Anne Johnson

Born 1954.
Professor of epidemiology.

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The following was transcribed and archived in 2021, with acknowledgement and thanks, from the BBC Radio 4 interview of Dame Anne Johnson by Jim Al-Khalili in his Life Scientific series. It was broadcast in February 2021.

1. Introduction

Jim Al-Khalili: Public health has been on all our minds during this pandemic but my guest today has thought about it a lot more than most. Professor Dame Anne Johnson worked as a GP in Newcastle in the 1970s before specialising in public health. Her pioneering research on the transmission of HIV AIDS focused on how people behave as well as the behaviour of the virus. And in order to find out what she needed to know she created surveys that asked people detailed questions about their sex lives. A national sex survey was a radical idea back in the 1980s. It was banned by the then Prime Minister Margaret Thatcher and was thought by many to be a scientific enterprise that was doomed to fail. They were wrong. The National Survey of Sexual Attitudes and Lifestyles continues to this day and is an invaluable resource.

In the noughties Anne was involved in another national survey Flu Watch and more recently, I am sure you won't be surprised to hear, she has been thinking a lot about Covid 19. Professor Dame Anne Johnson, welcome to The Life Scientific.

Public health is of course uppermost in everyone's minds right now and has been for a while. We are used to hearing professors of public health on radio and TV. But I guess that before the pandemic started many people didn't know that such experts existed. And I would go so far as to say that until very recently public health was a bit of a Cinderella science. Would you agree with that?

AJ: Well I think it is sometimes framed like that. I think people just forget the incredible contribution that public health has made to our health and continues to. In the 20th century there have been major changes in housing and sanitation. But we also saw vaccines coming to the fore. We saw legislation on smoking, seat belt bans, the Clean Air Act, all these things have made an incredible contribution to our health, and that's what public health is all about. It's about putting science into practice as well as doing science.

JA: You are, as I mentioned, a leading authority on public health epidemiology - the study of not only how infectious diseases are spread, but also non-infectious diseases like obesity. Like many of my distinguish guests on The Life Scientific, I think it took you a while to find your vocation.

AJ: It did, and so many people ask me 'How did you plan your career?'. I always look at them with surprise and say 'Plan? I didn't plan anything, I just seized the opportunities as they came along, and it has been just a fascinating career'. I've said to many people: 'Do what you want'.

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2. How It All Began

JA: So maybe you can tell me how it all began.

AJ: I came from a medical background, so I knew about medicine, so I embarked on medical training and applied for medical school.

JA: And you ended up going to Cambridge?

AJ: Yes, and that was a very deliberate choice about what I wanted to do. I was very clear, even before I began, that I wanted a broader intellectual experience in my education than I might get at a classical medical school. I then had this third year, as we all did then, when most people would have done pathology or anatomy and I chose to do social and political sciences. That was a really interesting year, and was a completely different way of working from the way I had worked in my medical sciences tripos.

JA: Did you enjoy it as much as the medicine?

AJ: Oh, I think I enjoyed it more than the medicine. It was a wonderful thing to be released from those labs and lectures and to be asked to sit down and read a whole book and express an opinion about it.

Newnham College, Cambridge.

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3. South America

JA: So what did you then, once you had graduated?

AJ: I was very uncertain about going forward with medicine. In fact I very nearly gave it up, and I'm so glad that I didn't. But I knew a number of anthropologists at Cambridge and I decided that I would take a year out, when people didn't take gap years. With a lot of support from Newnham College and a scholarship I went to spend a year in South America in the days when we only had the South American Handbook. It was a fairly perilous business going on old buses through the Andes where the wheels fell off from time to time.

But the main time I spent was in Venezuela, living in Caracas. It was really there that I began, from the dreaming spires, to understand what it is really like to see people's lives in the slums of Caracas. I began to realise what the relationship is between our socio-economic environment and our health. That was a very telling moment. We should be reminded that during Covid, of course, it's those people who have the most challenging socio-economic conditions that have been most affected by it.

JA: I know that, as well as working in the slums of Caracas you spent time with the Yanomami indigenous people living in the Orinoco Basin. What did you do there?

The Orinoco River.

AJ: I was very lucky. I had the opportunity to spend some time with the Yanomami people as part of a Ministry of Health programme on vaccination and on anti-malarial programmes. This was a very remote part. I'm talking about three days in an open motorised speedboat from the last port on the Orinoco.

I was twenty one years old. I do remember one particular moment of reflection. I was staying at this mission station and I was put up on my own in the dispensary for

a few days, waiting for the malaria boat to take me back down river at the end of this visit. I was lying there in my hammock, all alone and rather desolate because I didn't know when the boat would come. I was reading A Hundred Years of Solitude which was entirely appropriate. It was very hot. I had heard that the Yanomami had many rituals and there was clearly something going on. The next day they told me that it had been a funereal ceremony. I asked what the cause of death was, and it was very uncertain. People didn't know what people were dying of. But they were so affected by infection diseases that I really did reflect then on the enormous challenges of working health globally, and the ethics of it. I think that has followed me throughout my life.

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4. Newcastle University

Newcastle University.

JA: When you returned to the UK you then completed your clinical training as a doctor at Newcastle University. Why did you choose Newcastle?

AJ: That was my birthplace. But that wasn't the only reason, but that's why I went. I spent three years there, going on to train subsequently in general practice. I worked with very deprived communities where there was a lot of domestic violence, poverty, poor housing, unemployment, and strikingly low vaccination uptake rates. That really impacted on peoples' health. Then I had the opportunity to do my very first lessons in epidemiology, which I am afraid I hadn't learnt during my previous medical course. That was for me scales from the eyes.

JA: I think in many peoples' minds the boundary between medicine and public health is rather blurred. Perhaps you could spell it out for us. What is the difference between them?

AJ: Well I think most doctors will primarily have an interest, as rightly they should, with the patient in front of them. They are dealing with the individual. Whereas public health people tend to be thinking about the population as a whole, and the broader determinants of health. They therefore recognise that clinical treatments are only one part of how you improve health. Very important, but you need to take into account many of these wider issues to deliver either health care at the population level, or prevention at population level which is very much what public health is all about.

JA: Presumably there are also things like economic factors and policy decisions of governments.

AJ: Absolutely. So you can regard public health as both the science and art of improving health in populations. In the collective efforts of society to improve health the science, the epidemiology and the statistics, is the evidence base. But in the end surveillance and epidemiology is evidence for action. And that action often

has to be taken not just by medics but across government, in economic policy, in environmental policy, in housing policy and in fiscal policy. So inevitably, people in public health do get very much involved in the domain of policy and politics.

JA: So presumably that year you spent studying social and political science at Cambridge would have come in quite useful here?

AJ: It certainly did. And also it wasn't the political sciences that were important; the social sciences were very important too because I learned a lot about population health methods.

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5. Sexual Health

JA: Well, Anne Johnson, you are perhaps best known for your trailblazing research on the transmission of the HIV virus. So tell me what got you involved in studying sexual health?

Professor Michael Adler.

AJ: Another chance meeting, as so often happens in science. I completed an Msc in epidemiology and public health in 1984 and I was looking for a job and was introduced by a colleague to Mike Adler who was professor of genitourinary medicine at the Middlesex Hospital and very heavily involved in the early days of AIDS. He had been looking for a lecturer and signally failed to find one. So I went to see him one day and he said 'Look, I'm looking for somebody who would like to study with me the epidemiology of sexually transmitted infections and train in public health. I do remember realising that this was my moment. I had found the right job, and I skipped all the way home. Fortunately he gave me the job.

JA: It is of course an incredibly important area. But why were you skipping with joy when offered it?

AJ: Well it was a research job. And it wasn't just sexually transmitted infections, it was an opportunity to work on the early epidemiology of HIV. And that's in fact what I did. But there was a great stigma at the time. People said to me 'don't do that job for more than a year or you will ruin your career'. And 'are you sure you can't catch AIDS by reading about it?'. People really said that kind of thing. It was so stigmatized. And we happily talk about sexual health and sexual behaviours now, but I can tell you in the 80s the concept of sexual health didn't even exist as I remember. It was extraordinary when you think about it. The topics that politicians had to get used to talking about, as we all did. These were not public conversations as they are now. The idea of billboards advising people on the sex lives was pretty new.

6. Princess Diana

The powerfully influential photo of Princess Diana shaking hands with an AIDS patient.

JA: So, there you were in the mid 80s, starting this new job at Middlesex Hospital, having decided you wanted to do medical research rather than working as a GP. What happened next?

AJ: Soon after I arrived there was a lot of funding coming in for research. One of the major things was we have forgotten is that in those days it was terrible, The tests were only just being developed. People would come in terribly ill and the average life expectancy of these young men with AIDS was six months. And we had to look after them. So my job was to design a ward specifically for people with AIDS, which we did. We set it up at the Middlesex Hospital. It came to opening it, and I said Mike we had better get a Minister. And he said: 'No, no, no, I've called the Palace'. And that was when Princess Diana first got involved. She agreed to open the ward, and that was a very important moment.

JA: This is Princess Diana shaking hands with an AIDS patient?

AJ: Yes, and she shook hands without gloves at a time when people were terrified about casual transmission.

JA: It is incredible that that one image, as we would say today, went viral. It did so much to combat the stigma and misunderstanding.

AJ: I think it genuinely did, and actually it speaks volumes to us now, doesn't it, about how we best communicate with the public about the risks of Covid. I do worry that we haven't got enough of those sort of strong images to help guide people through what are at the moment just like the HIV behavioural changes. That is what is in our armamentarium now until we get this vaccine rolled out.

JA: Back then in the 80s, as you say, very little was known about HIV AIDS. One of the things that you studied was whether heterosexual couples could infect each other with HIV AIDS. And if that was the case, how exactly that happened. It seems extraordinary now to think that there was a time when this was simply not known.

AJ: Oh yes, initially it was thought to be a disease that only occurred when men had sex with men. Then people realised that there was an epidemic going in Africa, and of course the highest risk was with gay men having unprotected anal sex. There was a lot of discussion as to whether it could be transmitted through vaginal sex.

JA: And this is what you and others focused on?

AJ: Absolutely. And I think we have to remember that at that time there was a lot of uncertainty about how much heterosexual spread we would see in the population given the issues arising in Africa. That is why we so badly needed the data, both for prevention and also to think about how we would plan services for this going forward.

JA: How unusual was it, in those early days, to focus on the epidemiology of HIV and how it spreads, rather than on the biology of the virus or the search for biomedical treatments or vaccines?

AJ: Of course those things go hand in hand. But there's no doubt, and you see this in most epidemics, the fascination first is with finding the virus, then finding a test, and looking for a vaccine which we still don't have. I have cuttings from the 80s promising us a vaccine and cure for HIV AIDS. When of course there was a huge prevention agenda. It was the gay community that understood that. I went in 1986 to San Francisco and New York, and the gay community were amazing. They fortunately gave us great warnings about what could happen and we never got quite so severe an epidemic. The prevention was originally led very much by those community activities. There was quite a reluctance. I remember I came back talking about promoting the use of condoms by gay men and safer sex. And there was a sort of sense among the medical community that they shouldn't really be interfering and giving people guidance about their sex lives, because this might discourage them from coming. And there was a real resistance to some of that interestingly, at the time.

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7. The Tombstones and Mrs. Dawson

But there were a number of campaigns at the time on public broadcasting. The tombstones - you may remember those. They were much criticised but actually they were very effective, and sexual behaviour changed dramatically in those first years of the AIDS epidemic and they contributed to that. I had to take part in one of the sets of ads and I remember being taken to a film studio somewhere in London and was made up to the nines I remember, and had to practise lines until they found a good line for me to say. And this really came out of my study of heterosexual transmission. I can remember to this day my line was: 'We know for certain that HIV can be transmitted from men to women and women to men through vaginal intercourse'. That was a stunning performance! We were displayed in sepia. I don't think that was nearly as effective as Mrs. Dawson.

Still from Mrs. Dawson TV advert promoting use of condoms.

I don't know if you remember Mrs. Dawson. She worked in a factory making condoms and she became a sort of national hero because there was some humour in

all the gloom. She came on the telly encouraging everyone to use condoms and there was a massive uptake of condom use. We had snips on major soaps about people getting HIV AIDS, and those were very effective ways of communicating.

JA: Maybe we need another Mrs. Dawson today, to spread information about vaccines and social distancing and so on.

AJ: I definitely think it would be wonderful if we could find people who could put out very clear guidance for people to understand. I can say this on the radio, but I am a dull old epidemiologist.

JA: Epidemiologists aren't dull!

AJ: I don't know about that!

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8. National Survey of Sexual Attitudes and Lifestyles

JA: As well as being a leading edge HIV AIDS researcher, you have made a name for yourself as being the person who got us all talking about sex, not least because along with several colleagues, you created the National Survey of Sexual Attitudes and Lifestyles. You wanted to know what everyone was up to, not just people who were coming to the clinic or with HIV in hospital, but the whole of society.

AJ: Of course. This goes back to the modelling. We have all got used to modellers now, because we get R numbers every week. But or HIV the R number depends first of all on the thing I had been studying in my MD thesis which was the probability of transmission from an infected person to an uninfected person, and how that varies with different sexual practices. That was one thing that was going to determine transmission. The second, of course, was the number of sexual partners people had. Just like with Covid, the number of people you are in contact with will determine the spread of the virus. The third thing was how long people were going to be infectious for, the duration of infection. The probability of transmission, and the duration of infectiousness in people who've had HIV. But what we didn't know was what the pattern of behaviour was across the population. And that's why we had to study the whole population to understand how much spread we might anticipate. Specifically, we had to understand what particular types of contact they'd had, including different sexual practices. Because there were questions about the biology of transmission. So we had to ask all those questions.

JA: Did you feel uncomfortable about the idea of asking people about their sex lives, and in particular what kind of sex they were having?

AJ: I wasn't that daunted, really, simply because I understood how to do a random sample survey, and I'd rather forgotten that when I left Cambridge I had as a summer job working as an interviewer on a survey of young people, which included questions on their contraception use and so on. So I knew how to ask questions, and I knew from the studies we had done in the heterosexual partnership study that it was perfectly possible to ask questions if you ask them in the right way. You had to say why you needed to ask them, and enable people to answer in maximum privacy, which is exactly what we did. But people thought I was a bit crazy to think that was possible to do.

JA: Were you worried that the people you were asking the questions of would be too embarrassed to give an honest answer?

AJ: People always ask that question! First of all, you work with people to ask the questions in a way that they find acceptable. What kind of language to use and so on. And we identified that they preferred formal biological language. We also arranged that a lot of the questions were answered in a pen and paper format. They were given a booklet, and were asked to answer the questions in privacy. In that way people took the survey as seriously as any other survey. In fact, people were as willing to participate in this survey as they were in any other survey. Probably more than they were to answer questions about their income in fact. We got very high

response rates, with two thirds of the people we asked being happy to participate. That is probably higher than the survey responses you get in many surveys nowadays.

JA: I guess so much has changed in terms of our attitudes to sex, and in particular our willingness to talk about sex, that it is hard to imagine how radical that idea of a national survey of sexual attitudes was in the 1980s.

Mrs. Thatcher at her desk.

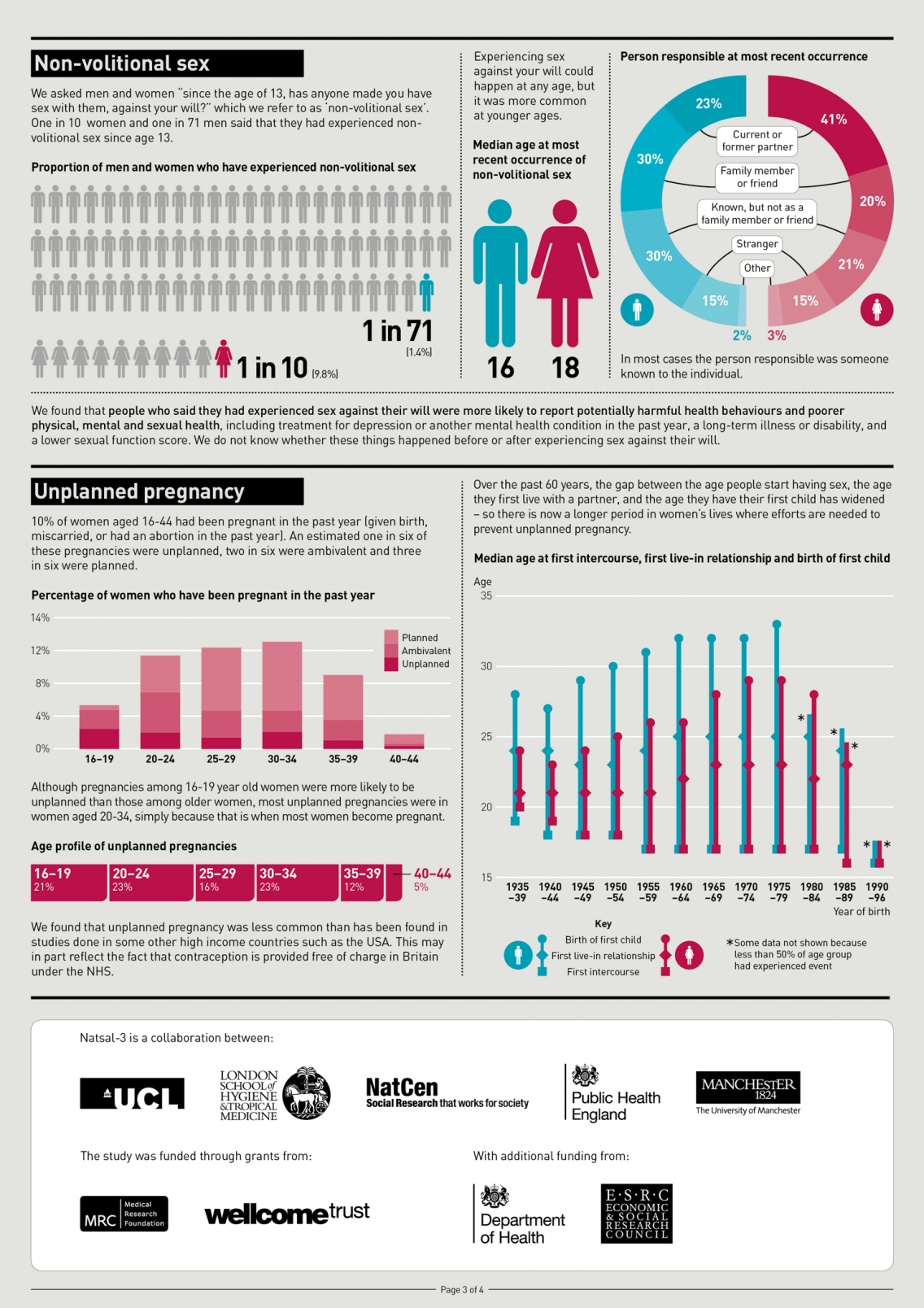
AJ: Well, I don't know how radical it was. It was an obvious thing to be doing. There was a deathly hush about us getting funding for the main survey, which ended in a telephone call to my colleague Kay Wellings from a journalist colleague to say that they understood it was on the PM's desk - Mrs. Thatcher at the time - and that she was not minded to allow it to be funded with public funding, which is what happened. We were headlined in the Sunday Times with 'Thatcher bans survey on sex'. Which the main thing anyone remembers about my career!

But actually what was extraordinary was that Wellcome Trust and the governors of the time recognised the importance of the survey and reviewed it within ten days. I well remember going to what was then a tiny head office of the Wellcome Trust in Regent's Park, sitting round the table with the then Director, and him announcing that Wellcome was prepared to fund the survey. Then he went into the office to phone No.10 and tell them that Wellcome had decided to fund the survey.

JA: The results of that first national survey of our sex lives were published in 1992. When you first came up with the idea, did you anticipate how useful that survey and its successors would prove to be? Not just for scientists and medics concerned with sexual health, but for governments and policy makers too?

AJ: I don't think we did realise that. The subsequent surveys have been used for an incredible number of things. Sex education policy, contraception policy, changes in the age of homosexual consent, for Chlamydia screening. We subsequently did a lot of work on Chlamydia that was asymptomatic. And we've done work that's informed HPV vaccination. And the surveys continue to be used, so it's become a

very big resource. Although one doesn't want to over-state it, I think probably those surveys are the only regular surveys of that kind anywhere in the world. It's been a useful resource.



An page from a recent report of the National Survey on Sexual Attitudes and Lifestyles.

9. Flu Watch

JA: And they you were very involved in taking the same idea of studying a large representative community sample and applying it to influenza. Because together with colleagues you set up another national survey called Flu Watch, this time to try to study the rates of influenza infection and how they have changed.

AJ: That was a slightly different kind of survey, but the same principle that if you want to understand the transmission of a virus you need to have a good large representative sample of the population. This is something that we've been seeing again with Covid. So with Angela Hayward we set up in the early 2000s Flu Watch. It turned out, and it was purely fortuitous that that study was running to study normal seasonal flu at the time when the 2009 pandemic of flu hit. That really did demonstrate how studying the sickest patients can give you a very skewed view.

You may remember that the first warning of this was a cluster of men in Mexico - young men who had a new variant of the virus and were very sick. There was a concern that this was going to be very pathogenic, or a virus that caught a lot of disease. But it turned out, as we know from Flu Watch and other studies, that the virus was if anything less virulent. It didn't cause much severe disease, and an awful lot of the disease actually turned out to be without symptoms. It was only the tip of the iceberg of infections that got to the doctor.

A lot of what we studied was also about immunity, both antibody immunity and what we call T-Cell immunity, alongside the behavioural data. Some of that we have gone on to analyse alongside Covid to see if it could inform us about the transmission of respiratory viruses. We have been able to use the data for that. One of the most interesting findings was that actually T-Cell immunity, the sort of long-term immunity, seemed to protect people from getting disease with severe symptoms when they met the new pandemic strain.

JA: Asymptomatic infections, T-Cell immunity, these are things we are all thinking about know, in relation to Covid 19. And they can't be quantified if you only study patients. Because to get to grips with an epidemic or indeed a pandemic, you need to understand what is going on in the whole population.

AJ: Absolutely. And I think that's incredibly important. What epidemiologists are always obsessed with is trying to understand the whole of the population without getting any bias. The trends tell you something. But it is the population studies that allow you to get a much better sense of the full spectrum of disease, figure out what proportion is asymptomatic, how much of it is transmitted by different routes, what proportion of people in different age groups get sick. That's what epidemiologists get out of bed for in the morning.

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10. Preparing for a Challenging Winter

JA: In July 2020 the Academy of Medical Sciences, of which you are now President, published a much quoted report of which you were one of the architects, entitled Preparing for a Challenging Winter. Do you think the risks described in that report, that was widely read back in July, were taken seriously enough by Government policy makers, the NHS, bodies like Public Health England?

AJ: Well, we know the report was regarded as very useful across Government, and I think it was widely used. Some of the areas have, I think, been well addressed. For example, we've seen a very good flu vaccination campaign being taken forward in the autumn. We've seen a lot of ramping up in the test and trace programme. But in September it really struggled, so perhaps that didn't get off to quite as good a start as it might have done. Surveillance has definitely improved, and I think we've been on the cutting edge of some of the genomic surveillance. We know a lot more.

But I think we do still have real challenges, as you can see, in health and social care, in being able to keep the NHS going. We know that the staff are under significant pressure now. I think there are still real concerns about how we enable better control of infection in hospitals and care homes. That's a very important area. But perhaps the one that we would really like to see more action is how do we communicate better to people the key messages about how they can contribute to reducing transmission in the population.

JA: Do you think it's going to be very difficult - let's suppose we have all been vaccinated - to maintain this change in behaviour we have learned in the last year if we are to keep the transmission of Covid 19 down in the future?

AJ: There are ways in which we are all going to learn and change after this. In South East Asia, after SARS, they have all worn masks, and have been very aware of those issues for a long time. That may play into why they have had less serious epidemics, I think they learned from SARS about the design of hospitals. I think we will carry some of these things forward. Indeed I hope that we will forever. In the same way as in the 19th century, when there were a bunch of public health changes put in that made water and housing and sanitation better. I hope that we are going to move forward and realise that we have to do more generally about respiratory hygiene, not just for Covid but for flu.

Flu is a big challenge. We have to reflect that having not had much flu this year, if we are back to a more normal life next winter, then we are going to have to prepare for the return of flu viruses that we have seen very little of this year. We may well see those coming back. So flu vaccination will be very important going forward. And we are going to have to get people to be familiar with more respiratory hygiene. Without being too gloomy, because these vaccines are a hugely important step forward, and every day we learn something new. So I don't want to be a prophet of doom at all! Indeed I would rather be optimistic about a way forward for everybody in which we all have a role to play. That is what public health is all about.