

Health and Social Care Committee

Oral evidence: Antimicrobial resistance, HC 962

Tuesday 11 September 2018

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Members present: Dr Sarah Wollaston (Chair); Mr Ben Bradshaw; Rosie Cooper; Dr Lisa Cameron; Diana Johnson; Johnny Mercer; Andrew Selous; Derek Thomas; Martin Vickers; Dr Paul Williams.

Questions 136 - 273

Witnesses

I: Professor Mike Sharland, Chair, Advisory Committee on Antimicrobial Prescribing, Resistance and Healthcare Associated Infection; and Dr Susan Hopkins, Healthcare Epidemiologist Consultant in Infectious Diseases and Microbiology, Public Health England.

II: Professor Peter Borriello, Chief Executive, Veterinary Medicines Directorate, Department for Environment, Food and Rural Affairs; Steve Brine MP, Parliamentary Under-Secretary of State, Department of Health and Social Care; and Dr Susan Hopkins, Healthcare Epidemiologist Consultant in Infectious Diseases and Microbiology, Public Health England.

Written evidence from witnesses:

- [Department for Health and Social Care](#)

Examination of witnesses

Witnesses: Professor Mike Sharland and Dr Susan Hopkins.

Q136 **Chair:** Welcome to our second session on antimicrobial resistance. Just to set the scene, we heard last week from Professor Dame Sally Davies, the chief medical officer, that modern medicine will be lost if we lose antimicrobials and that 43% of people died from infections before their discovery. This could not be more serious.

As our second panel, could you introduce yourselves for those following from outside the room, please, and the context in which you are speaking to us, starting with you, Dr Susan Hopkins?

Dr Hopkins: Hello. My name is Susan Hopkins. I am a consultant in infectious diseases and microbiology at the Royal Free and deputy director for the national infection service for Public Health England, which is why I am here today, as I lead their healthcare-associated infections and antimicrobial resistance group.

Professor Sharland: I am Mike Sharland. I am a paediatrician with an interest in infectious diseases at St George's, University of London. I have chaired the Government's expert advisory committee on antimicrobial prescribing, resistance and healthcare-associated infection since 2007.

Chair: Thank you both very much for coming today. Martin Vickers is going to open the questioning.

Q137 **Martin Vickers:** Could I open by getting a general overview and asking you what your views are on the progress that has been made to date on tackling AMR?

Dr Hopkins: In the last five years since the launch of the strategy in 2013, we have made quite a bit of progress in the UK. We have developed world-leading surveillance systems where we can measure antibiotic use to general practice level, to individual hospitals and antibiotic resistance across the country.

We have also developed initiatives such as quality indicators, and we use those to drive down prescribing in primary and secondary care such that there is 13% less prescribing in primary care compared with what it was five years ago. We have also developed increased research across both the UK and, with aid, across the world.

Professor Sharland: I entirely agree with Dr Hopkins. In a way, our first strategy was a first national action plan, and all countries are producing national action plans to try to combat antimicrobial resistance. In the UK, we probably have one of the most advanced overall national action plans in the first strategy, where we have produced really detailed quality indicators both to try to tackle inappropriate antimicrobial resistance prescribing and hospital-acquired infection. Many countries are now developing their national action plan, whereas the UK is moving on to its



second five-year national action plan. The UK has had a very good leadership role in both developing and then implementing those indicators.

Q138 Martin Vickers: Thank you. You referred to the next stage. On what key areas do you think the Government's next strategy plan should be focusing?

Professor Sharland: It is worth being aware that the evidence base for the policy interventions in this area is very much at the beginning. We do not know what the best policies are globally to try to control antimicrobial resistance and there are not many decades of experience in this area. It seems sensible to try to minimise inappropriate prescribing. Patients need antibiotics, and we try to work through what is appropriate prescribing for serious infections and what is not appropriate or less appropriate. We need to focus on and tackle that particular area.

Clearly, reducing the burden of infection—trying to reduce hospital-acquired infection but also, where possible, trying to reduce burden through vaccination in primary care—is also very sensible, trying to bring that down. There is a lot of work that we need to understand in how we take our surveillance data work through those with our policy indicators, see what the outcomes are, and then try to work round those levers again and again to try to drive resistance down. Those are much more focused or targeted interventions for the second strategy.

Q139 Martin Vickers: Dr Hopkins?

Dr Hopkins: I would completely agree with that. We will continue to need funding, particularly research funding, looking at new antimicrobials and new diagnostics, but none of those will change the situation within a five-year period. It is important to recognise that in the next five years we will continue to build on the work that we have done already.

The other important piece is to ensure that the guidelines that we develop for antibiotic prescribing are robust, that we are prescribing the right amount of antibiotics at the right dose at the right time, but minimising the amount of antibiotic exposure each individual has as much as possible.

Chair: Thank you very much. We will come to more detail now on prescribing, and Paul will take these questions.

Q140 Dr Williams: You have said that the strategy is to try to reduce inappropriate antibiotic prescribing. At the moment, how much of our antibiotic prescribing is appropriate?

Professor Sharland: We are at the beginning of trying to define that. I am a paediatrician, and it is really difficult in primary care—and we will come on to secondary care—with patients and children who have a fever and a cough and are really unwell, to know what proportion of those are viral infections that do not need antibiotics and what proportion are



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serious bacterial infections that do. When it is very obvious it is very obvious, but when it is less obvious it is very complicated.

NICE has taken a very good line in this, which is working through all of the evidence base and trying to define for all the different clinical infections, such as ear, throat and chest, to try to see what are the symptoms, signs and the severity of the illness where you probably don't need antibiotics and where you probably do need antibiotics. There is always a grey area, and there is always going to be, and we can come on to some of the ways we can deal with that later on.

The APRHAI committee worked through primary care and said that probably 20% or so of prescribing is inappropriate at the moment. That is an estimate and we have to recognise that that is an estimate. Therefore, the Government ambition was to reduce that by half to 10% of prescribing. That is what we have tried to do.

Do you want to go on to secondary care?

Dr Hopkins: Secondary care is equally complex. Patients who come in to secondary care are quite sick, so often people are prescribed an antibiotic immediately when they come in or when they are unwell. What we are now doing—

Dr Williams: Been there, done that.

Dr Hopkins: Exactly. We are trying to get people to focus on the 24, 48 and 72 hours after the antibiotic has been prescribed, to go back, look at the results, look at the patient and make a reassessment to stop antibiotics.

Also, we know that shortening antibiotic duration is a key component. There is increasing evidence showing that you can go from 10 days for pneumonia, which is traditional, right down to five days, even for severe pneumonia, as long as the patient is responding.

Reducing antibiotics is a key thing that we are driving in hospitals. Recent work that we are looking at shows that antibiotic use in hospital is mainly appropriate at the starting point, but the durations appear too long, so we are trying to drive down antibiotic duration at all times. Again, our estimates have been to drive down antibiotic prescribing by 1% to 2% a year in hospitals for the number of patients who come in. That is something that is difficult to do, but, none the less, about half the hospitals in the country have risen to that challenge and done that successfully in the last year.

Q141 **Dr Williams:** It surprised me, when pressed to put a figure on it, that you said only 20%, because there are some countries, such as the Netherlands, where antibiotic prescribing is only 50% of what exists in the UK.



Professor Sharland: Yes, that is entirely correct. There are different countries with different levels of deprivation and poverty, and we have to be aware of the population mix in different countries as well. Nobody knows what the appropriate level of prescribing is at a population level. At a national level, we are at about 650 prescriptions per 1,000 inhabitants per year, and some countries, as you say, are considerably lower than that. Equally, other countries are much higher than that as well. The UK has a middle to low ranking in that area.

As countries start to bring their prescribing rates down, we will start to look at and identify better ways of trying to determine what the overall goal is, but we have to be open and say that we do not have an absolute, clearly defined open goal at the moment.

One also needs to be aware of patient safety. It is really important that we try, as we move forward in the next strategy, to think more about targeting antibiotics appropriately. As we move on from overall total metrics, it is going to be more of a risk-based approach, trying to determine patients who are at higher risk of complications—the young, the elderly and those with underlying more complex medical conditions—and the otherwise fit and healthy are a different group.

Q142 **Dr Williams:** It is not as simple, is it, as working out whether or not a disease is caused by a bacterial infection, because most human beings who are otherwise fit and healthy are perfectly capable of clearing bacterial infections?

Professor Sharland: Exactly.

Q143 **Dr Williams:** Most of the current guidance does not look at the pre-existing risk in an individual.

Professor Sharland: Precisely. At the moment the strategy that the advisory committee has taken and the advice to the Government has been broadly to try to reduce the total and move from broad-spectrum prescribing to narrow-spectrum prescribing. That is the strategy both for primary and secondary care. In the end, they are relatively crude metrics. So, for the future, we want to try to target much more the individual and try to develop a clearer approach as to who needs an antibiotic and who does not.

Q144 **Dr Williams:** In our primary care, where 75% of antibiotics are prescribed, we have quite well-advanced sets of data, don't we, that would help us to look at that pre-existing risk—the underlying risk in patients? But we are not at the moment using our IT; we are not using the artificial intelligence we have heard about; we are not maximising the use of that. What needs to be done to make sure that our IT systems are better used to better target antibiotics?

Professor Sharland: Although that is perfectly correct, and we have extremely good IT systems in primary care, even at a very simple level linking the prescription to a clinical indication is not there at the moment.



We have that for research databases. There are particularly excellent research databases that cover very small parts of the population, but many of the large datasets do not, so that makes it quite difficult to interpret some of them. Of course, we also want to identify and follow the patient through from primary care into secondary care. It is linking those datasets through so that we can identify the patients who are most at risk of getting sick who did or did not have antibiotics, who then went through into primary care and then back into secondary care.

I think the two things are improving the diagnostic coding within the primary care datasets—which we have already been discussing, and we have been trying to work through that with all the relevant organisations— and then linking between primary and secondary care, which is coming in many of the centres.

Dr Hopkins: It is only one in three prescriptions at the moment that do not have a diagnostic code for an antibiotic in the primary care research databases, and they are regarded as the GPs who are the gold standard for recording and coding. We have a long way to go to get that as an implicit piece. Until we know what happens to all those patients who are or who are not prescribed antibiotics, equally, then we will not be able to develop better risk stratification tools in the future.

We know again from looking at the research databases that there do not seem to be any differences in how patients are prescribed antibiotics in primary care, whether they have lots of co-morbidities or they do not. Again, that means that the clinician who has that information sitting in front of them is not using that to make the decision. That is the first step.

We then need to use the linkage technologies, where we can link primary care data with secondary care data so that we understand the outcome for these patients. The outcomes we are trying to avoid for patients is that they do not get admitted to hospital and get sicker, but obviously that they can recover. People with many of these infections will need some time off work, whether they are receiving an antibiotic or not, and antibiotics often do not shorten the duration of illness. We are trying to make sure they do not get sicker and require hospital admission.

We need to have good-quality data in the primary care system, better than what is there right now, and then we need systems that can link that so that we can have a life-course event. We are starting to do that in pilots at the moment—but it is not quite routine—to be able to routine that to deliver it back to primary care.

Q145 **Dr Williams:** To increase the quality of data, the clinicians will follow what the computer is asking them to do. If the computer forces somebody to make a link they will make that link, and if it does not then they will not.

Dr Hopkins: Yes.



Q146 **Dr Williams:** Is that all joined up? That is the reassurance that we are looking for. Is somebody working with the suppliers of the software in order to try to get the computer to create the data that you need in order to make the changes?

Dr Hopkins: The answer is yes, we are.

Professor Sharland: Yes, we are.

Dr Hopkins: The NHS Commissioning Board, who are the primary people who deliver this, are very engaged with trying to improve it. One of the drivers in the next five-year strategy is to get the IT systems up to scratch in primary and secondary care, to make sure that they deliver these and allow us to link the data better. We are moving from an individual general practice right down to the patient-level data. That is where we are going to get to in the next five years.

Professor Sharland: If I can add—and I apologise—we did not have NICE comprehensive antibiotic guidance. NICE had certain guidance for particular conditions but not a comprehensive suite, so it is now producing rapid, short, very comprehensive clinical guidance for virtually all the common clinical infection syndromes, both for primary and secondary care. That will then be linked in obviously through the BNF—through the formulary—and that will go into the primary care datasets at the Department.

Q147 **Dr Williams:** Clearly, people need to be able to make real-time decisions.

Dr Hopkins: Yes.

Professor Sharland: Yes.

Q148 **Dr Williams:** It is not rocket science to work out that somebody who is 75, has COPD, diabetes, a fever and green sputum, probably does need antibiotics, but that somebody who is 25, who has no co-morbidities, does not have a fever but has a bit of green sputum, probably does not need antibiotics. That data is all there. It is just a case of organising it to be able to help the person on the ground make the decision.

Professor Sharland: It is. Also, it behoves us to have very clear guidance about when you do and do not prescribe, and we did not have that before. Now, for many of them, with the NICE guidance that is coming through, they not only have guidance on when to prescribe but on when not to prescribe. They are risk-based approaches that we are discussing. If you are of that age, these are your symptoms and you have had them for five days, then, no, you do not need antibiotics.

There is also very good guidance now on symptom relief and what you do for it. You do not just send the patient home empty-handed; you have very clear leaflets. We think the new leaflets are excellent, really clear, very simple one-page leaflets, saying, "This is what you prescribe. This is



what you don't prescribe. This is when you do." Those are now going to be completely comprehensive and will be for primary and secondary care, covering all the most common clinical infection syndromes.

Q149 Dr Williams: My final question is about consistency. There is wide variation between different clinicians. Some of that would be accounted for by the fact that people are serving different populations, but much of it is to do with individual prescriber behaviour. Nobody likes to be an outlier. How good are we at feeding back the data to individuals for them to see and reflect on their prescribing behaviour?

Dr Hopkins: At present, we can feed back general practice level data, so at practice level very well. The reason we can do that is because we know the number of patients seen in that practice are registered with that practice. We do not have data held nationally at the moment and will not have until the GP datasets come online from every GP practice to see how many consultations each GP is doing. Otherwise, you cannot really rank GPs. One GP could be doing one session a week and another 10, so you have nothing with which to compare them. At an individual practice level, they can extract that data quite easily from their system through simple audit level, and look at and compare within practice. Increasingly, clinical commissioning group pharmacists are working with GP practices so that they can feed back in a group way across general practice what each individual prescriber is doing in that general practice.

Q150 Dr Williams: I have always seen my individual data divided within the practice by the number of clinical sessions that I do. It is quite an easy thing to do and it has an influence. It means that you are sitting down with a group of your peers and pointing out the person who is doing all the prescribing, but I do not think that it is happening everywhere.

Dr Hopkins: I do not think it is, and good practice would help that. There have been increased resources put in to have increased pharmacists in general practice and increased pharmacists for clinical commissioning groups who will help GPs do that.

Q151 Chair: Before we move on to the next set of questions, did you follow the evidence that we heard last week from Professor Michael Moore at all? He took a much more pessimistic view of the state of affairs. He was saying that the research is published but it just does not get into practice, and the frustration with how, still, we do not see this properly linked in with IT systems to allow delayed prescribing. He felt that much more effective levers were needed at CCG level. You have talked about commissioning board level, but would you agree with his assessment that the progress that we have seen so far really is not good enough, based on the evidence we already know that is published?

Dr Hopkins: For example, when you think about it, there are two big groups of evidence that Michael Moore and his colleagues have produced, and one is on the delayed prescribing evidence. That is really to the front of the NICE guidance that started coming out earlier this year. Obviously,



to get something from clinical trials to implementation and into guidance that is going to be delivered to every single clinician in the country takes time, but the delayed prescribing is very much sitting at the forefront of the NICE guidance, telling people when and when not to do it.

Q152 **Chair:** He mentioned—and I remember this myself—that it was around the mid-1990s that they first starting publishing on delayed prescribing. This is not new. We are nearly a decade on, and we still do not really have an effective delayed prescribing system.

Dr Hopkins: He was talking about adding the delayed prescribing as a tool into the system.

Chair: Yes, he was.

Dr Hopkins: I think that is something that we would need to discuss with the system suppliers. NHS England are the people who commissioned the system. The system suppliers would need to add in the delayed prescribing piece. We are talking about the idea that that is one component of it. The other components are risk-stratifying the patients over who needs antibiotics and who does not. The delayed prescribing can be done by guidance, which is what NICE have done. They deliver guidance that tells people when they can prescribe and it is safe to delay prescribing to this group of patients.

Q153 **Chair:** It is a very effective way of getting doctors to pause and look at their practice if that can be programmed into their IT systems, and yet we heard about a complete separation between the companies that are producing the IT. It was put to us that this would be a very effective way of taking this forward. Do you agree with his assessment that we need to have much more effective levers at CCG level to make sure that those are in place?

Dr Hopkins: The levers for the IT systems need to be with NHS England because they are the commissioning body for them. They are discussing with the IT systems, as we speak, about how they can better implement new tools into those systems.

Chair: Right.

Dr Hopkins: So that is happening.

Q154 **Chair:** You feel that is—

Dr Hopkins: It is happening. It obviously could happen faster, but it is happening.

Chair: Thank you. I think we have probably reached the end of that.

Q155 **Andrew Selous:** I want to look at the issue of public awareness, particularly the aspects of whether what we are doing is effective and whether it is value for money. We heard evidence from the British Medical Association, who told us that they think there is little evidence as



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to whether the public awareness campaigns are successful in achieving their aim. Indeed, Professor Moore also said he thought the evidence was mixed, and he made the comment that you can spend a lot of money on public awareness and not achieve much. What is your response to those concerns from both the BMA and Professor Moore?

Dr Hopkins: Public Health England has run two campaigns: one as a pilot in the north-west and one nationally last year—the so-called “dancing pills” campaign on TV. That campaign was run to increase public knowledge and awareness, so that, when GPs say that a person does not need an antibiotic, they are supported in making that decision. The evidence from their pre and post-campaign tracking shows that there was a 5% increase in the number of people who recognised when they did not need antibiotics—that they had learned something.

Q156 **Andrew Selous:** Did you say 5%?

Dr Hopkins: A 5% increase.

Q157 **Andrew Selous:** Is that not quite small?

Dr Hopkins: It is quite small. It went from 73% to 78%, so there was quite a large understanding already, but 93% of GPs supported the campaign and said they felt supported in the decision not to prescribe because of the campaign, compared with, I think, about 75% before the campaign started. So, GPs felt supported.

Public Health England’s role in the “Keep Antibiotics Working” campaign is really to try to support the system into reducing prescribing. It is not there to reduce prescribing, because, at the end of the day, prescribing is done by prescribers—doctors, pharmacists and nurses. It is there to help them feel supported when people come to ask for an antibiotic. Alongside the campaign, it resonated through all the other materials that we ran. We had prescription pads that we used so that the GPs could give out a non-prescription—a prescription for care rather than antibiotics—that had the same dancing pills on it so that it was recognisable throughout.

We also have run a campaign for the last four years called “Antibiotic Guardian”, which is about engaging with the professionals so that they can pledge about individual actions; they change their behaviour in what they are going to do.

Alongside that, there are other campaigns, such as “Stay Well This Winter”, which is really a broader health-based campaign, understanding that you can go to your pharmacy to seek health advice, understanding that you do not always need an antibiotic, and, importantly, that if you are in one of those groups who need the flu vaccination you take up the opportunity.

All those sit hand in hand. Running one of them about antibiotics alone would not work unless you were doing all the other components as well, which is understanding and letting people know where they can seek



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advice and making sure that we get vaccination to the forefront of everyone's minds, because vaccination is key to preventing infections.

Q158 **Andrew Selous:** In the countries that are doing better than the UK in prescribing less—you have already mentioned the Netherlands—is greater public awareness of this issue part of the reason why they are doing better?

Dr Hopkins: The Netherlands ran a long campaign for about five years in a row a number of years ago now. Their prescribing reduced at the same time.

Q159 **Andrew Selous:** Did it decrease by more than 5% or was there a greater public awareness—more than 5%?

Dr Hopkins: They did not do any tracking of people. We have done tracking of people before and after the campaign. They just looked at their total prescribing. Obviously, our total prescribing before the campaign and after the campaign reduced by 5% as well, but that is maybe because it was part of the whole package. Separating out what is the marketing campaign from what we are doing to the prescribers and the levers that are there is very difficult. The fact is that the campaign is there to support the prescribers and to help inform the public about antibiotic resistance and when they need antibiotics.

Professor Sharland: The difficulty—the sort of scientific component—is trying to tease this out. Obviously, many countries are introducing campaigns, but they also have many levers at the same time, such as professional education and a whole range of different quality indicators, and they are often when people run a professional campaign at the same time. Scientifically, it has been very difficult internationally to try to tease out not only the impact of individual campaigns to professionals and to the public, but what is the most effective campaign methodology to do that. There is no consensus internationally at the moment, but the campaigns that we are doing in this country have been evaluated, similar to Dame Sally's letter that was sent out to those with high prescribing, and those are at least being peer-reviewed and published.

Q160 **Andrew Selous:** I want to move on to the issue of diagnostics and the O'Neill review—and we heard from Lord O'Neill last week—emphasising the importance of diagnostic testing. We also heard from Professor Dame Sally Davies and Professor Moore suggesting that algorithms could be just as useful as diagnostic tests. What is your reaction to those two slightly differing emphases on the importance of diagnostics?

Dr Hopkins: If we had a diagnostic that was going to tell us whether we needed an antibiotic or not, then we would introduce it. We do not have the holy grail of diagnostics as it stands right now. What we still need is the clinician to know what syndrome they are dealing with and maybe the diagnostic would help them. In many scenarios—a sore throat is a really good example—there is a diagnostic test for a sore throat, but equally there is a diagnostic tool or algorithm that is just as good as the



diagnostic test. So, rather than paying 10 quid for the diagnostic test, you can either apply a tick-box tool on your system, or on a piece of paper, and decide who you need to give the antibiotic to.

Q161 **Andrew Selous:** It is a combination of the two that we need, is it?

Dr Hopkins: You do not need the combination of the two. The trials that Michael Moore was involved in showed that the diagnostic tool was just as good as the diagnostic test. Therefore, you are paying money for a diagnostic test when the diagnostic tool is asking a patient some simple questions, and examining the patient, to tell you whether you need to give them an antibiotic or not, or who is at most risk.

From the point of view of other diagnostics, we do not have a diagnostic that tells us that this patient has a bacterial infection and needs treatment, because not all bacterial infections need treatment. Some of them, as you will have heard from Dr Paul Williams earlier, can get better by themselves. It is really about the individual as well.

In hospitals, we tend to do diagnostic tests because the patient is sicker, and we have looked at whether doing those tests faster will make a difference. Despite many faster methodologies coming out, we have not shown that they make a difference clinically to the patient, that is, that the patient gets to stay in hospital for shorter lengths of time or that the outcome from antibiotics is any different. We are still awaiting that diagnostic test, and I have no doubt that, when a diagnostic test comes along that is good enough that will do that, we will have to introduce it because it will make all the difference, but we are not there yet.

Q162 **Andrew Selous:** The other issue around diagnostics that was flagged up to us was the financial incentive aspect of this in that GPs are expected to pay for the tests themselves, whereas antibiotics are funded at the CCG level. Obviously, that is a big issue involving the structures of the NHS and some fairly historical architecture, which some of us might like to change, but, as the Chair said at the introduction of this session, this is an urgent, really important issue. How are we going to punch through those contradicting financial incentives?

Professor Sharland: It is actually even more fundamental than that. The difficulty is that most antibiotic courses cost £1. For penicillin and amoxicillin it is £1 for the course of antibiotics, whereas the cheapest diagnostics that you are going to have—CRP or a sort of rapid throat swab—are going to be more in the order of £10. So, it is a complete order of magnitude difference. There is a real issue about how you break through the health economics of prescribing and not prescribing.

Q163 **Andrew Selous:** With the 10-year plan and more money coming towards the NHS, are you putting in a bid for prioritisation for the use of some of that extra cash to go on some of these diagnostics?

Professor Sharland: Diagnostics are like many other technology-based platforms in that costs come down over a period of time. One of the other



areas, which I mentioned, is that with Dame Sally I co-chair the Longitude Prize. We see a lot of applications associated with that. Diagnostics companies are beginning to reduce costs over a period of time. Many diagnostics, in terms of identifying the bug, are finding the virus that causes it, whether it is influenza or another type of viral infection.

The difficulty is that that does not necessarily give complete confidence to the prescriber that they do not need antibiotics. Do they have a virus and another nasty bacterial infection as well? There are other diagnostics that try to determine or tell you by your body's chemicals whether it looks like you have a viral or bacterial infection. In the future, an ideal diagnostic will have all those things together. It will tell you that you have a virus; all your body's chemicals are telling you that, actually, you do not; it looks like you have a virus. That is great, and as that becomes available—it has to be very quick, obviously, for a primary care setting, and it has to be very affordable—that is the time that the diagnostic piece is going to take real steps forward, but we are not quite there yet.

Q164 Derek Thomas: We heard last week from Dame Sally Davies how severe the problem will become if we do not get on top of it. Today, do we currently know how many people succumb to or die because of AMR? For example, when someone dies, is it recorded and collated somewhere that they died of an infection that was resistant to treatment?

Dr Hopkins: That is really difficult. The commonest reasons that go on death certificates are the primary reason that the patient died, and those are things like cancer, Alzheimer's, which is one of the commonest reasons that people die, and heart disease. Underlying that may have been the fact that they came into hospital with an infection that was a bit more resistant, which made their heart disease worse or made something else worse. If the reason they came in and died was an infection, and that was the only reason, then it would get recorded on the death certificate.

By and large, if it is a secondary infection because of some other primary illness, it is not recorded very well on the death certificate and never has been. What we see quite well is records on the death certificates for TB—tuberculosis—and things such as measles, if it happened, would be well recorded on the death certificate, but much less for secondary bacterial infections, and antibiotic resistance even less so.

We tend instead to look and link, coming back to this data linkage. At Public Health England, with the assurance and into a safe haven of looking at data very carefully, we look at patients and then follow people up to see if they have died within 30 days. That is the standard global method of saying, "What is the 30-day all-cause mortality from different types of infections?" We measure those for a range of bloodstream infections, which is the more severe end—if people are going to die, they are most likely going to die from that—rather than measuring it from individuals who may come in with a kidney infection and so on. Then we



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have a global measure that we can look at both in this country and around the world.

Death certification will always be difficult, and I do not think it will be the answer in this case to get antibiotic resistance on the death certificate, because it will not be the primary reason that they have died but likely to be the secondary reason.

Q165 **Derek Thomas:** Is there a need for, and are there gaps in, the surveillance of the AMR incidences, to feed the debate and get things moving? Can we measure it, and where are the gaps?

Dr Hopkins: There are always gaps, because we have different areas of surveillance that are different priorities at different times. We measure our deaths, mortality, from major bloodstream infections in this country at 30 days—E. coli, MRSA, Klebsiella, pseudomonas and C. Diff infection—and we publish those 30-day mortality figures annually for the country. We see that the mortality from this range of serious infections is quite stable, but the more infections you have, the more people die. We are seeing more gram-negative infections at the moment, and we know that gram-negative infections particularly are a group in which resistance is rising, so those are the groups of patients that we see the most deaths from right now.

Professor Sharland: I agree entirely. It is a really complicated area. You can actually have a very serious infection; you can grow a bug from the bloodstream; you can be on completely the wrong antibiotic and you get better. You have an immune system. Therefore, this concept of attributable mortality, trying to identify what proportion is related to the fact that you were on the wrong antibiotic, is very complicated. It is also quite complicated, because often your test results might come back, you start off on a particular combination of antibiotics, a few days later that is changed in hospital, and people will put you on a different antibiotic. Therefore, trying to work out which part of that piece it is is also very complex.

The system is developing with electronic prescribing in more and more hospitals, and particularly in serious illness we have more electronic prescribing data. We are trying to work out what proportion of this is your underlying disease, your underlying medical problems, what proportion is related to the fact you were on, if you like, the “wrong” antibiotic, and now with other tests and more rapid laboratory tests getting patients on the “right” antibiotic as fast as possible and bringing down that adverse-outcomes part as much as we possibly can. That is where it is going to go in the future, which is all targeting.

Dr Hopkins: Measuring 30-day all-cause mortality consistently over time will tell us if we are making improvements in all of those different components.

Professor Sharland: Exactly.



Q166 **Derek Thomas:** Do you think within the Department of Health and Social Care this issue is given a significant enough priority?

Dr Hopkins: I think it is given a lot of priority. Dame Sally has really championed the issue. There has been a lot of discussion and a lot of momentum behind the AMR strategy. I think funding could always be greater across all the areas. There are many different disease areas that are equally demanding of attention and funding, so the money has to be shared out. Obviously, antimicrobial resistance is a future threat, particularly for this country, compared with a serious threat right now. I think we have given it substantially more funding in the last five years than we did before that, but we will need to continue with at least that, if not more, funding if we are to tackle the problem in the future.

Q167 **Derek Thomas:** Is it clear where that money should be directed? If you are as successful as Andrew is hoping your campaign will be, where is that money going to go to really crack this nut?

Dr Hopkins: You cannot put all your eggs in one basket. You are going to have to spread your money. You are going to have put your money into understanding the problem, which is the surveillance component. You are going to have to put your money into implementing solutions, which is thinking about the IT systems and making sure they are right. You are going to have to put money into the levers to reduce prescribing, so making sure that we have the right workforce out there, the right technology and that we get people talking about it in the system. You are going to have to make sure people are aware of the problem, because if the public are not talking about it no one else is going to talk about it either. We are going to have to ensure that we have enough research for new antibiotics and new diagnostics, so that will help us in the next five to 10 years. If we just do one thing and miss the rest, we will not actually do enough.

Professor Sharland: I entirely agree. The other large piece, of course, is infection prevention and control. That is a very serious component, which is to try to reduce the burden of infection, particularly focusing on hospital-acquired infection with an absolute gimlet eye on patient safety, and trying to reduce any aspect of hospital-acquired infection as far as possible. How that can come down to the minimum that we can achieve is a critical part of this.

Derek Thomas: Thank you very much.

Chair: Ben has a follow-up question.

Q168 **Mr Bradshaw:** We picked up a concern from last week's panel that, whereas under the previous Prime Minister, David Cameron, this was a major prime ministerial priority that was being driven from the top, that has disappeared; it has vanished. Are you feeling that yet on the coalface, as it were?



Dr Hopkins: I cannot say that it is obvious from where we sit at the front end. Our relationships with the Department of Health and Social Care and NHS England have built and got better over the last five years.

Professor Sharland: To some extent, what we are really focusing on now is the extremely challenging ambitions we have to deliver, which are halving inappropriate prescribing and then halving the hospital-acquired gram-negative bloodstream infections. These are the most ambitious ambitions of any Government anywhere in the world to tackle AMR.

Q169 **Mr Bradshaw:** But they are the legacy of the last Prime Minister.

Professor Sharland: You have to implement them. I suppose the focus now, rather than developing the ambition, is implementation. A lot of the work that is going on at the moment—and there is an enormous amount of work going on through NHSE and NHSI, PHE, NICE and all the other bodies—is trying to take the very impressive ambitions but also implementing those. There is an enormous amount of work going on at the coalface to do that at the moment. I suppose that is a slightly lower pay grade, if you like, but the bit we are trying to get on now is to work out how we implement them and how we try to turn round gram-negative bloodstream infection, get prescribing down, bring in all those things, and how we do that in the NHS on a day-to-day level.

Chair: Thank you. Are there any more questions from the Committee for the panel? Thank you both very much for coming this afternoon.

Examination of witnesses

Witnesses: Professor Peter Borriello, Steve Brine MP and Dr Susan Hopkins.

Q170 **Chair:** Welcome to our second panel and thank you for joining us for this session as well, Dr Susan Hopkins. For those who have just joined us, could you introduce yourselves to those following from outside the room, starting with you, Minister?

Steve Brine: I am Steve Brine, the Minister for public health at the Department of Health and Social Care.

Professor Borriello: I am Professor Borriello, chief executive, veterinary medicines directorate, an Executive agency of DEFRA, and senior responsible officer for AMR across DEFRA.

Chair: Thank you very much. Starting the questioning with this panel, we have Diana Johnson.

Q171 **Diana Johnson:** Minister, this is a question for you about how the work of AMR is currently co-ordinated across Government. Can you explain that to us?

Steve Brine: Hello. Thank you for asking us. It is good that you are doing this. The co-ordination is simple. The chief medical officer through, obviously, the Department of Health and Social Care, owns the strategy.



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The chief medical officer works with us but sits independent of us. She chairs the cross-Government group that has the oversight of the implementation of the current AMR strategy, and that group is developing the next one. The group has representations on it from the relevant Government Departments.

Q172 **Diana Johnson:** Which are?

Steve Brine: The Department of Health and Social Care, DEFRA and the Cabinet Office. There may be others.

Q173 **Diana Johnson:** Not business?

Steve Brine: The Department of BEIS, yes. There may be others that you may wish as a Committee to recommend should be in that. That would be very interesting. That has representation on it from all the Government Departments and the agencies. My understanding from information given to me is that they are fully engaged in the development of the next strategy, and discussion on securing the resource needed to take that new strategy forward is still under way.

There is obviously plenty more that we can always do to raise the profile of AMR across the Government. The CMO has said I think to you, and she has certainly said to me, that there should be a grand challenge for the UK. I would support that view; we certainly would in the Department, and we would encourage that view within Government. That, of course, is the co-ordination. I know from your evidence session last week that you are interested in political leadership, Diana.

Q174 **Diana Johnson:** That is my second question. If you want to tell me who leads politically on this in the Government, please do.

Steve Brine: Sally said that you were interested in that, and rightly you should be. Ultimately, the Prime Minister leads on it. The Secretary of State is her Secretary of State. I am one of her Ministers; we are all her Ministers, and, ultimately, she leads on everything. She would not want us to be refreshing the AMR strategy if she did not. She would not want to be putting the sort of significant investment that we are putting into it if she did not. That is where I would say the leadership comes from.

Q175 **Diana Johnson:** You talked about the officials who meet. Is there a political sub-committee that meets to bring together the political leads from all the different Departments? Out of the health Ministers, who is leading on this? This is your lead, is it, in the Department?

Steve Brine: It is public health, yes. If there is an intergovernmental ministerial committee, then—

Q176 **Diana Johnson:** And is there one?

Steve Brine: —I have not yet found it.

Q177 **Diana Johnson:** Do you think there should be one?



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Steve Brine: I am not desperate for more meetings and more committees, but if you put it as a recommendation in your report, and I am convinced that there is a benefit to us of doing that—that it is going to add to what the CMO is already doing in her cross-Government co-ordination—I would certainly look at that, yes.

Q178 **Diana Johnson:** I am trying to get a handle on this. We have talked a lot about the chief medical officer. You have said the Prime Minister is ultimately responsible, as she is for everything that goes on in her Government.

Steve Brine: Of course.

Q179 **Diana Johnson:** What we heard in the evidence last week from Lord O'Neill was that David Cameron had taken a particular interest in this and had really led from the front. Can you explain to me what exactly the current Prime Minister is doing to show that she is leading from the front on this?

Steve Brine: I have spoken to Lord O'Neill about that myself. He said it was one of the top five priorities. It was David Cameron and George Osborne who commissioned Lord O'Neill to do this piece of work, so, yes, by virtue of that, it is just a fact and not an opinion. That is obviously right.

Q180 **Diana Johnson:** My question is: what is the current Prime Minister doing?

Steve Brine: I also heard him say, "I have not heard the current Prime Minister lead on this, let alone mention it." I would suggest that maybe then we need to send him the diptels of our foreign work. The UK is and continues to be a world leader on AMR.

Q181 **Diana Johnson:** I am sorry, but what is the Prime Minister doing, Minister? That is the question.

Steve Brine: The Prime Minister herself has raised the issue of AMR in a number of international forums, including the G20 leaders' summit in Germany last year.

Q182 **Diana Johnson:** Okay, so that is one example.

Steve Brine: As you know, there are lots of things that the Prime Minister has on her plate right now that she could raise in a world forum.

Q183 **Diana Johnson:** I am not being difficult, Minister. I just want to understand politically who in this Government is dealing with, focusing on or making sure about the work that needs to go on. We have just heard about these really ambitious targets that we are aiming for. Who is driving that politically and holding the officials to account? That is what I am not following from what you are saying to me.

Steve Brine: I do not know how much clearer to put it, Ms Johnson. Ultimately, it is the Prime Minister, but the Secretary of State for Health



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and Social Care and me as the public health Minister are the Ministers who are responsible on a day-to-day level for holding the officials to account and for asking questions of the CMO, which we do regularly on this question.

Q184 **Diana Johnson:** Okay. I don't think I am going to get any further. How many times have you met to discuss this with the chief medical officer?

Steve Brine: I meet the chief medical officer regularly on lots of different issues and—

Q185 **Diana Johnson:** What about on this issue?

Steve Brine: Specifically on this issue where the meeting has been titled AMR, it has been a handful of times, but on regular occasions, when I see the CMO, this is a subject that we discuss, because there is always something going on in this field. Obviously, your inquiry has been something that we have talked about a lot in recent weeks, but we regularly—regularly—talk about AMR.

Q186 **Diana Johnson:** How often have you discussed this with the responsible DEFRA Minister?

Steve Brine: I have discussed this with Michael Gove, the Secretary of State, and with the farming Minister.

Q187 **Diana Johnson:** How many times?

Steve Brine: A handful of times.

Q188 **Diana Johnson:** A handful of times.

Steve Brine: Yes.

Q189 **Diana Johnson:** What do you think could be done to improve the situation? It seems to me that there is a lack of political co-ordination. What more could be done, do you think, to improve it?

Steve Brine: I would say what I said to you. I do not think that there is a lack of co-ordination. The chief medical officer is very well respected internationally and domestically. She chairs the cross-Government group. She does that with great competence, and you had evidence from her last week and saw that. That is the group that has oversight for implementation of the strategy and the preparation of the next strategy. Obviously, conversations around that are ongoing, but I think that is done very well.

Q190 **Diana Johnson:** Okay. I am just looking again at the exchange I had with Dame Sally when I asked, "Who is the political lead on this?" She said, "I think you are going to have to ask the Ministers."

Steve Brine: She said, "Ask the Ministers"—and you have.

Q191 **Diana Johnson:** Let us move on. Will tackling AMR be a central element of the NHS 10-year plan?



Steve Brine: Yes. What you will see in the refresh will be a 20-year UK vision for antimicrobial resistance, together with five-year UK national action plans. The vision will set out the role of the different sectors in supporting delivery of the vision. Of course, no plan that we prepare through the co-ordination group, through the CMO, would be produced in isolation and outside of NHS England, who are the ones producing the plan for us. So, yes, absolutely, the refresh strategy will set out the case to go further on AMR, and identify the specific actions and interventions that are needed to meet the objective that we will have. Our ability to go further and the pace at which we can do that will of course depend on the extent to which we can secure the appropriate resources through the spending review, and those conversations are ongoing.

We are working very closely with NHS England to ensure that the commitments in the refresh of the plan are suitably reflected in the long-term plan. Currently, that is being done via the prevention workstream. The new Secretary of State has talked about his three priorities, and one of those is music to my ears, which is prevention. I am going from here to a meeting with him about that. We see the AMR strategy sitting very much in the prevention work strand.

To give you an example of that, I am responsible for the flu vaccination programme, working with Public Health England. If we can do better on that—if we can do better on the “Catch it. Bin it. Kill it” campaign that PHE did successfully last winter—people do not contract flu and do not contract the other viruses and conditions that then might need antimicrobials. We see the new strategy as sitting within the prevention strand.

Q192 **Diana Johnson:** What are you lobbying for in terms of your priorities of how any additional funding should be spent and where it should be directed? You have talked about prevention. Is that your top priority?

Steve Brine: As ever with this issue, it is incredibly wide. As we are looking at the priorities for the next strategy, I would suggest that it has to be preventing infections from occurring in the first place. That is absolutely essential, and you have heard that in evidence already. We have had some success in reducing antimicrobial prescribing, but to be among the best in the world, in terms of our use, we have to improve the data coding—I heard a bit of the last session and know that was talked about—and the electronic system, so that we can understand exactly why AMBs are prescribed and target our improvements.

We need to do research on the impact on the environment of AMR so that we know where to target our surveillance. Infection prevention and control has to be crucial in tackling AMR. Good hand hygiene, for instance, is recognised as one of the most important measures to do that. I would say that the prevention strand of it is critical, obviously.

Q193 **Diana Johnson:** That is your top priority.



Steve Brine: Well, yes, and following through on many of the things that were in the O'Neill report, on which we have still to make sufficient progress.

Q194 **Diana Johnson:** I really just want to be clear what you, as a Minister with responsibility in the Department, see as your key priorities as to where any additional funding should be directed.

Steve Brine: Probably at the front end. You had a good discussion in the last session, didn't you, around primary care, where 75% of antimicrobials are prescribed; about being clearer where they are prescribed; the good use of IT, and I heard the exchanges around that—better use of IT—and the systems are coming in that respect? I think we also have to understand that, when it comes to prescribing, when it is obvious what antibiotics are needed, it is very obvious; when it is less so, it is less so, to be honest. The estimation is that about 20% of antibiotics are inappropriate prescribing. We need to get better on that. The only way that we can do that is, as I say, improving the data coding to make sure that we are better.

There is the prevention strand, there is the front end around primary care, and there is the research to make sure that we are working from the most important data. Then there is the whole issue around market entry and bringing new drugs to market, which is an international focus. It is not something that we can achieve on our own. If you want three pillars, those are probably my three pillars.

Q195 **Diana Johnson:** Could I ask one last question? In terms of prevention, one question I asked Dame Sally last week was about the cuts to public health budgets, particularly around sexual health services. Dame Sally said that she thought that the cuts in that particular area had gone too far. What do you think about that?

Steve Brine: I did read that. I would say that I think we have a strong record in public health on STIs and the number of infections continue to fall. But some sexual health services and tests are now much more widely available online, so the system is changing and the public's demand on the system is changing. There were some 11,000 diagnoses from online tests reported last year. We are giving £16 billion to local authorities for public health services over the current spending period. We have exchanged on this in the House before. I think they are best placed to understand and meet the public health needs of the local communities.

Q196 **Diana Johnson:** Does it worry you, though, that resistance to antibiotics is developing for gonorrhoea? Is that something you are concerned about, Minister?

Steve Brine: Of course I am concerned about any resistance to medication. I heard the quote from the Chair at the very start of your session today about the threat it is to medicine. Of course, I am concerned about any rise in that, but I do not think we are underinvesting. We are putting £16 billion, as I said, into local



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authorities' public health budgets, but it would be wrong of me to deny that, in the conversations that I am having with the new Secretary of State around prevention and that being a key part or a key interest that he has, I am making a very strong case as we move towards the spending review and as we draw up the 10-year plan around prevention.

Of course, I am concerned about any rise in incidents through sexual health services. I take that bit of my portfolio very seriously. I have been on a handful of visits where I have seen, at first hand, what goes on out there, and I take it very seriously. You are right to raise it with her and with me.

Diana Johnson: Thank you.

Chair: Derek has a follow-up point as well.

Q197 **Derek Thomas:** It is very brief. Minister, there was a suggestion at our session last week that, because of the severe nature of the issue that Diana has raised, maybe it should be brought into the NHS.

Steve Brine: Of what, I am sorry—diagnosis rates?

Q198 **Derek Thomas:** Sexual health. Do you have a view on that?

Steve Brine: I have only been in Parliament for eight years and I have only been a Minister for 15, but I have probably been here long enough now to have heard people say—

Q199 **Chair:** How long did you say you had been a Minister for?

Steve Brine: It is 15 months.

Q200 **Chair:** You may have said 15 years.

Steve Brine: Did I say 15 years? Hansard, correct the record.

Q201 **Chair:** So it is 15 months.

Steve Brine: It is 15 months. The serious point is that I have already been here long enough to have heard the circular argument that it was better in the old days. I do not meet many people out there in the public health world who tell me that it was all a rose-filled garden when the NHS ran public health services. Every local authority in this country is a public health authority. That was a decision made by this Parliament in 2013 when it passed the Health and Social Care Act, so I do think local authorities are best placed to make those decisions.

We have a ring-fenced public health grant at the moment. Our challenge is to make sure that they are encouraged, and some would say mandated, to spend that not just in the general pot, which is why, for instance, I have not pressed or ploughed on regardless ahead with 100% business rate retention, for instance, because that is one of the levers that I have around public health spending out there through the local authorities. Such is our system of healthcare in this country that it does



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not all sit on my desk. I am not responsible for DCLG, but there are things that I can and will do to encourage and make sure that that spend continues, because it is part of prevention, which is my bailiwick.

Q202 **Chair:** Presumably, Minister, though you have heard the concerns expressed across the sexual health community about the fragmentation of sexual health services.

Steve Brine: Yes. I have heard that concern. That has been brought to me out there in the field and by the LGA.

Q203 **Chair:** This Committee will be holding a separate inquiry on that and we look forward to welcoming you back on that one.

Steve Brine: We have just submitted our written evidence to you on that.

Q204 **Chair:** Before we move on to the next section, in the 15 months that you have been a Minister holding this brief, have you had any inter-ministerial meetings with your opposite number in DEFRA, in DFID and with the Prime Minister specifically on this issue, which has been flagged up to us by the chief medical officer as being a key threat?

Steve Brine: Not official, no.

Q205 **Chair:** You have not had any official meetings.

Steve Brine: I have had plenty of conversations.

Q206 **Chair:** It is also telling that the DEFRA Minister has not chosen to come to this Committee today, despite being invited. Do you think it is right, and people are expressing this concern, that this issue is going off the boil—that people are not paying the same attention to it that has been paid to it in the past? Would that be a fair assessment?

Steve Brine: No, because, if it was, we would not be putting in the amount of work and resource that we are putting into the refresh strategy.

Q207 **Chair:** You would reject that concern that has been raised directly with us—that this seems to have been deprioritised.

Steve Brine: Yes, I would in general terms. Those of you around the table who have served in Government will know that you do not often meet officials who demand less ministerial time. There may be some who demand less ministerial time with specific Ministers—maybe that is what they say behind my back—but those who have been in Government know that officials often want more ministerial time.

Q208 **Chair:** But this is a key national threat.

Steve Brine: I think what perhaps has come through to you in evidence last week is that they want more ministerial time on that. There are lots of balls in the air for Ministers, but it does not mean that we cannot do



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more than one thing at once, and we are writing a very ambitious refresh strategy with our colleagues in DEFRA and Government.

Q209 **Chair:** It is very disappointing that we were told that the Minister for DEFRA could not be here because of the Ivory Bill. In fact, the Ivory Bill is not before the House today, and yet we do not have a DEFRA Minister. I think that is rather unfortunate. That would be an indication of a lack of interest in this opportunity to have parliamentary scrutiny of DEFRA's role, which is really key to this, and there have been no meetings between Ministers to discuss something that has been identified by the chief medical officer as a key national threat. Is that something on which you will assure this Committee that you will now go and provide some leadership?

Steve Brine: I will look at the idea of the inter-ministerial committee that Ms Johnson mentioned and whether there is a need for that. I will discuss that with the chief medical officer, yes.

Q210 **Chair:** Clearly, the Prime Minister has now taken personal leadership of Brexit and it has been put to us that Brexit is consuming all the bandwidth in Government. Somebody has to hold key responsibility for this issue. If the Prime Minister is not able to do it, is that something that you see yourself as wanting to provide?

Steve Brine: Along with all the other things in my portfolio, yes, Chair.

Q211 **Dr Williams:** Steve Brine, we are going to move on to prescribing. You have already said and acknowledged that we have had a small but significant and welcome reduction in prescribing, but in the first evidence session we said that the prescription of antibiotics in some other European countries is only half of what we prescribe. You have said that about 20% of prescriptions are inappropriate. That is quite a strong word. There must be more than that that are perhaps unnecessary, if not inappropriate.

Steve Brine: Maybe, but the 20% is just an estimation.

Q212 **Dr Williams:** Are we being ambitious enough in our targeting here? We have 75% of all human antibiotics prescribed in primary care. Should we be looking for a 50% reduction over the next 10 years?

Steve Brine: I think we were quite ambitious actually in the first strategy, and I think we will be ambitious in the second strategy. We have to understand, don't we—and you know far more about this than me from a clinical perspective, Dr Williams; you are the GP and so is the Chair—that there are times when antibiotics are required?

I am well aware that one of the O'Neill recommendations was about the across-the-board use of diagnostics, for instance. We do not really agree with that as a carte blanche policy, because there are many examples where experienced GPs, such as you, know exactly what needs to be



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done. There are many examples where the computer systems can help GPs to know what needs to be done.

You heard in the last session, and I did hear a little of that online before I came over, that there is lots of work going on at the moment and investment by NHS England, who are the commissioners of this thing, to work with major suppliers so that we can develop the antimicrobial stewardship module working within general practice. So, in answer to your question, I do not think that we are unambitious in the target, but the 20% is an estimation.

Q213 Dr Williams: Can you tell us a bit more about the work that is being done with these computer suppliers, because it is true, is it not, that in the past they have been reluctant to make changes in order to be able to adapt the way that the computer is helping clinicians?

Steve Brine: The NHS is famously brilliant at sharing best practice but not so good at implementing best practice. We have to remember that GPs and other GP practices are independent contractors; they are independent businesses.

I know that Professor Moore in his evidence to you talked about the difficulties in changing GP electronic systems so that they support antimicrobial stewardship. We obviously recognise the limitations of GP systems and the improvements that need to be made in the coding consultations for infections, for instance, so that we can audit at a GP level. There will be actions included in the next strategy, without question, to address this. I know that one major supplier is talking to NHS England at the moment about developing an antimicrobial stewardship model. I can provide the Committee with more information on that in writing if you want. I think that is really important.

Q214 Dr Williams: We all know, for example, about delayed prescribing, and Professor Moore talked to us about it. There is a lot of evidence around delayed prescribing, and, as the Chair said, there has been evidence around for 20 years about this, but if I wanted to prescribe you a delayed prescription at the moment I would have to go through four or five different steps on the computer of changing the date and verifying that. There is not just a button that I can press that says, "Delay prescribing."

Steve Brine: Yes, "Delay prescribing," and then it provides you with a set of information that the patient can take away.

Q215 Dr Williams: Or that prints out a delayed prescription, although we no longer print out prescriptions; most prescriptions are sent electronically. There is not just a button; it is a fuff. There are many people within the NHS who know what needs to be done, but the barrier is the provider of the GP software. It always comes back to the fact, "Well, NHS England commissioned that." Who is making this link to make sure that the commissioning of the software does what it needs to do so that it is the clinicians who are leading the computer rather than the computer leading



the clinicians?

Steve Brine: I completely agree. I am not saying it is perfect; I know it is not. You obviously know it is not. I think you still practise, and you probably see that on a weekly basis when you are in. I know that that is a work in progress, and I have told you that the ambition will be in the refresh strategy around that.

I know you talked about public awareness campaigns. This was obviously something that Lord O'Neill originally talked about, and it was in our strategy. I would say the next phase of the strategy, when it comes to prescribing, needs to do much more work on the relationship between doctor and patient so that that conversation is had more intelligently between doctor and patient around when antibiotics are or are not needed. Perhaps the public have got themselves into a place where that is what they expect because they want to get something when they go into the GP surgery. Instead of just advice, they want to get something tangible that they can take physically or electronically.

We are working with Public Health England, so it is impossible at the moment to know at a prescriber level around prescribing antimicrobials, but we do know it at the practice level. Last year the CMO wrote to practices and told them, "You are among the 20% highest prescribers of antibiotics nationally."

That level of support and ability to drill down to practice level is absolutely there, and I want to see more of that in the refresh strategy. I want to see more of my colleagues in PHE, and through the CMO as the figurehead of it, working with those practices that are struggling in that regard. There is no point in us just pointing the finger and saying, "You're terrible." We have got to support them to make better decisions.

Q216 **Dr Williams:** Would you agree that, even though it is never an excuse for poor prescribing behaviour, it is sometimes an explanation that practices are busy dealing with demand, and the time taken to have a conversation with somebody about why an antibiotic should not be prescribed is much greater than the time needed to prescribe? Would you acknowledge that the workload volumes are at least an explanation for some of the difficulty in reducing prescribing?

Steve Brine: I cannot say that with any certainty. Yes, there are, clearly, workload pressures in primary care, but ultimately this is a patient safety issue, isn't it? They need to be mindful of that, and they are mindful of that, but I think it is about supporting them.

Let us also just note on the record that the quality premium has been effective in reducing prescribing in primary care, and we are talking to NHS England at the moment through the long-term plan and the refresh strategy as to what is the future of the quality premium. That seems to have been a success to me, so it is something that I would want to protect.



Chair: Thank you.

Q217 **Andrew Selous:** Thank you. Minister, can I ask you what your assessment is of the state of the market for antibiotic innovation and research?

Steve Brine: This was one of the key recommendations from Jim O'Neill's work. During the life of the current strategy we have seen unprecedented levels of research, investment and collaboration in the UK, and the next strategy will set out how we translate that research into frontline interventions.

While I would say that we as the Government broadly agree with Lord O'Neill that a market-entry reward system was an option to stimulate investment in new drugs, there is no point in pretending that this is anything other than an extremely complex area. The work to pilot a new reimbursement model is world leading, but the most complex part of that work is the need to establish a value for products included in a pilot. Obviously, we need to ensure that the NHS, publicly funded as it is, gets the best value from its drug budget, but, importantly, we need to take the rest of the world with us. The UK represents only about 3% of the global market, and we will not stimulate new drug development on our own. Our challenge is convincing other Governments through the G20.

I will be in Argentina next month—sadly, during the Conservative conference—and the CMO will be leading a workshop with all of the countries at the G20. Our challenge is to work with those other Governments to convince them of our world-leading work and that this should be done. The truth, Mr Selous, is that this has not been an easy sell. There is no point hiding from that.

Q218 **Andrew Selous:** Can I stop you there, because I am surprised that your assessment is not a little more sober? What we learned last week from Jim O'Neill is that things have got worse since his review in that no new major pharmaceutical company has entered the market, and indeed since his review finished more have left than have got involved. We seem to be going backwards in terms of pharmaceutical companies that are involved within this area.

What we do not understand as a Committee is why the Government have not committed to the trialling of market-entry rewards, given that it was not only Jim O'Neill's report that recommended it. He told us last week that all the other academic-based research is basically supporting the same idea or a close cousin of it. Given that the situation has got worse since his review and that companies are exiting this business rather than coming into it, why have you not picked up his major recommendation, which is so widely shared by the other academic research?

Steve Brine: Partly, I am a glass-three-quarters-full person, but I have just said to you, Mr Selous, that we are committed to pilot the new reimbursement model.



Q219 **Andrew Selous:** When is that going to happen?

Steve Brine: That does have the potential to incentivise companies to invest, but, as I have said, this is not a UK-sum game. We need other countries to follow our lead. Lord O'Neill was talking about how many billions would be needed and the UK could not fund this alone. As I have said, the 3% figure is a pretty sobering figure, isn't it? We are committed to the new reimbursement model. We are in the current strategy, and we will be in the next, but if this was an easy problem it would have been solved years ago.

Q220 **Andrew Selous:** Which of the leading countries are we working with to try to make this work internationally? I take your point about market size and the UK is—

Steve Brine: We are working through G7 and G20. When I attended a G7 in Milan in November last year, this was on the agenda. As I said, the Prime Minister raised it at the leaders' meeting last year, and it is on the agenda in a big way at the G20 next month in Argentina.

Q221 **Andrew Selous:** Which particular countries are showing the most promise of working profitably?

Steve Brine: I do not have that level of detail.

Q222 **Andrew Selous:** You do not have that detail; okay. Another initiative that was suggested to kick-start this research, which we have learned is going backwards and not forwards, is the advanced purchase initiative, which Dame Sally Davies and others talked to us about. Dame Sally made the comment that we would need to find the resources to make this happen and we would need to find companies to work with. What is happening in this area so that we can actually do it and do it at pace?

Steve Brine: If I need to provide more information subsequently, I will. My understanding on the API is that the reinvestment work will involve making an upfront annual payment to companies for products while likely having a nominal price paid at use. This de-links price from volume, basically, and supports good antibiotics stewardship. We are working with the ABPI, NICE and our partners at NHS England to develop the pilot and to take the work forward. That is as much as I can put on the record for you at the moment.

Q223 **Andrew Selous:** Is the advance purchase initiative going to get the money to make it happen?

Steve Brine: That is the conversation that is going on at the moment, Mr Selous.

Q224 **Andrew Selous:** When will that be resolved by?

Steve Brine: My hope is that that will be resolved when we publish the new strategy at the turn of the year.

Q225 **Andrew Selous:** So when we publish the new strategy—



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Steve Brine: The new strategy at the turn of the year, so when we publish the refresh strategy.

Q226 **Andrew Selous:** The turn of the year is early 2019, is it?

Steve Brine: That is what I am working towards, yes.

Q227 **Andrew Selous:** The third way you could try to deal with this issue of what is essentially market failure is by amending patent law to make the development of new antibiotics more appealing for pharmaceutical companies. There are lots of variations, such as longer patents, keeping a patent in play for longer, to make the upfront costs of the research economically worth while for these companies. What is the Government doing on that idea?

Steve Brine: We are not necessarily proceeding with that at this time. It is not something that is in active discussion. I would say in the last five years we have considered many options for incentivising new drug development. Jim O'Neill's review also looked at these and concluded that the global market entry reward was the best option. I said that I think that that is a good option, and we are open-minded to that, but the key point is that a global solution is needed; it is not a UK win.

Q228 **Andrew Selous:** Just to be clear, the Government's preference is market-entry rewards, of the three options that I have put to you.

Steve Brine: We said that we thought it was the best solution that Lord O'Neill placed.

Q229 **Andrew Selous:** The Government are working internationally.

Steve Brine: We are working internationally and will work on the API with the ABPI, NICE and NHS England to develop the pilot on this, as I have said.

Q230 **Andrew Selous:** Do you accept that there is a real sense of urgency on it, given that what we have heard from Jim O'Neill is that the market is contracting and people are exiting?

Steve Brine: Yes. Of course, we accept there is a sense of urgency in it, yes, but, as I said, if it was an easy problem it would have been fixed.

Andrew Selous: Thank you.

Chair: Thank you. Rosie.

Q231 **Rosie Cooper:** When we talked about patents with Jim O'Neill, it was clear that if you develop an antibiotic and it is of real use, once it is in play and is of value, it becomes part of the pool. Because we are trying to hold off using it, by the time we start to use it the patent is very nearly up. I am a very simple soul. Would not another way of doing this be that for a drug that we are using minimally—last use, whatever it is—its real patent date would not start until we actually universally started to use it? Would that not be a very simplistic way of helping these companies invest



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and yet get a return on their money?

Steve Brine: I do not think you are a very simple soul, Rosie, but, as I said, we are open-minded. I am sure that that has been considered and that they will be listening to you very clearly, but a global solution is what is needed; it is not something that we can do on our own.

Chair: Thank you. Ben.

Q232 **Mr Bradshaw:** Professor Borriello, given the progress that has already been made in reducing the use of antibiotics in animals, what do you think the next target should be in that area, if any?

Professor Borriello: Yes, thank you. You are correct to have noted the significant reduction across the field. We got the industry—and by that I mean all the different sectors, including, for example, game birds—to look at and to own the problem and to try to identify what they thought would be appropriate and challenging reductions in antibiotic use, and, more importantly, not just antibiotic use, but the pattern of use among different antibiotic classes, which is just as important as the total reduction.

They have set those targets. I am hoping to move from a position where a target is used to incentivise people to own the problem as to the actual amount of use being the measure and consequence of what they have achieved. That is where we are getting to.

We have not set new targets. The new strategy has said that we want to see where they have got to when we see the data of use, which always lags about 18 months to two years behind—where that is progressing. If we think they have not done enough, we will go in and challenge and see whether it is because they have reached a reasonable baseline in their own part of the sector or whether they are not trying hard enough, or we need more innovative thinking.

I am convinced, from what I have seen and what is taking place, that we will be achieving levels that will stay below the Netherlands. I know this Committee has often heard of the Netherlands as being a benchmark. We have been below them all the time and we still are, and we will be approaching the levels overall of Denmark, which is seen as a class leader. We will be looking, I think, for something round about the mid-30 milligrams per kilogram PCU, which puts us right at the leading edge.

We are not setting a finger-in-the air target as a challenge, because I think the 51 that Lord O'Neill set achieved what we wanted to achieve, which was huge engagement, which would give us sustainability.

More importantly, we will be trying to get better data on individual sector use. Certainly, many people do not realise that poultry is more than just poultry. You have egg layers, meat poultry, ducks and turkeys. Antibiotics are not authorised for all animals; they are authorised for specific animals, so there is a very limited range anyway of antibiotics.



We will be looking for comparators at the sectoral level. Once we get better data—and we have built that into systems now working in the industry, how much is actually used in pigs, not sold for use in animals—and as other countries get better data, we will be able to say what other countries with comparable systems are achieving better than us and how they are doing that.

Q233 **Mr Bradshaw:** It sounds to me that although the targets have worked—

Professor Borriello: Yes, they have.

Q234 **Mr Bradshaw:** Are you going to scrap them and not have targets any more? Is there no place for targets in the future? It would seem counterintuitive. If the targets have worked to get us this far, is not the danger that if you get rid of them—and we have seen this in health waiting times—that they just go back up again?

Professor Borriello: Our current view is no. Targets should not be set simply as a stick to say, “You must do this,” with no engagement. We saw no movement for two or three years. That is because we spent most of that time engaging and saying—it is really the simple message—that antibiotic resistance is everybody’s problem. On that basis, antibiotic resistance is everybody’s issue to tackle. We had to get them to own the issue, and they do. They are driving themselves. The poultry industry has driven itself, and we are staying with that.

As we said, we think it will reduce to a level probably below any artificial target we would have set, and we will be looking in a challenging way to see whether that can go further. That also has engaged, as part of that, continual maintenance of looking at most appropriate prescribing, which is by the assurance schemes as well as the retailers and food producers. They are producing their own policy statements on antibiotic uses and making them public. They are imposing maximum reduction where possible on their own producer farms, and the assurance schemes are also monitoring for that.

Q235 **Mr Bradshaw:** We heard some concern and criticism last week about the preventive use of antibiotics overall and of the use of antibiotics of last resort in animals. What is your view on a ban on both of those things?

Professor Borriello: Currently, I do not favour a ban, and I will explain the reason. Neither has any other country, other than Denmark, but that is a ban that still allows, under certain instances, for prophylaxis and metaphylaxis. Sweden has not banned them. The new EU strategy on veterinary medicines includes a major component on tighter restrictions on antibiotic use on the food-producing animal side, which has had European Parliament as well as European Council input, and they have a very precautionary standpoint. They have tighter description of considerations for when preventive use should be implemented. That guidance is very similar to what we already have from the Royal College of Veterinary Surgeons and the British Veterinary Association, as well as our own DEFRA/Government stance on this.



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It is also the case that you would not have achieved the significant reductions that we have if unnecessary, unthinking or unwarranted prophylaxis and metaphylaxis was not already being reduced, because there is no evidence that the infections that need to be treated have gone down. We have not put huge investment yet into improving biosecurity, so that big reduction has come from better preventive use and monitoring of that use. That is where we are at the moment.

Q236 **Chair:** Can I ask you to clarify for those who are following from outside the room what you mean by metaphylaxis?

Professor Borriello: Yes. On preventive use, you can either prevent on the basis that you see an infection and you want to stop it spreading—that is very similar, to, let us say, diphtheria in school or meningitis—or you can have it where, due to the processes, you know you are entering a high-risk period in animal rearing where disease incursion is common. I think the best human health equivalent is pre-operative bowel preparation. On the animal side, it is certain transitions post-weaning, for example, where there are lots of stresses. Therefore, an antibiotic is given.

That has been based on perceived best practice for a long time, and, increasingly, almost in parallel with the delayed prescribing on the veterinary side now, people are waiting, they are seeing, they are challenging and doing research to say, “Well, actually you can get away with not doing it.” I also think that improved husbandry practices and improved biosecurity, which is part of the new strategy and DEFRA’s commitment, will further reduce that need and that thinking. It will help to reduce those hotspot risks of infection.

Q237 **Mr Bradshaw:** You said rightly that the EU rules are the strongest internationally. We heard last week concerns that, contrary to that, in the United States, the use of antibiotics in livestock rearing is much less strict and more widespread, and fears that, were we to strike a trade deal with the US if we leave the European Union, we will be forced inevitably to accept these meat products. Is that a concern you share? Is that something you have lobbied Ministers and others on?

Professor Borriello: I know the Secretary of State has made very clear in public his view on maintaining our standards and ensuring that we will have some controls. Certainly, part of the negotiations is a view on importing from countries that have lower standards or controls. Equally you have to accept that in the US, for example, they would point out and ask: where is the evidence that even using antibiotics as a growth promoter is a key driver of resistance in people? To me, that is a separate argument. Antibiotics are a precious commodity that should be kept and restricted for treating and preventing disease, not for any other reason.

In the new regulations for veterinary medicine, the EU currently has a provision to say they will not import, as we currently do not, foods from



countries that use antibiotics for growth promotion. Therefore, those countries have separate provisions for that. So, even Australia has a separation provision of rearing in order to enter the EU market. I think the new regulations are going a little further in saying that they expect countries that export any animal produce to the UK to have in place comparable control systems across the board for AMR.

Q238 Mr Bradshaw: Your Secretary of State has made that clear to the DExEU and international trade secretaries of state.

Professor Borriello: I cannot comment on that. I do know that his general view on lowering our standards on food quality have been made very public.

Q239 Mr Bradshaw: Minister, have you or has your Department—

Steve Brine: Can I add to that, Mr Bradshaw, if I may? The DEFRA Secretary of State made very clear his view of chlorine-washed chicken, if you remember, and there was particular excitement in the media a little while ago. Although I was the Minister responsible for the Food Standards Agency, for instance, I would say that, although this is not something at the forefront of consumers' minds all the time—there are many other things they are thinking about and juggling—our constituents are in general terms very aware and switched on to these issues, and I do not think they would accept any dilution of food standards in the future as a result of Brexit or any other policy that this country has.

Q240 Mr Bradshaw: Have you spoken to your colleague Jacob Rees-Mogg, who today has launched an economic plan? I do not know what it is called, but he calls it the free market. It is the hard Brexiteers' ERG, economic plan, in which he makes quite clear that there will be no barriers at all to any of this US produce in their vision for a post-Brexit nightmare, in my view. Would you have a word with him on our behalf, please?

Steve Brine: Yes. Jacob Rees-Mogg is not a Minister in this Government. I am.

Mr Bradshaw: Thank you.

Chair: Thank you very much. Rosie.

Q241 Rosie Cooper: Professor Borriello, last week Dame Sally said that we do not do enough surveillance, we do not know enough about it and that we need to do more research about the interactions and complexities between the environment, animals and humans. In her part of the evidence, she spoke particularly about fish farming and antibiotics going straight into the water table and the oceans. Other members of the panel said broadly similar things. What work has been done by DEFRA to investigate and manage environmental contributors to AMR, including animal, human and manufacturing waste?



Professor Borriello: I have read the exchanges. I would like to preface it by saying that one has to be very careful in general comments to ensure that there is a distinction between what happens in the UK and what happens elsewhere. The main farmed fish in the UK is salmon, as it is in Norway, and in the UK it is in Scotland; and they use minuscule amounts of antibiotics. They have even developed mechanised systems for injecting to vaccinate the small fry to reduce operator needlestick injuries, because it used to be done by hand. Let us put that to one side.

The main use of antibiotics in fish farming is in the catfish-type area overseas and in shellfish, not in the UK. We do need to export best practice and I think that is a huge opportunity for the UK.

In terms of integrated surveillance and surveillance particularly in the DEFRA areas of responsibility, we need to do more. I used to be in public health, and it was always the mantra that we need more surveillance and evidence for action and policy. That is true, but what is particularly true for AMR is that monitoring certain compounds in the environment was not something that was considered that important in the past, so there are not systems to build on; we are having to start de novo.

I agree with Dame Sally. We need more investment in surveillance, but we need overall co-ordination of that investment so that the surveillance is done in a One Health concept. We need surveillance that will capture, integrate, analyse and provide information that is useful to those who provide the data as well as to inform policy, which captures Food Standards Agency interest on what has been found in food and the provenance of that food, captures resistance in livestock, which actually is not that high, which is a surprising issue, which captures resistance at abattoirs in the carcasses, and captures resistance maybe downstream from production plants or just in effluent from hospitals, households and farming run-off waste. If we do that piecemeal, we are not going to get any of the added value. If we get some additional investment but from the outset say that we are going to do this in an integrated way, it will be slightly more difficult. It won't be perfect. I do not think we need to aim for perfect. Things will get better as it goes along. That will then link in with the human resistance, particularly in the community. In hospitals, most of the resistance is a hospital control issue as opposed to environmental impact issues.

Q242 **Rosie Cooper:** I was going to ask you, reflecting the panel's view last week, why so little had been done, and you have now described One Health, which includes provenance, resistance and all the rest of it. Is that happening now? Where are you up to with that? What is the real planned work?

Professor Borriello: It is a stated aim now within the new strategy, and that is for better integration of usable datasets and analysed information.

In terms of doing more surveillance within the existing strategy, it has been done along vertical lines, but it has happened. We have the best



and most comprehensive surveillance of resistance in livestock, including for animal pathogens, not food-borne, which frequently gets overlooked but is of concern also to the animal side, of anywhere in the world, and we publish that and couple with it our sales data. We have a biennial One Health report, which has traditionally been done with the Department of Health and Social Care and Public Health England linking what we know on resistance surveillance in food-borne pathogens, where we have information on indicator organisms such as E. coli, drug/bug combinations for bloodstream infections, campylobacter, salmonella, and so on.

So, we do it; we have some integration. But with that fuller integration and off the back of that co-ordinated targeting of where to look, we are to have co-ordinated deeper dives for research as part of the new strategy, and it has not really happened in a co-ordinated way yet.

Q243 **Rosie Cooper:** How do you see it happening, though? If it has not happened yet, what will make it happen?

Professor Borriello: An awareness and a willingness to know that it could be of value. It has always been a hearts and minds issue. I think there is that awareness and that commitment. It will take some investment. We have not yet decided, because there will be so many players in this, whether that is going to take added moneys from somewhere or reprioritisation of existing moneys. My own view is that it probably does need some added financial input to all those Departments, including the Food Standards Agency, which will try to put this in place.

Q244 **Rosie Cooper:** Minister, when I hear words such as “may,” “might” and “requires finance,” I also think, “Never going to happen or not for a very long time.” What do you think?

Steve Brine: You are very cynical, Rosie Cooper.

Rosie Cooper: I am.

Steve Brine: “May” and “might.” As I said at the start, if you have a strategy that is ambitious, as we have had, and it will be more ambitious with the refresh strategy, and you have political support going right to the top, again I am a confident, positive, half-full person.

Q245 **Rosie Cooper:** The refresh will definitely come with money.

Steve Brine: That is my aim.

Chair: Thank you.

Professor Borriello: May I say, just to finish this issue, that there was also an indicative question about antibiotics in the environment? The Environment Agency, which is part of the DEFRA family and is a non-departmental public body, has been monitoring one class of antibiotics and three different types in the environment for a number of years. It is going to add to that now ampicillin and ciprofloxacin as a



fluoroquinolone, because indicator antibiotics were initially chosen based primarily on their stability in the environment and the difficulty of dealing with them. Our view was that you needed to add antibiotics that were more reflective of those more commonly used in clinical and veterinary practice as a better marker. They will be adding those two and undertaking that from 2019 onwards.

Q246 **Chair:** Thank you. Can I go back to your definition of metaphylaxis, which is covering for stressful periods where you might predict there is a higher risk of infection? Is this allowing us to use more intensive factory-style farming? Is that a serious factor in increasing the use of antibiotics that we could avoid?

Professor Borriello: I think it is like many of these areas: the evidence is not always there, so I can give you my opinion, some of which is evidence based. There are some, I suppose, anthropomorphic perceptions of animal rearing for food production. Free range can be very stressful to certain animals and housing less stressful, particularly if you measure hormonal markers as stress. Does that mean that it is wrong for them to be in that environment based on the other benefits? Not necessarily.

With regard to stress and density of animal rearing and antibiotic use, the direct link between there being more or less is not strong. There is some very direct and published evidence in the UK—well, it is in the public domain—on, for example, free-range chickens compared with caged and conventionally reared animals that, per animal, twice the amount of antibiotic was used in the free range, and that was 1.5 million birds, so it is not necessarily an unrepresentative number.

I do not think the assumption that a particular approach to rearing livestock for consumption automatically has all the benefits to reduce antibiotic use is there. There are some practices within conventional rearing that are now being looked at, and that is replacing access to colostrum where sometimes animals may be removed from colostrum a little earlier. It is a bit like the human breastfeeding story; it is the best protection. There is now a very actively promoted programme to reconstitute and redeliver colostrum, and that should help. That is a consequence of a type of rearing, or practice, that one can identify, intervene in and make a change on. But that is not necessarily true in all different practices.

Q247 **Chair:** Do you have the levers to make the change, though? Where you see the evidence base and mechanism to reduce metaphylactic use of antibiotics, what levers do you have to say, “We expect you to introduce this”?

Professor Borriello: Our lever is that we have this—to be blunt—threat of legislation, which is always a powerful lever. It is very hard, as it would be for human medicine, to say that a vet’s practice or a GP’s practice is illegal, because it is very difficult to define that. How do you monitor and



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how do you enforce? What we have, which is why I spent so much time saying it in response to an earlier question, is buy-in from all the food-producing sectors as well as the dedicated vets for those sectors and vets in general that they need to be reducing and changing the pattern of antibiotic use as far as possible. They are now moving to what prevention and best practices they can introduce to prevent the need for use of antibiotics. That is an area where we do need—

Q248 Chair: You have the threat of legislation as the stick, but what about the work that is going on in your Department to look at the mechanisms within the agriculture Bill about incentives—public money for public benefits and goods? Is that something into which you are feeding in loud and clear messages about reducing antibiotic use and having, if you like, incentives for farmers to reduce their use?

Professor Borriello: Yes. The incentivisation, and also the possibility of a different use of some aspects of the CAP money, depending on an EU exit outcome, is that there is a commitment to work with the livestock industry to improve housing and biosecurity. It is the upstream end—and this is on endemic disease. Traditionally, Government felt their role, if any, was for exotic incursions because of the impact it has on the economy. There is now an increasing awareness that maybe some support and working collaboratively with livestock sectors on endemic disease and reducing that reduces antibiotic use, because you have removed the need, and—

Q249 Chair: My question was, do you feel that within your Department there is sufficient focus on reducing antibiotics and how that might be reflected in legislation?

Professor Borriello: I think there is, yes. There is full sign-up and they were fully subscribed to the last five-year plan. They are fully subscribed to the current one, which has an awful lot in it, more emphasis on the environment, as well as preventing disease. DEFRA has made very clear in its 25-year environment plan that it is going to work to reduce endemic disease, therefore reducing the need for antibiotic use. It is also going to be a component of future farming.

Chair: Thank you. Paul has a follow-up question.

Q250 Dr Williams: The fact remains, though, that there is an economic consideration when deciding whether or not to prescribe antibiotics for an animal, and that economic consideration is not usually made when making that decision for human beings. That means the threshold for prescription of antibiotics is actually lower for animals than humans, and yet, in the long run, the impact will be on human health.

Professor Borriello: Yes. The evidence is that the amount used per head or kilogram of total livestock compared with people is lower in livestock, not higher. If you want to use some indirect marker of whether there is a threshold or not, as I have said, for the less-thinking use, which is the animal equivalent of the GP giving an antibiotic as they



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expect it and it will not do them any harm but might do them some good, the area in the veterinary profession for livestock was more in prophylaxis/metaphylaxis. As I have said, the reduction targets that were set by the reductions that have been met and are going to get even lower—better reductions and lower use—indicate that that behavioural change has happened and started to be embedded.

Q251 **Dr Williams:** But animals get more antibiotic per kilogram than humans.

Professor Borriello: No, they do not.

Q252 **Dr Williams:** They do not.

Professor Borriello: No, absolutely not.

Q253 **Dr Williams:** So humans get more.

Professor Borriello: We have published that.

Dr Hopkins: Per kilogram.

Professor Borriello: Per kilogram. We do not yet have DDD equivalents in animals. It is something that people are looking at, but again it is the compromise between how good is good enough to drive behavioural change. At the moment, we have used total sales as a surrogate marker. We will be moving to total sales per livestock sector as a stronger driver. The benefit you might get for the extra effort of defined daily dose equivalent, which is appropriateness of use, we need to look at carefully.

Q254 **Dr Williams:** We all want to see as little antibiotic prescribed as possible, don't we?

Professor Borriello: Across the patch, yes.

Q255 **Dr Williams:** We want a minimum amount needed in order to save life and prevent unnecessary disease and disability. Are there further changes to the environment that could be made that would reduce antibiotic prescribing in animals?

Professor Borriello: In the environment?

Q256 **Dr Williams:** Yes. Does the nature of the environment in which animals are reared lead to the need for more antibiotic prescribing because they are being exposed to a greater risk of disease?

Professor Borriello: There is an association that I can give you as an example from pig rearing in Denmark. It does not mean to say it is causal, but the association is that in Denmark they probably reach the low levels they have in pigs, which is one of the major users of antibiotics for livestock in most countries. They have them indoors on slatted floors, not on solid floors with hay, and not outdoors in straw and wandering around in muddy fields. That is an approach that most people believe has contributed to their lower antibiotic use because it has reduced cross-infection and environmental exposure. I presume there will be



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others who might think that a bit more of a free-range life or some compromise might be better, and there is a trade-off. That is not something I can comment on at the moment.

I think there are some markers from countries that have done the most extensive work and made the major achievements. We could still learn some things, for example, from Denmark and the Netherlands over and above, “Do we change how we rear pigs?”, for example, to reduce a little further, but we are actually making very good progress at the moment anyway.

In the dairy sector, I would argue that other countries should come and talk to us, because my analysis of the data available shows that we are probably the lowest user per head for dairy cattle of anywhere in the world. They also intend to make further progress by introducing preventive measures. In dairy cattle, that would be having a 40% increase in teat sealants, which help prevent infection. Their ambition is not to reduce use but to increase measures that help prevent infection.

Q257 Chair: Thank you. Can I come on now to Brexit and the whole field of AMR? Minister, could you set out for us what you feel the threats are in terms of tackling AMR and any opportunities as a result of Britain leaving the European Union?

Steve Brine: Yes. Obviously, we are still currently a member of the EU until we leave, and we will continue to work very closely with our EU colleagues before March 2019 and, I am sure, thereafter. We have set out very practical, principled and compromising proposals for our future relationship with the EU that I think are in the interests of both sides. We have discussed the G7 and G20, today, although we have not discussed the European Union, but there is no reason why our relationship on biosecurity issues should not continue to be strong and it is in both our interests—but it is not just about the EU. Our influence on AMR extends well beyond the member states, to the G20, and, as I said, to the United Nations, which has its first TB-specific conference in New York later this month. The UK, I think, is well placed to influence in those different forums.

We are aware that a number of antibiotic medicines used in the UK market are sourced through the European supply chain. There is no getting away from that. Therefore, our exiting the EU has the potential to impact on supplies of these products to the NHS. That is one reason why we support associate membership of the EMA, and I personally very much support that, as I know you do, Chair.

I noticed last week that Sheuli Porkess from the APBI—I was reading your exchanges—talked about it from a pharma industry perspective, didn’t she? I wrote down here that she said, “The recent guidance on no deal and the technical notes is welcome and goes some way to help, but the best way to go forward is to ensure that a future relationship contains



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the elements of regulatory alignment, frictionless trade and the talent and research side that I mentioned.”

My view is that is why the Government’s negotiating position—the so-called Chequers plan—is right. It sounds like Ms Porkess is a supporter—I knew we would find one—and why I hope that it is agreed by the EU and, in due course, this Parliament. Does that answer your question?

Q258 Chair: Yes, it does. The other point here is the pan-European surveillance networks for diseases. Is it your absolute intention that, even if we were to leave with no deal and no transition, you would be seeking, where possible, to maintain links with those networks?

Steve Brine: Yes. There are wider food and biosecurity issues that are in the interests of the United Kingdom and the European Union to continue working together on, and I do not see a change in that being in the interests of either side.

Q259 Chair: Thank you for that. Coming on to the issue of food labelling, consumers will want to know whether the food they buy is from animals that have been treated with antibiotics in a way that we would not allow in this country. Do you intend to push for legislation that allows complete clarity about the conditions in which animals have been reared, particularly if there is a risk that we have a free-for-all of everything coming in?

Steve Brine: I will not have mission creep in terms of what legislation I am prepared to push for, but I would say that the UK and my overarching ambition is not only to reduce the development and spread of AMR to protect human health, but to see a reduction in animal prescribing. The responsible use of antibiotics helps to ensure, I think, the continued access to treatments in the future and makes it certain that diseases are not left untreated.

As I said to Mr Bradshaw before he left, the public are very demanding. I think there is definitely a market out there for antibiotic-free products. I think the public will have very little truck with any dilution of our food standards as a result of leaving the European Union. There are many reasons why all of our constituents voted to leave the European Union, but I do not believe that the dilution of food standards was one of them.

Q260 Chair: I guess you would agree that there is considerable pressure from some quarters to allow a reduction in those standards in order to have lower prices.

Steve Brine: There is considerable pressure from every single possible quarter on this particular issue, but I do not think I could have been clearer on the record today about where I stand and where I think Government stand.

Q261 Chair: You would oppose a diminution in standards.



Steve Brine: Yes, I would.

Chair: Thank you for clarifying that.

Steve Brine: I think the Secretary of State and DEFRA have been very clear on that as well.

Q262 **Chair:** If that were to change and we were to see a flood of imports not regulated to the standards that we currently have, would it be your personal intention to push to make sure that there was absolute transparency in terms of labelling?

Steve Brine: I will go as far as to say that I will make a lot of noise if that happens. More to the point, Chair, I think the public, our constituents, will make a lot of noise if that happens, and rightly so.

Q263 **Mr Bradshaw:** You might make a lot of noise, but our understanding is that, under this nightmare Jacob Rees-Mogg scenario, WTO nonsense and all of that, we would not be allowed to do anything about labelling. Professor Borriello might be able to help us here.

Steve Brine: The WTO and what that allows us to do in respect of labelling as a result of our freedom from the EU is a matter for debate, frankly.

Professor Borriello: I think this is an opportune moment to say what the view of the retailers is, as well as the Food Standards Agency and DEFRA on this issue. It is one of consensus that labelling things as antibiotic-free is not a productive way to go. It is misinforming the public, and there are better ways of indicating the provenance of the food with respect to antibiotic use.

Q264 **Chair:** Indeed, because we heard that the antibiotics would have cleared through the system by the time they are on the shelf, so anyone could label something antibiotic-free, but it does not—

Professor Borriello: Absolutely. Everything is antibiotic-free. That is the whole problem. The problem is that, if you start labelling something as antibiotic-free, the consumer wonders whether everything else that is not labelled that way has antibiotics in it.

Q265 **Mr Bradshaw:** My question was really the other way round: we would not be allowed, would we, under WTO rules?

Professor Borriello: There are things that you allow. For example, at the moment in the UK you can have an organic label; you can have farm assurance labels—Red Tractor, or Arla in dairy; and you can have RSPCA labelling on food as assurance. The view is that, to reassure the public in the UK through retailers, you need to get an understanding that if it is marked Red Tractor it also means responsible use of veterinary medicines per se, not just antibiotics. That marker now is a marker not just of the housing, the conditions and the quality, but also medicines used in the production of those livestock, that it fully complies with all the national



regulations and that any medicine use has been as optimally responsible as possible. The view is that, if we are going to move that way, that is where it will go, and, in a very enlightened way, the retailers in the UK acknowledge this as a non-competitive issue, because it could have—

Q266 **Mr Bradshaw:** You have not answered my question. Under WTO rules, we would not be allowed to say, “This meat was produced in the United States using antibiotics that would not be allowed to be used here,” are we? That is the point we are making. The Minister can make a lot of fuss and noise about this, but, in the end, he would not be able to do anything in the event of this disadvantageous trade deal with President Trump.

Professor Borriello: My apologies, because my response did answer that question, but I should have made it clearer. Food imported from the US would not have a Red Tractor label on it, so the absence of a particular label might be all that you need as sufficient to inform the public to make their choices.

Q267 **Mr Bradshaw:** Do you think the Americans would buy into that?

Professor Borriello: It is not for the Americans to buy into or not.

Steve Brine: If they did not meet the standards of Red Tractor, they would not have Red Tractor.

Q268 **Chair:** Do you think that the absence of a label is sufficient? Don't you think that there is a case for the public being told that an animal has been produced during the time of its rearing using antibiotics in a way that would not be acceptable here?

Steve Brine: I think Red Tractor is a very potent symbol.

Q269 **Chair:** So you think just the absence of Red Tractor—

Steve Brine: Consumers are very aware of Red Tractor. On the issue that you are raising about the WTO, I saw Professor Moore make those comments last week in the Hansard report. I am not fully aware of that. I will seek advice on that, but I take your point.

Q270 **Chair:** You are saying that you think the absence of a label is sufficient.

Steve Brine: It is what Professor Borriello said. I think Red Tractor is a potent symbol, and the public consumers are very aware of what it means. If it comes from a country that does not meet those standards, it would not have it.

Chair: Does anyone have any further points on this?

Q271 **Andrew Selous:** I have one. I want to return to the position of the UK's role internationally on this. In terms of global Britain, which is very much part of the Government's positioning of the UK within a post-Brexit world, what does UK leadership on this issue look like in terms of Global Britain? Could you put a bit of flesh on the bones for that?



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Steve Brine: I think, Andrew, it is what it has looked like to date. The way that Britain and the UK has led on AMR is a good example of Global Britain. Global Britain has been going on for a long time. This is a trading nation as old as the hills have been outside. The way that we interact with other international bodies—the UN, G20, G7 and the European Union—has been going on for a long time and will continue to go on for a long time before and after 31 March 2019.

Q272 **Andrew Selous:** You could reassure us that there is no less energy, enthusiasm or urgency across Government in terms of the salience of this issue internationally in terms of the UK's dialogue with our partners around the world.

Steve Brine: Absolutely, Andrew. If there was less energy, then our chief medical officer would not be holding court with the entire G20 next month in Argentina, running most of a half-day session on AMR. The energy is immense. Those of you who have met Sally are aware of her energy; she is not shy in coming forward.

Q273 **Andrew Selous:** What we are seeking is a little more detail and a little more reassurance, given some of the concerns expressed by Jim O'Neill last week. You have helpfully provided a little more detail, but perhaps just putting that out in the public domain a little more so that the public are aware of it would be helpful.

Steve Brine: When the refresh comes out, hopefully that will be a great reminder to the public and Parliament that we have been serious about this and continue to be so.

Chair: Thank you for coming this afternoon.

Steve Brine: Thank you for having us.