Elizabeth Blackwell Annual Public lecture 2022 - transcript

Climate Changes Health with Professor Kristie Ebi

Professor Rachael Gooberman-Hill:

Good evening. Good evening and a really warm welcome on this slightly damp and very dark November evening. My name is Rachel Gooberman Hill. I'm director of the Elizabeth Blackwell Institute for Health Research. And it's my job today to act as your host and to welcome you to this event.

I'm absolutely delighted that we're here this evening. We haven't run this event in person for the last two years, so it's a real pleasure to be here today. And it's a great pleasure to be here in City Hall. It's great to see so many friends and colleagues here, friends and colleagues who work at the council. Friends and colleagues who work across the city of Bristol as a whole.

And we're particularly pleased to welcome Deputy Lord Mayor Steve Smith, who's joining us this evening for the event. So thank you, Steve. I'm sure you'll find it really interesting and thank you for joining.

So it's my role this evening just to do a little bit of housekeeping with you and say a little bit about the Elizabeth Blackwell Institute Annual Public lecture. So that will take about 5 minutes before we move on to introduce our esteemed and fabulous lecturer this evening, Professor Kristie Ebi.

So by way of housekeeping, there's just six things I need to mention. The first of these is that we're not expecting a fire drill tonight. So if you hear a fire alarm, we'd like you to leave the building by one of these doors over here and congregate outside.

The second thing to mention, of course, is toilets. There are ladies loos down the stairs that way. There are gents loos down the stairs this way.

And you'll find accessible toilets at the very far end of the corridor in that direction. And the very far end of the corridor in the other direction.

If you need first aid assistance or if you need any kind of assistance, we're really pleased to be able to help you from the Elizabeth Blackwell Institute team. And you can find out who we are by looking out for our purple lanyards that look like this. So if you need help, please do ask.

I'm really pleased to welcome two British Sign Language interpreters this evening. This is Naomi and Lisa. Naomi and Lisa, thank you in advance for all of the work that you're doing this evening.

And this evening, in order to thank our speaker, to thank our lecturer, we're going to use silent applause. And I'm sure that most of you know how this looks, but I'll just show it to you in case; silent applause looks like this.

And I find it a really fantastic way to thank the speaker; It's inclusive, it's encouraging, and I also find it joyful. So I hope you'll enjoy joining me in silent applause tonight.

We're going to be filming this evening's event and we're going to be taking photographs of the event. Please let us know if that's something you're not comfortable with.

So by way of welcome, I want to say a few words about the Elizabeth Blackwell Institute and about Elizabeth Blackwell herself.

The Elizabeth Blackwell Institute is based at the University of Bristol, and we have the great privilege of supporting health research across the whole university. As part of that work in recent years, we've been working with fantastic climate scientists and with fantastic health researchers to help them come together and work in the climate change and health space, which is so important to all of us.

We hold this lecture every year and we do so in memory and honour of Dr Elizabeth Blackwell.

Dr Elizabeth Blackwell was a fantastic, incredible and inspiring person. She was born in Bristol and she was born in Bristol 201 years ago. So we were pleased last year to celebrate the 200th anniversary of her birth.

In case you're interested, she was born in Bristol and then lived a number one Wilson Street. And if you want to know where that is, if you go from here towards the M32 through whatever method you prefer, on foot, bus or car if you see on your right, you'll see Cabot Circus, and Wilson Street is on the left.

So Elizabeth Blackwell grew up on Wilson Street until she was 11 years old. When she was 11, she moved with her family to the United States. And in the United States, she entered medical school not without a high degree of challenge to gain entry. She then graduated top of her class at medical school and became the very first woman to graduate from medical school in America.

As a young adult, she moved back to Europe and she spent time in London. She spent time in Paris. And while she was here in England, she became listed on the British Medical Register, and that happened in 1859. That means that she was able to practice medicine, and that means that many people think of her as the very first female doctor.

She was really incredible. And the reasons that she was so incredible is she worked incredibly hard and she was especially interested in preventative medicine and equalizing health outcomes for everybody. She was also interested in the things that impact on our health and the things that made a difference to us.

So I think the lecture tonight is really going to resonate with all of her interests and her hard work over the years. So I'm hugely honoured that the Elizabeth Blackwell Institute lecturer for 2022 is Professor Kristie Ebi.

Professor Ebi is joining us on her way from Washington to COP 27. She needs little introduction. She's known for her work globally on the impacts of climate change and climate variability on health, and she's inputted nationally and internationally into climate change assessments. And she's also supported considerable impactful work in climate change adaptation approaches and policies.

So the format for tonight is that in a minute, we're going to welcome Professor Ebi to the stage. Professor Ebi is going to speak with us for about 40 minutes. After her talk, you'll have the chance to ask her questions and we'll have roving microphones to enable that to happen. After the Q&A, we're going to spend time in the foyer, and we'd love you to join each other in order to have a soft drinks reception. We hope you'll carry on the conversations there.

So please join me in silent applause to welcome Professor Kristie Ebi to give the 2022 Elizabeth Blackwell Institute lecture.

Professor Kristie Ebi:

Thank you very, very much. I really am deeply honoured to be here.

It's just amazing to read the history of Doctor Blackwell and all that she was able to accomplish.

She worked very hard against a lot of significant challenges. And so she really is an inspiration. And it means quite a bit to me to be able to give this lecture to you today.

I also want to thank all of you for showing up, for wanting to hear more about how climate changes our health. It's a huge topic. There's no way I can cover all of the issues in a short amount of time. I'm going to pick and choose and talk about a few things and hopefully that will start a conversation.

The most important thing is we do have those conversations. When we look at what needs to be done to address the challenges of a changing climate, one of the most important is to start talking with each other about that, that the polarization around this topic has meant that many people don't talk to other people about their concerns about climate change.

We're going to create the political will to implement changes in our greenhouse gas emissions, changes in the interventions to protect our populations, only if we come together and make sure that we have those discussions and that we ensure that people who take decisions will hear them.

I want to start with the most fundamental point; climate change is adversely affecting the physical health of people around the world and is negatively affecting mental health in places where we have data to look at it.

As I said, I'll talk about just a few of those changes.

When we look across the health impacts of a changing climate, worldwide, more than 80% of those impacts are in children. So when thinking about climate change and health, please think about children. I'm from the United States. When you say climate change, people think about polar bears. And so we're trying to convince people they should also think about the impacts on their children. The children of their children, of their colleagues, children in other countries, because they're the ones who are experiencing the impacts.

I must start with something that all of you are quite familiar with. This was the heatwave last summer. There is a million photographs online about the heatwave in the UK last summer.

I just thought I'd show one from the zoo to remind us that it's not just us that gets affected by the heat. There's a lot that's understood physiologically about how heat affects our bodies. And because of that understanding and because we know what kinds of interventions can be taken, we can say with full confidence that nobody should die in a heatwave. That all deaths in heatwaves are essentially preventable.

When we think about how our bodies react to higher temperatures. We are concerned about our core body temperature. We have behavioural mechanisms and we have mechanisms through our infrastructure, through our societies, to try and protect ourselves from the heat.

Behaviourally, when it's hot, we all go to try and find someplace that's cool. There's ways we can make sure our cities are cooler and that there are places for people to go and appreciate parks, for example, where the temperatures are lower. Physiologically as our core body temperature starts to rise, when those behavioural mechanisms are insufficient, what happens is that we can't reduce that internal heat. We start cooking ourselves in our organs. It just is too hot for us.

And we know those physiological mechanisms. We've all had experience with things like sweating. And so we can use that information to help better understand who's more at risk when the temperatures arise and what we need to do to protect them.

There is an international process called the Lancet countdown.

Can I use this? This might be a little hard to see, but I'm not asking you to read the details. This is exposure to heatwave days for adults over the age of 65 and children under the age of one. And all you have to do is just look at the pattern. This is since 1980. And shows a very significant increase. I put the numbers at the top. You may not be able to read them at the back.

In 2020, there were more than 3.1 billion additional exposure days to heatwaves for adults over the age of 65. This is one of the groups that most is at risk. For children under the age of one you can see 626 million additional days.

There is a formal process through some sophisticated statistics of determining the extent to which a particular heatwave was due to climate change. It's a method called detection and attribution. And there's been multiple efforts, The one on the left I'll talk about in a moment, to do detection attribution for heat waves. And the answer is a growing number of our heatwaves are because of climate change. They're not because we have variability from year to year. We know that some summers are hotter than others. These are actually caused by climate change.

And because they're caused by climate change, we can look at how many deaths occurred in those heatwaves. And we know the deaths are due to climate change. So from my perspective, as someone who's been working in this field for 25 years, we're now in a different situation.

I know people are dying from climate change. It's not as I would have said a couple of years ago, we see associations between temperature and mortality, temperature and hospitalizations. But this is because physically our climate system has changed so much and it's killing people. And as I said before, it doesn't need to.

This was a study that looked across 43 countries, 700 and some locations, some complicated modeling to look at what proportion of summer related deaths are due to climate change. And the answer across these countries and locations was about 37%.

You can see without, you don't have to read the names of the countries going around the circle, you can just see a lot of variability. Variability means there's opportunities for us to understand why some places do better and some places do worse and use that information to better align the actions that we take. So people are dying from climate change and it's in the thousands of people every year.

The photo on the right is a reminder that when we think about people most at risk from heat, we talk about adults over the age of 65. People with chronic underlying medical conditions, outdoor workers. There's a lot of research that's come out recently about pregnant women. When pregnant women are exposed to high temperatures towards the end of their pregnancy, there's a higher prevalence, they more often have low birth weight babies. The babies come sooner and that can have consequences for the baby for the rest of their lives.

And so we need to make sure that we pay attention to pregnant women and make sure that they are protected as well.

I hope all of you know that in the UK you have a fantastic heatwave plan. If you don't know that there is a heatwave plan, you certainly heard the message and it came out this last summer about the heat waves. There was significant effort here to try and protect the population when the temperatures got so high. When I talk about heat wave early warning systems, I often hold up this plan as one of the better examples. It's been around for quite a few years. It's a very well-coordinated mechanism across multiple agencies and institutions and has been by and large, really quite effective.

But to understand the kind of challenges we're facing going into a much warmer future, these are the numbers that were just released for this last summer. You can see that between June and August, there were more than 3000 excess deaths. These are people who wouldn't have died otherwise. About half of all excess deaths are from cardiovascular causes. People who have a heart attack who would not have had a heart attack otherwise.

In the hottest period, you can see that there was over 2000 excess deaths, there was a 10% increase in mortality during that period. And this is just from the heat.

74% of adult deaths were adults over the age of 74. So despite having a really effective heatwave early warning system, despite all the public messaging that occurred, people still died needlessly. And it really illustrates how much we have yet to do. That we have to make sure that these programs are even more effective, even more inclusive, and make sure that we reach out to the most vulnerable and protect them when these temperatures rise the way they have been.

And the message from climatologists is the future is going to be much hotter.

These are data, of course, from the US. You can recognize that the map of the US towards the end of the century. And it makes a nice contrast. The top row. The models assume there's no adaptation. People don't try to adapt to a changing climate. The bottom row there is adaptation. The left is high greenhouse gas emissions. The right is low greenhouse gas emissions.

So compare this world with the one on the bottom right. In both of these worlds, there's an increase in the number of people who die in heat waves. Population aging is going to be a significant factor.

And no matter what we do, we're going to have what we call residual risks. We're going to have to protect more people from the higher temperatures. But if we don't take any action, there's thousands and thousands of additional heat wave deaths if we don't both adapt and mitigate.

I'm from the Pacific Northwest. I think about heat and the next thing I think about is wildfires. This is the view from my daughter's house. You should be able to see Lake Union. You should be able to see the mountain range that's in here. It's a small mountain range and you should be able to see beyond it to the Cascades. For the last couple of weeks, for many days in the last couple of weeks, the air quality in Seattle was the worst in the world. And it was all from wildfires.

On the right. It shows you the relationship between what we call the air quality index. It's a measure of how many particles are in the air of a particular size. This particular size particle is one that is easy to inhale. It goes deep into your lungs. It's embedded in your lung tissue, absorbed into your body, and so has lots of negative health consequences. And this shows you the relationship with diabetes, lung and heart disease. For our air quality index

when you get to about 60, it's unhealthy air for anybody to breathe. The air quality in Seattle on and off for the last two weeks has been in the two hundreds. So well beyond what's unhealthy for anybody to breathe. Last summer, there was wildfires in Los Angeles. Some communities had air quality index measurements of over 750. Massive exposure to wildfire smoke. And the wildfire smoke is more toxic than just counting how many particles there are because of the characteristics of the particles.

So one thing that is a focus going forward is better understanding these wildfire risks, what they mean for health and what it means when people have these short term, extremely high exposures. Studies are ongoing and we'll know more soon about that.

Flooding. You had you had a bit of flooding in the winter of 2013, 2014. I assume some people in the audience were affected by that flooding. Anybody affected by the flooding in 2013? A few people have got their hands up, but there might be more.

I wanted to raise this not only because flooding is increasing with climate change, but also because it ties very strongly with mental health.

These are data following up from that particular flooding event. And this looks at anxiety and post-traumatic stress disorder.

And divided the people in the flooded areas into three groups. One is people who lived in a residence that was not affected at all. The second were people who lived in residences where the floodwaters came to the front door but didn't go inside. So their lives were disrupted. But they didn't actually experience flooding. And the third is people who were flooded. So for anxiety, this is year one, year two and year three and your two and three gives you a sense of the background of how many people experience anxiety on a day to day basis.

And look at the numbers for disrupted and flooded.

And you can see for the flooded, for both anxiety and post-traumatic stress disorder, that the prevalence comes down, but it doesn't go back to background. That flooding events have long term consequences for mental health. One of the findings from this particular study was that in year three, the prevalence of possible post-traumatic stress disorder in people who had persistent problems because of the flooding was about 30%.

That's a huge cost, obviously, to the individuals and the families, but also to society. There's a lot more that needs to be done in terms of how we protect mental health as we start seeing more extreme weather and climate events.

Moving on to vector borne diseases, diseases that are carried by mosquitoes and ticks. This is some relatively recent work looking at Lyme disease, and I understand it's a little hard to see the colour as it's kind of washed out from having the lights up. But basically, it's a study that looked at what could happen in the future with Lyme disease. Looking at both the peak season for Lyme disease and then the off-peak season. And essentially finding that particularly in the off-peak season for the UK, depending on what happens in terms of adaptation and mitigation, you can start seeing a significant expansion of the geographic range in the UK.

Also a big problem in Canada. There are quite a few studies in Canada showing that Lyme disease is already changing its geographic range in Canada because of climate change. That the warmer temperatures mean that the ticks just move into new areas.

It's not just climate change. When we think about climate change as a driver, we have to think about other drivers of these health outcomes. This is a quite interesting study looking at how many people arrive in the UK, in Europe, during two different periods, one year, from countries that you often see diseases like Dengue fever. Dengue fever is carried by a mosquito. The mosquito is very widespread around the world.

The mosquito is imported along with the people; mosquitoes often get on airplanes they get in wheels of wheels. They are transported when people sell used tires. There's lots of ways the mosquito moves around the world. And so there is work going on on what is the actual risk. It's not zero. Because we're moving the vector, the mosquito, we're moving the virus as we move people and goods around the world.

So the European Centre for Disease Control and Prevention is doing work in this area to better understand the risk that could happen here in the UK as well as in Europe.

Likely the biggest impact of a change in climate is going to be undernutrition. And that's going to be through two major pathways. This is a nice illustration from a recent report from the Intergovernmental Panel on Climate Change looking at the different interactions between heat, drought, soil, moisture, food yield, food prices, undernutrition and other interactions, including infectious diseases.

This is another figure where I just want you to look at the pattern. Not here to look at the details. And it's looking at maize, rice - we're going to skip soybeans because soybeans are really very different - and wheat. This is mid-century. This is end of the century. These are the zero lines across these figures. And if you look at the figures, you just see a big decline. That all of the projections, looking at what's going to happen with crop yields show declining in crop yields, particularly in the countries that are most vulnerable right now.

There's about 820 million people in the world who are food insecure. And all the projections suggest that's going to increase.

The other mechanism is through carbon dioxide itself. All of our plants have mechanisms whereby they bring in carbon dioxide from the atmosphere, they bring it into the plant and through a photosynthetic pathway, break the carbon dioxide into carbon and oxygen and then use the carbon to grow. So sometimes you read people write that carbon dioxide is plant food, and it is; the plants need that carbon to grow. 85% of all of our plants have one particular photosynthetic pathway.

Characteristics of that pathway mean they're called C3 plants. That's all. That's all that C3 stands for. And for C3 plants - this includes wheat, rice, barley, potatoes, grasses, trees - what happens is when there's higher carbon dioxide, and what I'm saying is based on field experiments where people have nice big plots and some of them they pull carbon dioxide over and some of them they don't, you see more carbon based molecules, you see more carbohydrates.

At the same time, you see fewer of the compounds in plants that are based on nitrogen. This is why you see lower amounts of protein and you see a big decline in the B vitamins because they're nitrogen based. Through another mechanism you see a decline in micronutrients, particularly iron and zinc. I mentioned 820 million people in the world who are food insecure. About 2 billion have micronutrient deficiencies.

1.5 billion women and girls have iron deficiency anaemia. All of the projections on these consequences for the nutritional density of our food suggest hundreds of millions of people could be affected by the end of the century. This is an area in which there needs to be a lot more research and a lot more investment because we need to ensure that we not only produce the food that's needed, but it has the nutritional quality that people have that children need to be able to grow.

This is an iconic figure that's used in the Intergovernmental Panel on Climate Change. I'd like to take a moment to explain it, because it's something that is so well understood by the policymakers.

On this side shows you from 1950 out to 2100. Just changes in temperature. This is global mean surface temperature. The black line here is the observations when you get here. These are projections. These are different assumptions about how much we're going to reduce our greenhouse gas emissions. Are we going to aim for net zero and get our emissions way down? Are we going to continue with very high emissions? These kinds of figures come out from the Intergovernmental Panel on Climate Change with every assessment that they do.

And these can be paired then with assessments of what are the risks. And I only put here heat related mortality. And when you look at this, this is the temperature that corresponds with the figure over here. The zero line is pre-industrial temperatures. So traditionally in this area, we look at pre-industrial temperatures.

For this figure, when the colour is white, it means scientifically we can't tell that heat related mortality has changed. It could have changed. We don't have enough data. We're in a place in Africa where we don't have any data at all. So we don't know if there's been a change. When it goes to yellow it means that heat related mortality has changed over time. And we can say with medium confidence that climate change contributed to that.

When the colour changes to red it; it means the risks are very high. It means the risks are high when it changes to purple, which I don't have on here, it goes to very high.

And this was done with three different assumptions about how active we are in terms of adaptation, how much we invest in our health systems, invest in early warning systems, invest in altering our infrastructure so it's better prepared for a warming climate.

The dots on here have to do with confidence in the transition. They're annoying, but the program we use means we can't take it out. So I apologize for having all those dots in.

But when you look at these, you can see that these combinations of mitigation, you've got high mitigation over here, very little mitigation here, very high adaptation there, very low adaptation here. You can see the different colour patterns. You can see the different trends. And it points out again how important it is we both adapt and mitigate? And it shows the potential; if we both adapt and mitigate the risk will continue to rise, but nowhere near they would be if we didn't take action.

Again, underscoring the importance of taking action.

There's lots of action being taken. There's lots that's being led by the World Health Organisation. For the second time in the history of the World Health Organisation, they had a World Health Day focused on climate change and health. This year.

W.H.O. has documents, guidance documents, for countries on the actions that they can start taking, how to build the resilience of our health systems, how to build early warning systems, how to make sure we've got surveillance systems collecting the data that we need. So countries all have access to these documents. And dozens and dozens of countries around the world are using these documents to try and increase their level of preparedness. When we look at climate change in health, all of the health risks of a change in climate are current problems.

But none of our current policies and programs were designed to think about climate change. And so it's taking what they already do and modifying it to make sure it's going to be effective.

And this process is going on in countries, as I said, all around the world are finding ways. And this happens to be in Bhutan. It's a meeting between people in the ministry of the health, people in the meteorological services, their department that has to do with agriculture and water. And working together to say, how are we going to manage the challenges that we're facing and put in place the policies that we need.

There's also lots of inspiring work going on in terms of health care itself, access to health care, and making sure that our health care facilities are resilient. This is an amazing hospital, about an hour and a half outside of Bangkok that I had the privilege to visit quite a few years ago, where one super

energetic person really was making a difference in that hospital to make it green and clean where green and clean are acronyms and stand for what you see on the right.

They've reduced their greenhouse gas emissions significantly. They've provided care for patients in new ways so that they're more resilient. And they've been really very creative.

Like many places in Thailand, you can't drink the water and you need a water treatment pond. So they have a water treatment pond and they put a track around it so that the staff, the patients can go out and actually walk and get some exercise. You need to aerate those ponds. And so somebody put in an old rusty bicycle and installed it in the ground so that you could sit on the bicycle and ride the bicycle and aerate the pond. And then they decided, as long as they were out, that they also put in an irrigation system.

So you can sit on the bike, a second bike and ride the bike and you can water the grass so that there's nice greenery all around you. They take the used water bottles. If any of you have ever been into a hospital, everybody gets a flowmeter that you have to blow into. Those are expensive. So they take the water bottles, the plastic ones, they clean them. It's hard to explain, but they put a little stick in them, literally a stick with a little whirligig on the top. And they blow into that and they give it to the patients for free.

So they use their water bottles efficiently. The patients get the kind of care that they need and they keep reducing how much emissions they have from their activities in the hospital and in the supply chain.

Another very creative activity I wanted to highlight. I hope you can see this; it's really important, as I've emphasized, to reduce our greenhouse gas emissions worldwide. About four and a half percent of all greenhouse gas emissions come from health care. A message that hasn't gotten out very clearly is when you look at mitigation, when you look at reducing emissions from coal for power plants, when you get more people walking and biking, when you have people eat no more red meat than their doctor recommends,

You can look at the benefits for health. All of these have very significant benefits for health. And when you value the avoided hospitalisations, the avoided premature deaths, the value of the health benefits of mitigation is equal to or greater than the cost of mitigation. So when you see stories talking about how expensive it is going to be to mitigate, you need to take into account that you're going to save at least that much from the benefits for our health in reduced health care costs.

With all of that, I hope you've been able to see this. This is a bike bus that's being used in the Netherlands. This is what it looks like. And they put all the kids in there and the kids that go around and pick up the kids in the morning. The kids bike together to school. So the kids get a habit of exercise. They start riding bicycles when they're quite young and they have more even more of a bike culture than they already have.

With that, I'd like to end with some key findings from an IPCC report from a few years ago that summarises where we are. Every bit of warming matters. It matters for our health. It matters for agriculture, for water and other sectors. We know that every year counts, that the longer we put off addressing the challenges of a changing climate, the more difficult it's going to be. And every choice matters. Everything that each one of us decides to do makes a difference.

And so I urge you to think about the choices that you make individually and collectively, because the future really is in our hands. Thank you very much.