurgery team drilled a hole in her skill, put a pressure probe all the way down into her brain. And then with that pressure probe, they had the readings on the pressure there and they could dial the medicines and the fluids up and down until they could gradually lower the pressure inside her brain.

She remained comatose for a week, totally unresponsive. But then her pupils began to react to light and then she began to breathe on her own. And then one day, she simply awoke. Her eyes opened and she was there.

Two weeks later, she ended up going home.

Now it still wasn't over. Her right arm and leg were paralysed, her speech was severely slurred. She had to get intensive physical therapy, educational therapy just to learn what she could learn, how much speech she could bring back. And two years later, they brought her back to the hospital for a round of neuropsychological testing and physical testing. They found that physically her strength was completely back - she was equal on both sides of her body – and what's more is that they found her psychological capabilities were exactly where they were supposed to be for someone of her now 5 year old age. She was, in other words, after all of that, just like any other little 5 year old girl that you and I know.

Now I'm reading this case report about how you save somebody from drowning and there are two things that struck me as I'm looking at this. Number one was the extent of the capability that we have discovered; that we could take somebody who had gone without breathing, 30 minutes underwater, CPR for another hour, and that … and that they could come back, that we had the capabilities to bring them back. But the second thing was holy cow, how do you do this? The extent of what was required to pull it off seemed almost impossible. Everybody had to get every step right. There were dozens, probably hundreds of people involved in the course of care along the way, and any one of those people make a small mistake. One nurse who forgets to wash his or her hands and lets bacteria get in under that drape with the open chest, and it was over.

Now what I think, when we come to understanding what it means to really deliver on the discoveries of the last century, is that I think we have been fooled by Penicillin. Penicillin discovered not far from here, St. Mary's Hospital 1929 by Alexander Fleming, and it was another almost 20 years before it really became something that could be mass produced and brought into communities, that Penicillin could come as an antibiotic that could stop disease.

And when it arrived in our communities, it came as a miracle. The miracle was, for one, that we'd found this treatment that could eliminate whole classes of disease – you know a whole body of bacterial infections that we basically thought, you know, you couldn't do much of anything about. But the second thing was it came as a miracle because it was so easy. It was just an injection.

Now that made us imagine that this was the future of medicine, of healthcare in general; that we would just have an injection for cancers, for heart disease, for stroke. But the truth that emerged from this last century of discovery is that, you know, very little of it has turned out to be like Penicillin. It's been much more like trying to make sure that you can replicate what that team did for that little girl who drowned, that it can be incredibly complex. In fact I've argued that what we are facing when we try to deliver on the discoveries that we have, we're facing extreme complexity.

You know across the United States and Europe, we know despite all of the money we put into healthcare that 40 per cent of our population who has coronary artery/heart disease receives incomplete and inappropriate care. We know that 60 per cent of our asthma patients or of our population that has high blood pressure – the biggest killer in the world – 60 per cent receive incomplete or inappropriate care for those conditions. It closes in on 90 percent for certain mental health conditions. Consider just the fact that we have 6 million people in our hospitals who pick up infections that they didn't have just because somebody has failed to follow the basic infection control procedures that have been known for decades.

So how do we understand what this is really about? You know you go farther and you realise it's a more general problem than just something that's happening in medicine. We have made tremendous discoveries, but find it's extremely complex to deliver on them. We have inadequate homicide investigations, for instance. We have flawed software design. We have intelligence failures. We've had tottering banks. And what we see repeatedly, again and again, I think is that as we embark on the 21st century we have found that the 20th century has given us a volume and knowledge and skill that is beyond what any individual can simply hold in their head, can know how to deliver on, and simply do it on their own. The volume of knowledge and skill has exceeded our individual capabilities.

So how do we try to solve that? How do we go about improving the performance of what we do in medicine or beyond it? Well, you know I think we have had one core idea, and I call it the "primitive" idea, and that core, primitive notion is that we really just need to tell people you ought to do x. You ought to do this thing we tell you to do. It might be washing hands, it might be how you take care of a drowning girl, it might be how you investigate a homicide properly. You ought to do x. And what do we do? We we teach you in classes, we train you along the way, and then we find you know you may not do it later on.

And so then we went to the medieval approach: You must do x. We've issued standards and guidelines and regulations. We'll take away your licence if you don't do this. Or, if we're being nice about it - we'll pay you more, if you do it, we'll give you incentives. And that did make improvements in matters, but only a bit. It didn't get us to what we want. And what we want in the modern version of the world is that the norm is to do X. And the way that we make it the norm are systems. And they can be as simple a system as just checklists. It can be defaults, it can be feedback loops. The important insight is that what we have to focus on is how to deliver on the guidelines and standards and knowledge that we have discovered, how to make it easy for everybody to follow.

One of my colleagues said that "we are graduating from the century of the molecule to the century of the system." And by that what he meant was that we've gained an enormous amount in the last century by focusing on reducing problems to their atomic particles – you know discovered the gene that underlies disease or the neuron that underlies the way our brain works or you know the super specialist that can deliver on a corner of knowledge - but what we're discovering is that we graduate into the future, we are faced with a world where it's how the genes connect together that actually determine what our diseases actually do. It's how the neurons connect together and form networks that create consciousness and behaviour, and it's in fact how the drugs and the devices and the specialists all work together that actually create the care that we want. And when they don't fit together, we get the experience we all have - which is that care falls apart. The basics end up being known, but they're not followed.

And so we were approached by the World Health Organisation several years ago with a project to try to reduce deaths in surgery. I thought how can you possibly do that? But it was in exactly the same kind of problem – the basics were known but not necessarily followed. And so we worked with a team from … from the airline industry to design what emerged as just a checklist – a checklist though that was made specifically to catch the kinds of problems that even experts will make mistakes at doing. Most often basically failures of communications. The checklist had some dumb things – do you have the right patient, do you have the right side of the body you're operating on, have you given an antibiotic that can reduce the infections by 50 per cent, have you given it at the right time? But the most powerful components are does everybody on the team know each other's name and role, has the anaesthesia team described the medical issues the patient has? Has the surgeon briefed the team on the goals of the operation, how long the case will take, how much blood they should be prepared to give? Has the nurse been able to outline what equipment is prepared? Are all questions answered? And only then do you begin.

Well the result after we tested in eight cities around the world - including right here at St. Mary's Hospital in London, in Toronto, in Seattle, also in Delhi, in Tanzania – was that in every hospital that used the checklist, the experts found that their complication rates fell. The average reduction in complications was 35 per cent. The average reduction in deaths was 47 per cent. And it's been replicated in multiple places. Scotland has implemented it and taught it at the frontlines and they have now demonstrated that 9,000 people lives have been saved over the last 4 years.

Now what we know is it's clearly not just the checklist. It's not some piece of paper you hand out as a kind of tick box exercise. We've had to form an organisation called Lifebox that brings

these capabilities to the low and middle income world, and what we've found is the hardest part is to bring the culture that has the humility to recognise that even the most experienced people, even the most expert fail, and that we need the humility to be able to understand that.

But across many fields, we're seeing now that you know our design has been around the idea of the individual instead of the system, around the drug or the device or the specialist, the reductionist ideal instead of how it all fits together. We fear these kinds of system. We fear that it'll be a loss of daring, it'll be a loss of heroism. But we surveyed surgeons and asked them, "You know what do you think about this approach?" 3 months after they adopted it, and we found that about 20 per cent or more really dislike it. Like you know "It's paperwork, it's a pain in the butt, I don't want to do this." And then we ask, "If you're having an operation, would you want the team to use the checklist?" Ninety-four per cent did. And what you discover is that discipline makes daring possible.

Now when I read that article about the drowning girl, my puzzle was how did they do that? You know this was not discovered in Harvard where I am, here in London. It wasn't some mecca. It was in a small community hospital in the Alps in Austria. So I called up the first author, who was a young cardiac surgeon named Markus Thalmann in Klagenfurt, Austria, and I said, "How did you do it?" And he told me the story. He said, "You know we have dozens of people who are caught in avalanches every year and we find them frozen, the equivalent of being drowned, and I was convinced we could save them. And so the first way that we went about trying to do it was say "Here's everything that needs to be done; now let's just do it!" That's what the surgeon does, right? We say, "Just do it, damn it!" And it didn't work.

And so then he looked at the failures and he realised that the problem was a lack of speed. You needed to have an array of things at the ready. You needed to have the pump available and primed and ready to go; you needed to have the emergency room team prepared; you needed to have the trauma surgeon, the cardiac surgeon, the cardiac anaesthetist, the perfusionist. And always something wasn't there. You know the anaesthetist would be you know at home when they were supposed to be called in, and that's 30 minutes away, or the machine wouldn't be ready.

And so what they did was they made a checklist and they gave it to the person who had the least power in the system: the telephone operator. And the telephone operator got the call and could activate the checklist. They could call up the anaesthesiologist and the cardiac surgeon and tell them "You need to come in from home now." The engineer would get the machine ready. And this was the way they had their first survivor – that little girl – and since then, when I called him he said they'd had "Many" and he told me about the most recent.

He said that there was a mother and a daughter who'd been in a car and they were driving on an … on an icy mountain road and the car skidded on the ice as it lost control, hit a guardrail, instantly killing the mother. The car went through the guardrail, over the cliff and into a mountain river and then went under the water. The emergency crew got there just in time to see the car going under the water. They had to use the jaws of life to get the door open under the water. I don't even know how they did that and then they got the girl to the surface again with more than half an hour with no breathing under the water.

But from that point on, the system went like clockwork. The hospital was notified, they arrived within minutes, they by-passed the emergency room, went straight to the OR, they crashed onto the bypass machine. They got the heart back. They worked on getting her lungs back, moving the fluids and the drugs. They were able to get this process going even faster.
And here was the result: the next day all her lines and tubes were removed, and the day after that she was already sitting up in bed ready to go home.

Thank you.

(AUDIENCE APPLAUSE)

SUE LAWLEY: Brilliant. Atul Gawande, thank you very much indeed. Let me now open up the subject to the audience here at the Wellcome Collection in London where we've got leading professionals in medicine and in public health, as well as those of us who simply seek to keep healthy and off that operating table. There's a questioner here.

BECKY HIND: Hello, my name's Becky Hind. I'm an operations manager at Heathrow Airport. I wondered if you can, listening to your work on teams and complexity, wondered if you'd looked outside of the medical industry for any ideas around organising complex operations such as we do at the airport?

ATUL GAWANDE: Yeah, very much. In fact in order to even come at how we would attack this question in surgery, what we did was we brought in the lead safety engineer from Boeing to come with us. He didn't know anything about healthcare, but when he saw the way that we even approached the problem of improving outcomes in surgery, he was sort of baffled, you know, that he would watch how I went into an operating room and I'd go into an operating room and I'd just start operating. And he said, "Hold on a minute. Is this really what you do? You don't … Have you made a plan with every …" "Everybody knows what to do. They all know what to do. You guys know what to do, right?" "Oh yeah, yeah, yeah, we know what to do." And then we'd watch one thing fall through the cracks and then another and then another. It took him only a moment to step back and say, "You all need some basic communication systems around the idea that a team has to be effective at what they're doing." So I think that there are lessons very much coming from other fields.

Here's the big difference. There are two people in a cockpit trying to make something happen and in many clinical environments it's many more than that. My mother went for a total knee replacement and I counted the number of people who walked in the room in three days and it was 66 different people. And so the complexity of making 66 people work together – you know you'd have the physical therapist walk in in the morning and they'd say, "What are you doing in bed? You should be out of bed." And the physical therapist would come in the afternoon and it would be a different person and they'd say, "What are you doing out of bed? You should be in bed." This is still where we are.

SIWAN THOMAS-GIBSON: Hi, my name's Siwan Thomas-Gibson. I'm a gastroenterologist in London. Thank you, that was fascinating. We've introduced your checklist in our tertiary

centre for endoscopy and, believe me, it was a struggle and we had more than 20 per cent of doubters.

SUE LAWLEY: Why did they doubt?

SIWAN THOMAS-GIBSON: Well I wouldn't say that we have some surgical endoscopists because that would be too easy, but no it was precisely for the reason that actually we have a relatively easy procedure if you like, procedure base, and so it's not seen to be complex. But we were having complications and we were having errors in the system – not always errors with consequence, they were often errors without consequence – but that's where you can intervene. My question was really around … I think you mentioned Lifebox and to take it right back to something you said right at the beginning, which is that rich and poor countries have problems with healthcare and so using something like a checklist can make a big difference, I think. No-one would argue with saving the life of a small, little girl, but for the cost of that, why can't we afford clean water and vaccinations for … that would save thousands of little girls elsewhere in the country? Can our checklists and can Lifebox – I'd love to hear more about it – can that help thousands more?

SUE LAWLEY: Just give us a sentence on what Lifebox is specifically before you answer that.

ATUL GAWANDE: So this is the non-profit organisation that we started to bring the basic ideas of the checklists and the teaching of it into low and middle income countries …

SUE LAWLEY: Okay, so why …

ATUL GAWANDE: … so whether it's Eastern Europe or in Southern Africa. ..Why would it be so difficult in her own unit? And the answer is error is rare now - you know you're talking about 1 in 100, 1 in 200 – and to cut that by 50 per cent is massive when we do millions of these procedures, but day to day in your life what you experience is I feel like I'm perfect, so why do I need this, right?

Well the same thing happens in the low income countries where there's even less of the tradition of the same kind of professionalism and demand for accountability, transparency and safety. You go further though and you know this question of well why are we concentrating so much effort in these kinds of areas? Can't we make sure that just the basics are delivered in other places? And I don't see it as either/or. Two reasons. Number one, we were still going to rescue that drowning girl. She's going to be a phenomenal expenditure of money and if we can actually do it right, she's going to get to live and contribute in the world and help us in the future. And you know where we see when you work to make these complications get solved, we're saving substantial money instead of making it worse. The second is that many times the approaches are very simple. We have a checklist that we've designed now for childbirth in poor countries and what we found was that the most basic failures were ones of failing to wash hands, for example. One per cent hand washing before child delivery that we're observing in places that have a 6 per cent death rate for newborns. One in 16 where you know we're used to 1 in 2,000.

SUE LAWLEY: But what about clean water for these people, why can't it be extended to provide something as basic as that?

ATUL GAWANDE: But this to me is that kind of example. We went into this clinic. They say, "We don't have clean water." You know it's on the checklist. And then you being to say how do you solve this? Let's bring it into the room and use the cleaners to get it there. So it's that kind of problem solving that has to be embedded into part of this.

SUE LAWLEY: I'm going to a question here.

SIMON CHAPLIN: My name's Simon Chaplin. I'm Director of Culture and Society here at the Wellcome Trust. We're in a venue that's dedicated to exploring the intersection between medicine, life and art, and I wonder in your vision is there still a place for creativity and innovation in medicine?

ATUL GAWANDE: It is everywhere. Now what's interesting to me is that the version of creativity and innovation is changing. Creativity and innovation was seen as a solitary kind of enterprise – the scientists at the laboratory with their, you know, test tubes or their rats. But the place now for innovation and discovery in how you make the systems work around us are, you know, the laboratory is a completely different realm. So making systems our laboratory is messier in certain ways, much harder to control, but phenomenally creative and that's where I've enjoyed it.

SUE LAWLEY: But in a hospital system, if you're going to reduce or elevate (whichever way you care to look at) everything to a kind of tick box system, aren't you going to ossify medicine, aren't you going to hinder innovation?

ATUL GAWANDE: That's precisely the danger. So there's the bad checklist and the good checklist, right? So the bad one is one that turns people's brains off. More often than not, the effective checklist – ask people questions that they have to discuss and get their ideas forward - and that was out of a scientific process that we identified and it's made in ways to help an expert be even better at what they do.

SUE LAWLEY: Okay…

MAUREEN BAKER: Maureen Baker, Chair of the Royal College of GPs. You mentioned the challenge for healthcare is that of extreme complexity. Do you think a systems approach has something to offer in the management of ongoing multiple conditions? The management of hypertension when it's a single disease condition is pretty easy by and large. It's very difficult, complex and dangerous when it's one of four or more ongoing conditions and it's often what you <u>don't</u> do benefits the patient as much as what you <u>do</u> do.

ATUL GAWANDE: No it's absolutely true. What you realise is the job of the GP, but also of all physicians but especially the primary physicians, is dealing with variety and the complexity of the number of conditions, and what we've never studied, we've not even made it a science yet is who is more effective in managing that complexity? What are they doing that makes them

more capable of managing their time? I think we're learning is that more than not they are members of teams and that those teams are people who can take someone who has ten different problems and address priorities that the patient and doctor set for themselves but then follow through on it – calling them up every couple of weeks, how are we doing on that smoking goal and by the way you know are we keeping your prescriptions filled?
Dramatic improvements in outcomes, costs, reduced hospital admissions. We're starting to see this now.

SUE LAWLEY: Costs I would have thought would go up if you were doing all that kind of thing and following people up and ringing them up and …?

ATUL GAWANDE: So there's investment upfront, but the thing that you're preventing is these are people who end up having fewer visits to the emergency room, fewer admissions to the hospital.

SUE LAWLEY: But it's a long game is what you're saying?

ATUL GAWANDE: It is the long game.

SUE LAWLEY: I'm going to a question here…

NICK BLACK: Nick Black, Professor of Health Services Research at the London School of Hygiene. I'd be interested in your thoughts on the role of patients as key players within the system rather than the system as being entirely a sort of technocratic professional activity.

ATUL GAWANDE: Well I'll give an example where we have a chronic, huge problem that we under-deliver on, the biggest killer in the world, bigger than smoking nowadays in places like the UK and the US where we've gotten smoking down – high blood pressure. For the most part 60 per cent or more of our populations who have severe high blood pressure don't have it under control. There are known things that doctors and nurses can do to make sure people are on effective drugs, and that if they have side effects that we adjust them so that they're not having those problems. But the most effective programmes also allow patients themselves to be in control of the medication and to be able to adjust the medication based on their own blood pressure. So that ability to use known approaches, systems that give more autonomy and authority to the public around their own care can be fundamentally important in driving these kind of approaches.

SUE LAWLEY: But that's an education process, an educational process that takes time, doesn't it?

ATUL GAWANDE: And it's not just education. It also even is the system you build in. So, for example, say your blood pressure's high today; that you're allowed to increase your own dose. Right now we don't allow it. You know we can even introduce you know an app on your phone. All of these things are innovation spaces that have barely been entered. I mean we're certainly not investing in them and here's one of the biggest killers.

SUE LAWLEY: A question here and down here.

ALI PARSA: Ali Parsa, Chief Executive of Babylon.

Babylon tries to deliver most of the healthcare we need in our day to day life through your mobile phone, through interaction of humans and machines together and the patients.

I started my career as an engineering physicist, and in engineering physics we never would have thought to think anymore to do everything by human brain. We use artificial intelligence to help us capture what we know. In medicine, we don't do that. What are your views about the use of artificial intelligence in medicine?

ATUL GAWANDE: You let me bring up what I think is the next stage of development in improvement of performance. The complexity we're talking about means that we're not ready to automate all of it and yet there are huge components that I think actually could be automated. Even certain kinds of operations might be able to be automated themselves. So I think we're entering that phase where we're going to see some opportunity around diagnosis and perhaps around treatment being able to start automating certain components more and more??

SUE LAWLEY: So do you see the patient going into or not even going into a doctor's surgery. I mean if you … you know you have your genome mapped??, you could simply sit in front of a computer and answer a series of questions and diagnose yourself or be diagnosed by a computer.

ATUL GAWANDE: The power's going to end up.. I'm more and more convinced that the power's going to come from how human beings and automation come together. So you work with a doctor who helps confirm that you have high blood pressure, but then you might be able to work with a programme that does more or less most of your management of how to get that blood pressure under control.

SUE LAWLEY: We're getting pressed for time now and I've got several hands up, so I'm going to go here if we can …

SALLY DAVIES: Sally Davies, the Chief Medical Officer. You've made me feel profoundly uncomfortable this evening on a number of counts. The first is if people think you can rescue from drowning like that in general, they should understand that you've talked about people who were seriously chilled, so with good treatment like you gave them there is an opportunity. The second is that in this country, thanks to a backbone of excellent general practice, actually hypertension is not the biggest cause. The problem is smoking. So the big question I'm left with is.. and of course you're a surgeon, so you deal with sick people, but the <u>real</u> issue we're facing is how do we stop them getting sick? And the big problems are weight management, lack of physical activity, smoking and alcohol in our society. So how do you bring your century of the system out to play to have a big impact on that?

ATUL GAWANDE: Well thank you for the cautionary notes. Very important that people understand it's the drowning in the frozen water or the avalanche that makes it work because that stops, keeps you in a suspended state of animation. Second, we will have to talk about whether

it's hypertension or tobacco at this stage and I would love to have that discussion. But it clearly is the case that the chance to keep healthy is going to be I think tied to some of what we were talking about earlier. It's teams - because the ability to recognise whether in a GP's practice you have certain people who have as their goals the ability to you know if they have five different problems, how to tackle those goals, or it might be around you know just some very simple things. The most important thing they can work on is reducing smoking and then there's a team that actually works really effectively on getting that smoking stopped. Now some component of it is also that it doesn't even have to involve the healthcare system directly. It is everything from our devices that can monitor how much we're walking and how much we're consuming and give that feedback loop directly to you is also potentially avenues that will be open to us in the next few years to turn care around??

SUE LAWLEY: Are you persuaded, Sally Davies?

SALLY DAVIES: I think you're beginning to get there in those last few comments. Thank you.

SUE LAWLEY: It's put you in your place.

ATUL GAWANDE: Yeah.

SUE LAWLEY: Okay, I'm going to take a last question here.

CLARE MARX: I'm Clare Marx. I'm President of the Royal College of Surgeons and I'm here to defend you just for one moment. But actually what I really wanted to mention was that I looked after a patient who was one of the guinea pigs for Penicillin. And Penicillin was given in 20 ml injections four times a day intravascularly. It was agonising and the only thing that enabled him to carry on was the compassionate care of the people who delivered that. And in all the systems that we put together really the most important thing, I think, is the understanding of the compassion and caring that has to go with that. Do you have anything to make us all into compassionate, caring clinicians?

(AUDIENCE APPLAUSE)

ATUL GAWANDE: Fundamentally important and in fact the subject of my entire next lecture. At a minimum it's about our ability to connect with people and understand their priorities in their life. And being able to capture that and understand the skills required around how we're able to do that really turns out from the second thing, which is not just recognising people have priorities besides just being alive; it's being able to ask them what their priorities are, and we haven't learned those skills and we haven't incorporated them into what we do. But the power of it is that I think we're discovering how there are even ways to reach that goal of simply being human beings caring for human beings while having all the advantage of these systems around us.

SUE LAWLEY: It's a good place to end.

Next week we shall be in Edinburgh when Atul will be looking at the great unfixables in healthcare: ageing and death. Until then, our thanks to our hosts here at the Wellcome Collection in Euston Road, London, and of course to our Reith Lecturer, Atul Gawande.

(AUDIENCE APPLAUSE)