



HOUSE OF LORDS

Science and Technology Select Committee

Corrected oral evidence: Ageing: Science, Technology and Healthy Living

Tuesday 15 October 2019

10.20 am

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Members present: Lord Patel (The Chair); Lord Borwick; Lord Browne of Ladyton; Baroness Hilton of Eggardon; Lord Hollick; Lord Kakkar; Baroness Manningham-Buller; Viscount Ridley; Baroness Sheehan; Baroness Walmsley; Baroness Young of Old Scone.

Evidence Session No. 1

Heard in Public

Questions 1 - 10

Witness

Professor Chris Whitty, Chief Medical Officer for England and Chief Scientific Adviser at the Department of Health and Social Care.

USE OF THE TRANSCRIPT

1. This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of witness

Professor Chris Whitty.

Q1 **The Chair:** Professor Whitty, good morning. Thank you for coming today. Before I start, may I, on behalf of the Committee, congratulate you on your appointment as Chief Medical Officer? This might be one of your first duties to date.

Professor Whitty: It is.

The Chair: So we are the first to so-called blood you. Is that right?

Professor Chris Whitty: Yes. That is exactly right.

The Chair: You have a gentle start then. Before we begin, would you mind saying for the record who you are and what position you have? If you want to make any initial comments before we go to the questions, please feel free to do so. I know that in some of the questions we sent to you we implied that we want data related to the UK population. We understand that that might be a mistake, because you might have data that is for England's population, so please clarify that.

Professor Chris Whitty: Thank you very much, Chair and members of the Committee. As of two weeks ago I am Chief Medical Officer, but as of rather longer ago I am the Chief Scientific Adviser at the Department of Health and Social Care. I am by background an epidemiologist.

The Chair: Do have any initial comments that you would like to make?

Professor Chris Whitty: I am very happy to follow the Committee's lead.

Q2 **The Chair:** Thank you very much. My question relates to some of the initial data—to set the scene, so to speak. I assume that it is data related to England's population rather than to the UK's population.

We would like you to tell us about the age distribution of the population; the life expectancy; the mortality, including causes of death; and lastly, and importantly, the healthy life expectancy. We know that there are government plans and strategies for increasing healthy life expectancy, and you might say something about that, although we have questions coming that refer to that.

Professor Chris Whitty: Thank you. I will start with England and UK data. To be clear, I am also Chief Medical Adviser to the UK Government as a whole, so I have an interest not just in England; clearly, it has to be seen in the context of other countries.

Let us start with age structure, and perhaps I will pause at the end of that and we can move on to life expectancy, because although those are linked they are different sets of problems and lead us in different directions.

If we look at the population structure here in the UK and in England at the moment, the trend we will see very clearly, even if there is a little bit

of variance in the numbers that we get from the Office for National Statistics, is that the people who are older, and in particular quite a lot older, will steadily increase, whilst the population of working age is likely to stay relatively static. Normally, it would be much easier in other situations to do this with the benefit of demographic tables, population pyramids, and so on. I will read out some numbers, simply for the record, which illustrate this point and make it clear that this is the situation.

If we look at those aged 16 to 64, which is working age minus a little bit—obviously working age will change over time, so I am sticking to that age band—over the next four decades, 2020, 2030, 2040, 2050, we will move from about 41,815 thousand, so millions overall, to about 42,700 thousand at the end of that time. That is a pretty small change.

If we look at those aged 60 to 74, there will be a small increase over the next decade, but that then goes backwards, which is the baby boomers coming through.

The really big change, and the one that will have a big impact on health, social care and all other areas, is in people at higher ages than that. Just taking three snapshots, in mid-2016, which is the last date for which we have really reliable data on this particular issue, there were 1.6 million people aged over 85, which is 2% of the population. If we go forward 25 years to 2041, that is projected to be 3.2 million, which is 4% of the population, so that will have doubled. If we go forward to 2066, it is 5.1 million: i.e. 7% of the UK population.¹

The point I am making is that, until you get to the older age groups, the population remains remarkably static. But once you get to those higher age groups, which is where a lot of the medical and disability issues historically come in and probably will come in at least for the foreseeable future, there will be a very substantial expansion.

That is the first general point. However, there are two points that it is probably worth making to give context to that. I make them because they are often overlooked in policy-making and I think they are quite important. The first is that in the UK in general, certainly in England, cities maintain their demographic profile; people come in at about 18 and tend to leave, classically, after their second child, although it varies a bit. Therefore, if you project forward, London, Birmingham, Manchester, Liverpool and Newcastle will have a demographic profile in 30 years that will be very similar to the one they have today. There will be a slight increase in age, but it will not be extreme.

However, the equation has to be balanced. Therefore, the rest of the UK, particularly the rural areas, will get older a lot faster than the overall figures would suggest. I make that point, because the people in the very old age group will therefore be very highly concentrated and often in places where delivery of service is more difficult than it is in cities.

¹ These figures were from 2016-based population projections. Shortly after this hearing, on 21st October, the Office for National Statistics (ONS) published new 2018-based population projections. The projected numbers for the over-85 population have reduced slightly, but the general point of a substantial expansion in older-age groups in the future still holds true. The 2018-based projections can be found on the ONS website.

That is the first general point which I think is often missed in the debates on this. The second general point, and then perhaps I will stop and wait for follow-up questions, is that it is very important that we look seriously at our neighbours in Europe and the wider world and what is happening to them, because in reality our current model is based on the ability to hire in medical nursing and care workers from around the system.

If you look at the demographic pyramids in Europe, we will have a relatively gentle path down to that change in age group. It will still be relatively steep, but it will be steady. That is not true for most of our European neighbours—Germany, Spain, and most of the southern European ones—which moved from a population pyramid that bulges right out to a very narrow population pyramid over a period of about a decade. Which decade it was varied slightly. Therefore, they will go through the demographic bump that will occur extremely hard, and will move from having a large supply of people and a relatively low demand to a very large demand and a much smaller supply of people over a very short period of time.

If you look more widely globally, the same process is happening in east Asia, China, Japan, South Korea and various other places that are demographically slightly ahead of us, and it is increasingly happening in south Asia and in Latin America. So we will be in a global competition—I do not mean that in a negative sense but in a purely economic sense—for each of these classes of workers.

Therefore, our model will have to take account of the fact that simply expecting that we can buy in help when we need it will be very difficult to sustain, and certainly economically difficult to sustain. That makes all the discussions that you will have in the rest of your inquiry a lot more important, because we simply cannot rely on having a large workforce of medical nursing, care and all the paramedical professions to care for those people in the current situation. We will have to think of another model—the current model will not work—and it has to be able to work in north Norfolk and Hastings rather than just in central London or central Birmingham.

The Chair: My last point, which we might expand a bit, was about healthy life expectancy as opposed to life expectancy. What will happen to the healthy life expectancy in the demographic figures that you gave?

Professor Chris Whitty: I have been talking about population structure, so maybe I can move over to life expectancy, which, as I said, is a slightly different set of issues. Again, I am doing this because this is the first hearing in this inquiry and I am just putting some numbers on the table; these are reasonably standard. Currently—so the last data—the period life expectancy here is 82.9 for females and 79.2 for males. Those people are either dead or alive; that is a very clear definition.

Cohort life expectancy is what the ONS thinks might happen if current trends continue. Those figures are higher. Period life expectancy is if we imagine that this year is what typically people will have for the rest of their lives; cohort life expectancy makes some assumptions about

improvements. The cohort life expectancy is now 91.9 for females and 89.3 for males.

I am making that technical point because people often use them interchangeably. To be clear, the cohort life expectancy makes a number of assumptions. My own view is that the ONS assumptions are probably optimistic rather than pessimistic. If I was going to guess where we were in the range between the period, which is the base case, and the optimistic cohort, I would expect it to be rather lower than the ONS, but we can come back to why that is.

Healthy life expectancy is a much more slippery concept, as is disability-free life expectancy, because there is no doubt in any country who is dead and alive—generally. The idea of healthy life expectancy is a self-determined state, which can change over time, and disability is a relative construct. Those are different again from people having a good quality of life. For example, the ONS data suggest that the happiest period of many people's lives is between 65 and 79. That is a period when they will have more disabilities than they would have had at an earlier stage. It is important that these things are seen to be separate.

If you look around the UK and England, you will see substantial variation. In the most deprived areas, both life expectancy and healthy life expectancy are substantially shorter than in the wealthier areas. In terms of healthy life expectancy, the gap in healthy life expectancy goes up to about 19 years between the highest and lowest deciles—the gap in actual life expectancy between the most and least deprived areas ranges from seven to nine years, depending on which gender we are talking about.

There is a very big difference. If you go around the country, the more granular you are about the geography, the bigger the variation. For example, female age-standardised mortality rates in London would be about 733; in the north-east, they would be about 956. If we then got to a narrower geographical basis, in the City of London, it would be 347, while in Stoke-on-Trent, which is the worst for female life expectancy, it would be 1,174. If we were talking about male age-standardised mortality, for the City of London the figure would be 494, whereas in Blackpool it would be 1553.

My point is that the more granular you are with the detail, the wider the variation; it is not uniform across the country. That tells us many things, but one of them is that this is not a biological necessity; it happens because of socioeconomic status all the way through the life course.

Lord Borwick: Were those figures for deaths per hundred thousand expected in the current year?

Professor Chris Whitty: They were age-standardised mortality rates, which is slightly different, but it is structured against the overall population.

Lord Borwick: Was that a yes?

Professor Chris Whitty: It was a polite no. I was citing age-standardised mortality. If we cite just death rates, because the population structures for these different places are different, you get a very misleading answer. I am giving an age-standardised one, which is a demographic approach to making those rates essentially normalised for the local population.

Lord Borwick: I think I understand that.

The Chair: I think you are basically saying that, in deprived areas, the age of mortality is lower.

Professor Chris Whitty: Substantially lower, and in terms of healthy years the difference is even more than that. If you wish, I shall stop the numbers there, but I just wanted to put some on record at the beginning to demonstrate that these are hard points.

Baroness Manningham-Buller: We can do numbers, but we sometimes need them explained.

Professor Chris Whitty: Fine.

Viscount Ridley: May I press you on one small point related to the location-versus-decile issue? You are very clear that, at a granular level, you can pick up the deprivation difference in geography, but in our briefing papers we had a chart from the Centre for Ageing Better which showed a bigger gap in Kensington and Chelsea than in Glasgow between how long you live and how long you live healthily for. Is something awry with the granularity there?

Baroness Manningham-Buller: North Kensington.

Professor Chris Whitty: Yes, for north Kensington, that would be true. It has a very wide socioeconomic spectrum within it. When you see big gaps within a local geography, it is usually because there is a very large gradient socioeconomically within a relatively small geographical area.

Viscount Ridley: So this is key to your point about granularity. You are not necessarily going to pick this up on a city-versus-city basis, but on a district basis.

Professor Chris Whitty: Yes. The more granular you get, the bigger the disparities will be.

Q3

Lord Browne of Ladyton: Professor, you have helpfully encouraged us to look at the wider world, so I would like to ask you some questions about international comparisons. Apart from anything else, I think that some of us are interested in where we can learn things. How do our UK or English statistics compare with those for other western countries for life expectancy and, importantly, for healthy life expectancy or causes of death? Are there countries with significantly higher periods of healthy aged life that we could look to for lessons?

Professor Chris Whitty: My summary would be that if you look at OECD data—the same would be true for the EU data, which are slightly different—you will see that we are pretty well mid-table. We are not the worst, but we are certainly not the best. That would be true for both life expectancy and healthy life expectancy.

I have a very big rider on that, which is that healthy life expectancy is assessed very differently in different countries. I find it quite difficult, frankly, to interpret a difference, but it is probably worth starting off with the countries that are top of the table, because they make for an interesting comparison with the UK. At the top of the table for males are Switzerland, Japan, Australia, Iceland, Canada and then Singapore. For females, it is Japan, Spain, France, the Republic of Korea and Switzerland—if Hong Kong was a country, it would be right near the top.

It is quite tricky to work out what those countries have in common. One of the first things you learn during epidemiology is that geographical comparisons are useful for hypothesis generation but not for settling things, because the different countries have taken very different approaches to healthcare and have in some cases very different ethnic mixes. Therefore, drawing too strong a conclusion is a mistake.

However, I think we can say with safety that we could improve on where we are, because there are many countries that are pretty similar to us where both life expectancy and healthy life expectancy are better than they are in the UK. Those are UK figures, because the way in which it is calculated is UK wide; there is also, of course, variation within the UK between Scotland, England, Wales and Northern Ireland, where there is slightly higher life expectancy and healthy life expectancy in England, but, again, it is hugely variable between different regions. Again, I would not to draw too strong a conclusion from that.

Lord Browne of Ladyton: Are there particular countries that you would encourage us to look at?

Professor Chris Whitty: There are some countries that are closest to us geographically and in population structure which appear to be getting some things right that we are not. I would include in those the north European and Scandinavian countries and France, but the bigger the difference, the more you can learn, so it is also interesting to look at countries such as Japan and regions such as Hong Kong to ask what they are doing. They have a very different approach to healthcare delivery; of course, they also have different ethnic mixes and a variety of other things. It depends what comparison we are talking about, but I would add the caution that we should use it to generate an idea but not to try to prove a point, because it is difficult to prove a point from these data.

Baroness Sheehan: Following on from the discrepancy between countries, we were given some ONS analysis of 20 countries. Females in the UK had the lowest rate of life expectancy improvement, followed by the USA, and it gives a whole list of other countries.

If I may concentrate on the UK, in the most recent six years, compared to the preceding six, we fared very badly. There can be all sorts of factors underlying that discrepancy. To what extent have you taken changes in the climate into account; extreme weather events experienced in recent years—very hot weather, very cold weather?

Professor Chris Whitty: I will answer your specific question directly, but you make an important point in your first question about the difficulties between the rate of change between the two things, which I can come back to if you would like.

Baroness Sheehan: Yes, please.

Professor Chris Whitty: On climate, my view is that how important climate is for health depends on both your geography and over what timeframe. If you are talking about a relatively short period in the northern hemisphere in an area like the UK, my view is that the impact on health is marginal; it is not zero, but it is relatively modest. If I was in the Sahel, there would already be a very significant difference.

Baroness Sheehan: May I stop you there? We are talking about life expectancy rather than health.

Professor Chris Whitty: It is true for both. It is true whether we are talking about life expectancy or healthy life expectancy. If we are projecting more than 100 years, my view is that climate change becomes a much more important issue over that timeframe. Climate change moves relatively slowly, and the impact of the difference in the UK at this point is relatively modest. I am not claiming that there is no big importance globally, and I am not saying that there is no big importance over the longer term.

Baroness Sheehan: But there are spikes in death rates, are there not, when we have extreme weather? In the very hot summer last year there was a spike in death rates, and we have seen spikes in death rates over very cold winters. To what extent is that reflected in these figures?

Professor Chris Whitty: That is absolutely true, but they tend to be smoothed out if you take a rolling three-year average. You are absolutely right about very hot summers and very cold winters. Infectious things such as flus and adenoviruses also tend to lead to very short-term variations over time. And you are absolutely right again, obviously, that the variation is likely to change over time because of climate change.

Baroness Sheehan: Indeed, but that acceleration in change is increasing, is it not?

Professor Chris Whitty: It is, but I do not want to exaggerate how big the effect would be and the numbers over this timeframe.

Baroness Sheehan: Right. I just wanted to ask whether you had looked into that.

Professor Chris Whitty: Yes.

Baroness Sheehan: Okay. Excellent.

Viscount Ridley: Just on that point, can you confirm that winter mortality is still higher than summer mortality in all the recent years in the UK?

Professor Chris Whitty: Correct. That is not just to do with temperature; a lot of that is to do with infection. But the statement of fact is: absolutely, yes.

Q4 **Baroness Manningham-Buller:** Thank you, Professor Whitty, for your introduction. It was very helpful.

Would you be willing to drill down a bit into the healthy life expectancy and the inequalities in this? You mentioned that we must not be too general about this, because it varies so dramatically. Could you expand on the reasons for those dramatic difficulties as you are aware of them in the Department of Health?

Professor Chris Whitty: If I may, I will start with the differences in mortality, because those are hard, in a sense, and then I will come on to difficulties in healthy life expectancy, because that is a bit more subjective.

If we look at male differences, the life expectancy for the most deprived decile is currently at 73.9 and the least deprived is at 83.3 at this point in time. I will give examples of the conditions that cumulatively make up that difference, starting with the ones with the biggest effect and then going down. Heart disease is the biggest at 1.49 years; then lung cancer at 0.93; then chronic lower respiratory conditions at 0.92. All of those are very strongly driven by smoking, to be clear. Then there is cirrhosis at 0.57—I think everyone knows that that is a combination of alcohol and obesity; then pneumonia and influenza, which is a mixed bag, although smoking also contributes; then stroke—back to smoking again; and then other.

The female differences are a slightly different list, but the list is basically pretty similar. The point is that some quite amenable things drive potentially quite a lot of this difference. I am not claiming that all those differences are driven by smoking, obesity and alcohol, but they are three targets that we could have—among several others; there are many other things as well.

Baroness Manningham-Buller: Those are some of the things. On the things that are about wealth and deprivation, are the bad figures all from deprived areas, or does that not work either? Or does that work?

Professor Chris Whitty: There is clearly an advantage to being a wealthier person, or a less deprived person, anywhere you are. There is also, all other things being equal, an advantage to being the same person in a less deprived area. That is true globally and in the UK. It cuts both

ways. If some of the people from north Kensington who were talked about earlier moved to Chelsea and Kensington, they might have a slightly different outcome, despite all other things being equal.

Baroness Manningham-Buller: What about ethnicity? Do we see patterns in ethnicity?

Professor Chris Whitty: We see very clear patterns certainly in both mortality and healthy life expectancy in ethnicity. The first thing to say is that they collocate to a large degree with deprivation at this point in time, so you need to be careful not to overinterpret that, but there is definitely a significant gradient.

Interestingly, once you look to perception of ill health, it is not completely predictable. I think people just assume that it is ethnic minority groups who have a greater perception of ill health.

Baroness Manningham-Buller: Sorry, who have what?

Professor Chris Whitty: A greater perception of having ill health in later life. Take the female data, for example; male data is slightly different. The groups with the highest perception of ill health tend to be Traveller and Gypsy minority groups, and then Bangladeshi and Pakistani-heritage groups. On the other hand, the Chinese population, and actually the black African population, have a better perception of health than the general white population.

These things are not completely linear, and when it comes to the mortality data a lot is driven by deprivation issues. If you control for deprivation, a lot of the differences tend to decrease.

Baroness Manningham-Buller: You have just introduced, to me certainly, a slightly new concept that confuses it, which is one's perception as opposed to whether one is ageing healthily. How do you measure and judge perception?

Professor Chris Whitty: You ask people, and they will give a view. To be clear, the data I gave on healthy life expectancy is based on self-perceived health. All these official data are still driven by perception, and different groups may see things differently or answer questions differently, so it is very important to be quite careful about interpreting them. The point I am making is that it is not: if you are a minority it is all a lot worse than if you are in the white British population. It is more complicated.

Baroness Manningham-Buller: Surely the cohort studies and others give us data that is more reliable than just people's perceptions.

Professor Chris Whitty: It is the difference between disability, which in a sense tests whether people objectively have an illness that a doctor would put a label on, and the perception of health, which is essentially a self-perception issue. They correlate, but quite weakly actually.

Baroness Manningham-Buller: That is very interesting.

The Chair: How would you define healthy life expectancy?

Professor Chris Whitty: First, although it is an inexact science, my view is that asking someone whether they feel healthy is actually very useful, because if they do not feel healthy you then need to ask why and what elements make that up. There is a big difference between someone feeling healthy, having a disability and having a good life. You can have a very good life and have multiple disabilities, and some people can have no disabilities objectively but feel that they have a rotten life and indeed feel that their health is impaired. That is particularly true with some mental health issues.

Dividing these things up is not straightforward, and in my view there is no objective measure of health. That is why I started off with the mortality data, because that is very objective—you are dead or you are alive—whereas with all the other data there is some degree of subjectivity, either self-reported or medically reported.

The Chair: The data that we have seen others produce is that healthy life expectancy in England, whether it is an average or a mode, is 63 years. Is that rubbish?

Professor Chris Whitty: No, it is not rubbish at all. That is what people report as their health state, so it is not rubbish. If you asked anybody how they were feeling and they gave a view, you would not immediately say, "Well, they just gave a view. It's rubbish". It is the view they have given, but it is not something that you can measure objectively in the way you can measure whether someone has ischaemic heart disease, whether someone has had a stroke, whether someone has cancer. Those are, in a sense, objective things, but they are not absolutely correlated.

Q5 **Baroness Young of Old Scone:** How close are we to being able to get something more objective? We have heard about some cohort studies where they are taking levels of DNA methylation and senescent cells as objective markers of the true ageing process. Presumably, some of the data about the conditions that people have must be more readily available. I dare say that even the dreaded NHS health check ought to be producing some data. Are we any closer to having something rather more objective? That might account for the Scots being so ill in old age, because they are just miserable buggers basically.

Professor Chris Whitty: I am sure there are people around the table who take a very different view.

Baroness Young of Old Scone: Sorry, strike that from *Hansard*.

Professor Chris Whitty: One thing that has bedevilled the field—I am sure you will come to it in subsequent sessions with other witnesses—is that the biomarkers of ageing currently do not correlate terribly clearly with things that people care about. That is quite an important issue. They correlate with things that are biologically true. It is not that they are not

objective measures; they are measuring something and probably something very important, but they are not measuring how people feel. Ultimately, how people feel is quite an important part of what we need to try to address. It is important that we differentiate these quite clear biological processes from the wider perception of good health.

Baroness Young of Old Scone: And the NHS health check?

Professor Chris Whitty: The NHS health check is very useful for those who have it, but it does not correlate most with those who need it. One of its problems is that it tends to select for people who are already slightly healthier. It checks many useful things such as cholesterol, blood pressure and various other markers that say, "These are modifiable and if you do something about them your rate of ageing will decrease", but one of our worries—to go back to the point we made about deprivation—is that many of our interventions are most effective at getting people who are moderately healthy to be even healthier and less effective at finding the people who are least healthy and moving them up the scale. That is one of the biggest issues that we must face, and health checks are one of the areas where we need to think about it quite hard.

Baroness Sheehan: Chris, I hope that my question is easier. How do you define disability?

Professor Chris Whitty: You can have either self-perception of disability or an objective measure. There are different approaches.

Baroness Sheehan: Which do you use?

Professor Chris Whitty: Both, actually. It is very useful to be able to say objectively that someone has hearing loss and other things, but if someone feels disabled by something, just to say, "Well, I can't measure it; on your way" is not a terribly effective approach. We have to view them as slightly different things having different purposes.

Lord Hollick: Coming back to the question about objective data, we have medical records which are available for most of the population and can be accessed; we now have an increasing array of methods of collecting data on people's well-being on a daily, hourly and minute-by-minute basis, and we have sample surveys. Does the work that you do as an epidemiologist include sampling, where you can get a properly structured and balanced sample by location and different age groups and where that data is available? For instance, the artificial intelligence community uses a lot of that data to drive quite significant improvements in healthcare. Are you taking advantage of that data?

Professor Chris Whitty: Epidemiologically, there are several ways in which you can do this, but the key thing with any data that you try to collect across the population is to make it representative. It does not have to be the whole population, but it has to be a representative sample of it, just as with polling or many other areas.

In time, with the fantastic data that we are getting from the NHS and if we can centralise it and get public consent—a very important point—we might at least be able to have a snapshot of virtually the entire country, but on objective things like, “Have they had a heart attack? Have they had a stroke? Have they got cancer?”

That will not necessarily provide data on well-being, but it will give objective data on disease, which is very useful. Before we have complete data, the key thing is to have representativeness, so you take a sample that is balanced across the population that you are interested in and then you can find out whatever you want, using instruments as objectively as you can and measuring what people have in terms of disease and their well-being.

Lord Hollick: And are you doing that?

Professor Chris Whitty: Yes, that is being done by multiple groups. I am not personally doing it, but lots of groups—the ONS, Public Health England and many academic groups—are.

Q6

Lord Kakkar: As it is the first time that I have contributed in the Committee, I should declare my interest as professor of surgery at UCL and chairman of UCLPartners. Is any research being supported by NIHR or others to develop an objective patient-reported-outcome or public-reported-outcome measure that could be used to give more confidence about these interpretations?

Professor Chris Whitty: There are quite a lot of measures out there. I am not trying to diss them, to be clear—I think that people are inferring from what I have said that I do not think that these are good measures; they are good measures, but they are not fully objective in the sense that a brain scan or heart attack might be. Quite a large number of tools are highly validated at least within particular cultural groups—there is always more difficulty when you are comparing across them. My view is that trying to get yet more measures probably will not help this field. There are the things that you can measure very objectively using tests. UCLPartners among others—I should declare an interest that I am also a consultant physician at University College hospitals but not involved in UCLP—are using very good biomarkers. Those tell you about disease and, to that extent, you can say that they tell you also about disability, but the thing which people have rightly picked up on is that well-being and sense of health are that, but they are other things as well.

The main use of the markers, in my view, is to compare things over time. If you are using the same, slightly flawed, measure over time, there is a reasonably good chance of any fluctuations meaning something, whereas if you constantly change the markers you use it makes it quite difficult to work out what trends are going on. Some of the data I look at I find difficult to interpret because someone has suddenly changed the methodology halfway through, and then you think, “Well, I’m not sure what the ‘before’ and ‘after’ really means here”.

Viscount Ridley: A quick, further question on subjectivity: is there any

research showing that people have moved the goalposts on what they perceive as healthy over the generations; for example, stuff that I would whinge about but of which a previous generation might have said, "Can't complain about"?

Professor Chris Whitty: One of the multiple explanations for the period spent in ill health being reported as having increased over time is that people just change what they perceive as ill health—that is just a cultural change. It is one of multiple possible explanations. People hypothesise it, but no one has been able to prove it or disprove it. It may be true to some degree.

Q7 **Baroness Walmsley:** You referred earlier to the health inequalities across the country and across the age range; obviously, we are focusing on the period of healthy old age. Can you hazard a guess at the key issues that we would need to address to equalise healthy old age across the country? Referring to one of your earlier answers, would those solutions differ in the cities and in the rural areas?

Professor Chris Whitty: That is a very difficult question to answer because there are so many different potential answers, but I shall do my best. I would divide the answer into the things that the individual can do for themselves, the things that are the role of the medical profession and the things that are the role of government. The answers will be different depending on which of those we are talking about.

Pretty clearly, the single thing that would probably lead to the greatest reduction in disparities would be getting rid of smoking completely. There is a huge disparity in smoking rates, which drives at least some of, and probably a large part of, the difference between these, but definitely not all—alcohol maybe to a lesser extent, obesity maybe to a lesser extent.

Then there is a whole other area of health, in a sense—individuals interacting with the health system—because the medical profession can do a lot to slow down the ageing at least of particular organs. One of the huge changes of the last 15 years has been the stunning reduction in cardiovascular disease—heart disease and stroke. It has been really, really impressive, a halving of mortality from these things. Some of that is done by better things in hospital, but a lot of it is done by better primary and secondary prevention—things like getting people to take statins, lowering blood pressure, and so on.

One of the problems that we have is that people in more deprived areas, in addition to having issues of behaviours, particularly smoking, that will age them more, also tend to access healthcare less effectively and then tend not to get the kinds of medical interventions that can be useful.

Then, of course, there are the things that government can do. There is a bunch of different bits of advice that we can give that are moderately effective and which, if people take them, can make a big difference, such as taking more exercise. The two things that will most slow down people's ageing at this point in time are stopping smoking and taking more exercise. If we added in a few others, they would include to have

friends and a good education. With the exception of smoking, the great majority of good advice for healthy living that we can give was given by the Greek philosophers more than 2,000 years ago. Stopping smoking is obviously a new one.

There are nuances, however. For example, we can advise people not only that they should do things that keep them active, like running, but that they also need to do things that exercise all your muscles against resistance, because that keeps your balance and your muscle bulk into old age. So there are things that we can do to slightly improve on that advice.

On the disparity point, the problem is basically that the people who are most likely to take this advice are not the people who would actually benefit most from it. A lot of the research, in my view, should really be going into how we get the group who would most benefit from this to have access to the primary and the secondary prevention, and indeed the curative services of the health system, in a way in which they currently do not.

Q8 **Viscount Ridley:** If there were to be changes to healthy life expectancy, what might the wider economic and societal consequences be? For example, if we were to achieve a compression of the morbidity by a couple of years, or if we were to fail to do that and go back a couple of years, what would the impact on society be in the next few decades?

Professor Chris Whitty: I will take two of those and then stop and see if you want to go on to slightly wider ones.

The first is obviously that the advantage to individual families would be huge. Secondly, one thing that has been very clear over the past 150 years has been a steady and inexorable concentration of mortality in a very narrow age band. There is a public perception that the average age is a bell curve that moves steadily to the right. That is not actually what is happening. What is happening is that people are dying less and less and less at younger ages, but for those aged 85 to 90 it is pretty static. We have not had an improvement in mortality over the age of 90 for over a decade now. So the concentration is increasingly—

Viscount Ridley: Sorry, but just on that I have read that the number of people getting to 110 is static or declining.

Professor Chris Whitty: Yes, exactly. That is one reason why I have some caution about some of the ONS projections. My view is that, at least at this point in medicine and in society, there appears to be not a biological hard stop but a biological soft stop. This means that the concentration of mortality is getting greater, which in my view means that we have a realistic prospect biologically of compressing morbidity as well as mortality.

If we could do that, it would clearly be very good for everybody, because what we all want is to do our most enjoyable things until the day we die and then just die, because we all have to die; that is the one certainty in life. Also, it clearly has huge advantages for the NHS, because the great

majority of the healthcare expenditure for any individual is in their last two years of life, and the closer you get to the date of death, the greater the expenditure will be.

If we can keep people healthy until they are very close to the point where suddenly they die, it is great for them and it will make the whole system work a lot better. That is not unrealistic, because we do not have a constantly shifting rightward drift; we have a rightward drift of the left-hand edge of the bell curve and a much slower drift of the right-hand one. It is a serious prospect, which is why the people who will hear from in subsequent sessions are really on to something, because I really do think that we could make this happen, to a fair degree.

The final question is whether it is economically useful for wider society. That is variable. If you can get someone of 60 to remain healthy until they are 70, the economic impact of that is really clear for wider society. It gets a little less clear once you get on to people who are 80 moving into 85.

Viscount Ridley: Except, presumably, that the people who are 80 moving on to 85 are reducing the productivity of their kids a bit as they are spending time looking after their parents.

Professor Chris Whitty: You are exactly right. You may well come on to this at some point, but work on carers and people who are informal carers shows that this is in addition to their work and clearly reduces their earning power. I could go into this in a lot of detail, but there are people who do this better than me.

Q9 Baroness Young of Old Scone: If you were in charge of all of this, what priority actions would you look for? Would it mainly be public health advice, technologies in services, things to do with the Healthy Ageing Grand Challenge, for example, drugs, therapies? Where are the fertile areas, particularly in addressing the incline between rich and poor populations?

Professor Chris Whitty: I will divide this up into four different sections, because there are near-term wins, medium-term wins and more speculative but very exciting longer-term wins.

On the near-term wins, there is a bunch of things that we know work, including stopping smoking, exercising more and so on, which we just need to press "on" on, and the same is true for providing primary and secondary prevention that we know works. There is a bunch of things that are simply not happening, but if they happened to the people most at risk, things would improve really quite fast.

Then there is a group of things in the middle relating to research within organ systems at this point in time. We have managed, for example, to move the age of the heart, which used to age in UK populations way before the rest of the body and was why people dying of a heart attack were otherwise remarkably well, right out to the right, so that you can now have a heart that is as young, or even younger, than you are. That was not true before.

We are doing the same for other organ systems as we go through things. The one that we have not succeeded with so far is the three major dementias of the UK: Alzheimer's, dementia with Lewy bodies, and vascular dementia—we have succeeded a little bit with vascular dementia.

So there is a bunch of things that we can do on that. The science on that is relatively in view. Those improvements are happening the whole time. Cardiology happens to have gone the fastest, but there are a lot of other things that we could do, organ by organ.

There are two broad longer-term issues. There are some non-specific studies of drugs that might be able to slow the ageing process as a whole. They are very much at the mouse end of things, but the science is very exciting here. There might be a modern equivalent of the elixir of youth, but that is quite a long way away, to be clear, in terms of the overall effects.

The much bigger issue, and one that I worry about, is that science is currently designed wholly around single organ systems, and the same is true for the NHS. It is clear that we are moving from a situation where people accumulate diseases very slowly to a situation where people have nothing or a large number of diseases—multimorbidity is the rather pompous term for it—and we do not have the science of properly linking up different diseases, which may well have a common pathway. Someone can have, let us say, problems with their bones, eyes, hearing, anything, and will go to six different clinics and follow six different NICE pathways. We really have to try to work out a way of bringing those together. That, in my view, is a really serious priority.

Baroness Young of Old Scone: Is there a broader co-ordination issue, because we do not have a national institute for ageing, as they do in the States, co-ordinating the relative priorities for research and pushing forward the implication of technologies right across the spectrum, not just in medicine but in social care and in some of the AI, gadget-based technologies, for support that could increase the level of independence and overcome some of the issues, particularly in the rural areas? Will UKRI do this, or is this bigger than that and needs some co-ordinating mechanism?

Professor Chris Whitty: First, I should be very clear that I do not speak for UKRI, so I do not want to put words into its mouth, but I re-read in preparation for this meeting the report of your predecessor panel from 2006, which looked at this issue. Interestingly, that was one of its major recommendations. A surprising number of things are remarkably similar, but there are also some important differences from that time.

I am cautious about that fixing anything; I can see the internal logic of it. The real problem is that the whole scientific community has ignored some areas—multimorbidity, the interaction of different diseases, is one—and the medical system is not currently designed to do research at its best in older populations. For example, there are very few academic geriatricians; there are many people who look at infectious diseases in

younger people. We simply have not got that fixed. I am not certain that a group, whether it was based in UKRI or anywhere else, would be able to fix it. That is a philosophical change that the scientific and medical communities need to come together to sort out. You are right that there needs to be greater co-ordination, because some quite large areas of ageing are left behind while some are heavily invested in. The logic for that is not always obvious.

Viscount Ridley: On that last point, you mentioned the relative failure to tackle the dementias compared with the enormous success in tackling cardiovascular disease. I had a good friend of 51 who dropped dead at work of a heart attack a few weeks ago. It was a tragedy, but, as far as the country is concerned, that is a very short piece of morbidity, whereas somebody getting dementia is a very long piece. Is this where the problem is coming from: that we have tackled the things that kill us quickly, but we have not tackled the things that kill us slowly?

Professor Chris Whitty: It is easier to tackle things that could kill us quickly, for a variety of reasons. Dementia is a particular case, but it is an important case, because it is now the leading cause of mortality in both men and women over the age of 80. We have seen some improvement, probably, in mortality from dementia in men over the past 40 years but not in women. The most common dementia in the UK is Alzheimer's, but it is not the only one. We do not really have a sound scientific basis for understanding the disease. On vascular dementia, which is probably the second-most common, if you do things that are good for your heart and good for stroke, it seems to have a positive effect also on vascular dementia. We are seeing some improvements there, but almost accidentally. We need to start thinking quite differently about the dementias because they are a major priority for us now.

Q10 The Chair: Do you have a view as to what the Government are trying to do with their Grand Challenge on Healthy Ageing, and how do we go about achieving it?

Professor Chris Whitty: There is a puzzle for anybody who looks at this, which is that, everywhere in the world, the population is ageing quite rapidly—it is doing so from different positions, but the direction of travel is very clear—yet the number of companies involved in the ageing industry is very small and has gone nowhere. Interestingly, that was one of the points made by your predecessor Committee in 2006. The situation is remarkably similar now. One looks at the trends and thinks, "Why would someone not want to be in this area?", but the fact is that they do not. One looks at the market; it has spoken, and it is not interested in working in this area.

That point of the Grand Challenge was to encourage some entrants to the market. It would be very good for society and for the economy if we ended up with a vibrant market. Work is obviously going on at the pharmaceutical end—I think that you will hear people talking about that later. Where I think the Grand Challenge will have its biggest impact if it goes according to plan is more in medical devices. It is important to keep

people healthy, but, for most people, the important gap is that between what they want to do and what they can do.

If we can provide devices that essentially narrow that gap by making their environment easier to operate in—it could be as simple as a better Zimmer frame or it could be a complicated exoskeleton; it does not really matter—we can improve their quality of life irrespective of their health. Essentially, we need to tackle it from both ends: improve health so that people's disability is less and improve the environment so that the same degree of disability has less impact on what they do. If we can achieve both of those, we can make quite substantial progress. I think that the Grand Challenge will have its biggest impact on the second of those: changing the environment and making it easier for people to operate effectively in it.

The Chair: You referred to some ideas; you might have more. What do you think that we as a Committee should be looking at to question or identify issues related to the Grand Challenge on Healthy Ageing?

Professor Chris Whitty: It would be very useful if the Committee did two things: both examined the hi-tech, high-sexiness factor things such as the exoskeletons or the anti-senescent drugs, and looked at the large number of near-term gains that we could achieve in the next few years with an improvement on current technology. I worry that it is easy to get transfixed by the high science that might fix it in 20 years, when a bunch of problems are solvable here in the next five. They are often overlooked because they are not as exciting, but, in practical terms, they are likely to be more important.

Baroness Sheehan: Could you give some examples of those?

Professor Chris Whitty: There is a bunch of things that need to be done around housing. In the UK, we depend on a second-hand housing stock more than many other countries. Our housing stock is designed essentially for young families. There is a whole bunch of engineering issues around that. A lot of things could be done around mobility and around hearing, which leads to a lot of social isolation, secondary depression and various other things. There is a large number of relatively specific areas where quite modest interventions could make the difference between someone functioning just below or well below what they want and their functioning above what they want, where they could live a very fulfilling life with the same degree of disability. There is almost no organ system and almost no part of life where we could not find things that made a substantial difference, often with quite a modest tweak.

The Chair: Thank you very much, Professor Whitty, for coming today. You have been most helpful. I have no doubt that we will see you again later on—maybe when we see the Minister. Thank you for coming today and setting the scene. I congratulated you on your appointment. I now wish you well in your role in the future as the nation's doctor.

Professor Chris Whitty: Thank you very much indeed.