



Petitions and Health Committees

Oral evidence: [Petition on the meningitis B vaccine](#),
HC 900

Tuesday 22 March 2016

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Members present: Helen Jones (Chair), Ian Blackford, Dr James Davies, Paul Flynn, Ben Howlett, David Mackintosh, Emma Reynolds, Paul Scully, Helen Whately, Dr Philippa Whitford, Dr Sarah Wollaston

Questions 55-149

Examination of Witnesses

Witnesses: **Sue Davie**, CEO, Meningitis Now, **Steve Dayman**, Executive Founder, Meningitis Now, **Vinny Smith**, CEO, Meningitis Research Foundation, and **Linda Glennie**, Head of Research and Medical Information, Meningitis Research Foundation, gave evidence.

Q55 Chair: Good afternoon. I welcome our witnesses, Sue Davie and Steve Dayman from Meningitis Now, and Vinny Smith and Linda Glennie from the Meningitis Research Foundation. It is good to see you here this afternoon. Thank you very much for your time.

I want to start by exploring the slightly different positions you take. Sue or Steve, I understand you support the call for the meningitis B vaccine to be made available to more children. Can you explain your stance on that, and which groups you think should be offered the vaccine?

Sue Davie: We do support the call to extend it. Ever since we knew the vaccine would be available back in January 2013 when it was licensed, we have been calling for the under-fives, as the most at-risk group, to be protected. We are supportive of the call for an adolescent intervention study, recognising that protecting adolescents may give wider protection and could be the most cost effective. We have always called for under-fives, as the at-risk group, to be protected until such time as the work with adolescents could be done.

Q56 Chair: What is your evidence for the call to extend it to under-fives? I understand you are supporting more research into whether it is effective to vaccinate adolescents, so what research are you relying on in the call to extend it to under-fives?



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Sue Davie: The burden of the disease is greatest in the under-fives, and it is the group least able to speak for themselves, so that is the group we are looking to protect.

Q57 Chair: When you say “the burden of the disease is greatest”, are you talking about numbers affected?

Sue Davie: Numbers of cases, sorry.

Q58 Chair: Numbers of cases. How many?

Sue Davie: In that age group, you’ve got up to about 200. It has varied over time. The disease goes in a cycle. We have numbers at the moment—you are looking at about 200 in that age group.

Q59 Chair: But you think that it would prevent those 200 cases, depending on the number that you have each year?

Sue Davie: We know the vaccine that is currently being used is not 100% effective. That has been known since the beginning. We are looking for the effectiveness data that will come through to see if it is protecting against the types that we believe would be covered by that. That data is not known yet.

Steve Dayman: I have been involved for 33 years since losing my son, Spencer, when he was 14 months old. One of my main roles for the past 30 years has been visiting families who have experienced meningitis. I have probably visited more families than anyone else in Europe. We talk about the burden of the disease. What I have experienced is that the burden is massive. It is not just the aftereffects. It is also the social cost to the families involved.

Only on Friday, I was with a family who lost their 18-month-old little girl from meningitis B. It is her funeral tomorrow. The parents are obviously off work and they do not know when they are going back. Most parents are young and have mortgages, and it is quite likely that they could have their house repossessed. It would be a cost to the taxpayer to rehouse them with various grants and so on. I do not believe that the burden has been really identified in the document that the JCVI was given to guide them with their decision.

Q60 Chair: That is something that we will raise with them later. Linda and Vinny, your position is slightly different, is it not? You have said that more evidence is needed to make the case for vaccinations to be extended. Is that correct and, if so, can you tell us what kind of research you are looking at?

Vinny Smith: First, thank you very much for inviting us. We really want everybody protected: the under-fives; as the petition said, up to under-11s; and hopefully everybody in this room. That is what we would really like. We completely support the

call for an under-fives catch-up campaign. We are totally in agreement with Meningitis Now on that.

At the Meningitis Research Foundation, we have said that this is a really innovative drug. We should be rightly proud that this country has introduced it. All the data that we have suggests that it will be successful. We also need to stay open-minded to see how that has worked in the real world. We know that the first indicators of how that is working in the real world will come out towards the end of this year. It may not say conclusively—in fact, it almost certainly will not say conclusively whether this has been a guaranteed, certain, definitely-has-worked vaccine, but we should be able to take some early learnings from it to see whether, on balance, it is working or not. With that evidence and information, we can then look at protecting the most vulnerable groups. As Sue has just said, that is the under-fives.

Q61 Chair: Under-fives. But you just appeared to say that you wanted all adults vaccinated as well.

Vinny Smith: That is a really important thing. Protecting everybody does not mean vaccinating everybody. The bug that lives in the noses and throats of people—particularly teenagers in this case—does not live in everybody. Killing the bug does not necessarily mean vaccinating everybody. It means vaccinating target groups who carry the bug. That can then protect everybody.

Chair: I understand. Thank you for clarifying that.

Q62 Emma Reynolds: When we spoke to the families involved in the petition last week, it was striking that we spent a lot of our time talking to them about raising awareness. I want to ask you a number of questions on that. The first question is: what more do you think the NHS can do to raise awareness among its own health professionals? There was obviously a failure to diagnose in the case of the Burdett family and we know that has been the case with other families who have lost children. What are you suggesting should be done to raise awareness among staff in the NHS?

Vinny Smith: Both charities have been awareness-raising for many years with health professionals and GPs. I am sure we will talk later about hospitals and schools and other groups that can be influential. It is essential that we carry on that work. We spoke to 1,000 hospitals last year and 9,000 GPs. We are regularly in touch and I think most GPs have access to the materials that we produce.

On top of that, it is important to say that no matter how much we raise awareness with health professionals, how much we do to improve diagnosis and treatment and how much we educate parents, this is a fiendishly difficult disease to detect. It often looks like flu. It has rapid onset that, no matter how quickly you respond, you might be able to do nothing about.



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The most important thing to help ensure that we do not have the tragic stories that we had around the table last week, is to protect people up front, and the only way to do that is by vaccines.

Sue Davie: I support everything Vinnie said about the awareness-raising we do. We have to ensure that we are protecting but also continually raising awareness. Even if we can see more people protected by this vaccine, there are other forms of meningitis as well. Critical for us is maintaining that level of awareness, yes, through health professionals, reaching out, for example, to pharmacists because we are seeing more people encouraged to go to them. We are looking at an e-learning resource for them.

It is finding ways to have accessible information for those health professionals, bearing in mind that they won't often see a case from that perspective. We have got to keep supporting them the way we are while also trying to prevent more cases. Obviously, over the years we have seen a significant reduction overall of the number of cases. That means that health professionals are seeing it less often, which makes it harder again. We must not forget about awareness alongside prevention all the time.

Q63 Emma Reynolds: We heard evidence last week from one of the parents that there had been leaflets at the GP surgery. It is just that, if you are not worried about meningitis as a parent, you may not pick one up. Is there more that can be done through those contact points, particularly GPs' surgeries but also nurseries, childminders, schools? There is a whole range of institutions that parents come into contact with. Is there more that can be done to raise awareness among parents as well? You may be doing this already.

Sue Davie: Definitely. One thing that came out last week from the families was how to ensure that parents get informed very early on without scaring them, but empowering them with information. One example is the red book that every parent gets for vaccination schedules and things like that. We have managed to get information into some of those, but can't we have something as standard in there? Because that is where you keep your vaccine records for the first five years of life, so let's get more information in there.

Our symptoms cards go into all the bounty bags for new-born babies, for example. That is great, but you get so much other stuff in there. So it would be good if we could do the red book. The more we can give people the opportunity to be aware of it, to be reminded of it, without scaring them, armed with information, the better. The answer to your question of whether we could do more is that we can always do more, sitting alongside prevention.

Linda Glennie: That point about the red book is important because we know that people hang on to their red books. We have a resource called "Babywatch" and about half of parents get a red book with "Babywatch" in it. If it could go into all of them that would make a big difference.

Steve Dayman: Before the Men C vaccine was introduced in 1999—and there was a catch-up period up to the age of 24 with that vaccine—the chief medical officer used to write to every GP in the country every September reminding them that we were

now entering the meningococcal season. That stopped after the Men C vaccine was introduced. Perhaps that is something that should be reintroduced with maybe information from the charities as well.

Q64 Emma Reynolds: That was going to be my next question. What should the Government do? What more could the Government do? What used the Government to do that they should reintroduce beyond that to ensure that midwives, GPs and others are passing on these messages to parents?

Steve Dayman: I think the message should be that parents know their children best. None of us seek medical help or advice unless we are really concerned, especially with a young child. That is something that should be recognised all the way through the healthcare delivery system. I know you will get the odd case where maybe the parent goes along to get a nappy changed, but in most cases you will notice a rapid deterioration in a child's condition, or that of a teenager or young adult.

That is almost a symptom in itself.

That's what everyone should recognise, that we don't go to the doctors because we want to make a nuisance of ourselves, and children especially should be kept in hospital a bit longer for observation, because we all want to hear, "Mrs Smith, it's not meningitis, don't worry", and we all think, "Well, thank God. It's not serious." And we all then go home with a false sense of security, our loved one gets worse and we think, "Oh, let's just hang on a bit longer, because the health professional said it wasn't serious." And by the time you get back to hospital, it's too late.

Q65 Dr Whitford: It came out last week—in a way, almost a false reassurance that parents had had, because as far as they were concerned, their child was vaccinated against meningitis. Do you think that we've really done enough to explain the different types? And surely that would still apply, because obviously this vaccine—if it was rolled out further—does not cover all strains of meningitis.

Sue Davie: We find ourselves doing that a lot, all the time saying, "There's a vaccine, but you still need to be aware", and that was—

Q66 Dr Whitford: Is that written in what you would put in the red book, because you are talking five years later?

Sue Davie: Absolutely. As charities, we want to be very careful that we are not scaremongering; it's about empowering people with information. This is a rare disease; it is a complex disease. Before I joined, I just thought that meningitis was one thing that babies got, and all the time I think as charities we are trying to address that. I think there is an element of all of us thinking, "Well, it won't happen to me."

So, I think the more opportunities to remind people in places like the red book, which they trust—putting information in there, and they can have the charity information

details there if they want more. But actually it's those reputable sources that mean that people will pay attention. And the more opportunities that we have—if that's then through schools as well, and pre-schools and the like—I think it's that number of opportunities to be reminded without scaremongering going on.

Linda Glennie: It is still important to remember that even with absolutely the most aware parents and the most dedicated, well-educated health professionals, there will still be cases and prevention is key.

Q67 Emma Reynolds: Just on your work in schools really—this is to Sue—could you explain a little bit more about what you are doing with schools to raise awareness?

Sue Davie: With schools, we have all our normal awareness activity; we will go in and do talks and things like that. Sometimes, our young ambassadors will go in, because young people talking to young people is far more effective. And we have inspirational young people who might have lost limbs—things like that—who immediately children will pay attention to, because suddenly it's very real.

One of the things that we have been developing is a meningitis-aware recognition mark concept, whereby a school, university or pharmacy—it is a programme whereby we make sure that everybody in the school, for example, is aware of meningitis, so that the teachers feel armed with information, and so things go home to parents via the children. That might just be symptoms cards—very simple things. But it's that regular annual check that says, "Let's make sure you've still got materials in the school, so you, as a school, are saying, 'We are meningitis-aware'", and that's a positive thing to be giving out as a message to parents.

Q68 Emma Reynolds: How many schools are you able to reach? Obviously, there's a lot of them around the country.

Sue Davie: The ultimate goal is all of them. What we're doing at the moment is that we want to start with a core set of primary schools, getting them to help to shape how that will be. With the universities, we are working with Universities UK. So it's finding the right bodies for us to work with. There are limited resources for us, so we have to get to the right people, who can then really help us to spread that information.

Q69 David Mackintosh: The Committee heard last week about the costs associated with lifetime support and those who have survived meningitis. Can you give us a picture of the kinds of costs that a family whose child is left disabled by meningitis might face?

Linda Glennie: We have done a study on this, actually. We did a "counting the cost" study, where we looked at the lifelong costs of people with severe disabilities. One of the things that it showed was what it was like for someone with very severe disabilities, who has had—let's say—multiple amputations and throughout childhood has to have revisions to their stumps and new sockets and new prosthetics fitted, and physiotherapy; the various things that are involved in rehabilitating them and making

them able to work and take part in life. That ends up costing upwards of £3 million. One thing we are trying to draw attention to, though, is the fact that these costs are discounted at 3.5%. That ends up meaning just over £1 million. We are trying to draw attention to the fact that the costs that we are looking at just are not measured properly. The JCVI has done the most it can with the numbers and parameters that it has got, but the framework is just not fair, because discounting should not be 1.5% in health. In public health interventions considered by NICE, the discount rate used is 1.5%, for everything else it is 3.5%, and that just is not fair.

Q70 Chair: Before David proceeds with his question, can I just ask whether you have sent that study in as part of the written evidence to this inquiry?

Linda Glennie: No, we haven't but we can.

Q71 Chair: Could you possibly send it to us because it is quite an important factor, as you say, in looking at the cost-effectiveness of vaccination? I think the Committee would be glad to have that. Thank you.

Linda Glennie: Okay.

Q72 David Mackintosh: Thank you; that is helpful. Specifically to Meningitis Now, how many families each year do you support financially?

Sue Davie: We support financially more than 300 families a year. That varies from something relatively small, a piece of respite care, perhaps, or a specialist bit of equipment, to more significant home adaptations. That is obviously purely from a financial grant support perspective. We support many more through emotional support.

Q73 David Mackintosh: We have heard a bit about this, but do you think that the costs borne by meningitis survivors and their families are given sufficient weight in the JCVI's assessment of the cost-effectiveness of vaccines?

Vinny Smith: No is the simple answer, but there is a very complex set of reasons below that. We think the current cost-effectiveness model is unfair on several levels. As Linda said, the issue of discounting is really important because it means that interventions with immediate cost but long-term savings and health benefits are disadvantaged, because much greater importance is placed on immediate health gains and costs compared with those that stretch well into the future.

That effectively means that, if you think of the underlying model that is used to look at this decision, you are not looking at a 60-year-old and seeing the benefits they have from not having had this disease or the loss of a limb. You are trying to cram all those benefits into the very early years up until about 30. That is effectively what is

happening. I think if you asked a 60-year-old whether they still had a limb or not that would feel extremely real to them.

There is something fundamentally important about that principle that is wrong in this discounting issue. In addition to that, we think that the model does not take into account peace of mind benefits. That is not just a phrase made up by two charities trying to promote their cause. It is in the cost-effectiveness working group's own terms of reference, this peace of mind idea.

That means that this has benefit to every parent. It is something that they value and would put a value to if they could in this model. That is not taken into account. The model only accounts for people who might be affected specifically by the disease. That is really important.

Public preference is not actually well accounted for in the model at the moment. We know that. Various studies have shown that the public want prevention over cures or treatments. They want to prevent serious diseases rather than a series of milder diseases added together. For example, the current model equates roughly 5,400 mild viral illnesses that might cause two or three days off work for you or me—adds them together—and says that is worth roughly one Faye Burdett. If you ask the public and look at the evidence that does not quite stack up to them as being intuitively sensible.

Lastly, it does not express a public preference for targeting children over adults. It says we would rather have children treated for severe illnesses that might go on to have lifelong effects than have the model prioritise, say, me. Those things are pretty fundamental to have a look at in detail, really to understand how they affect this cost-effectiveness model. Adding them together and unpacking them could make a major difference to how the decision is made about whether public funds should be used with this vaccine for this group and the most vulnerable. We have not got there yet. Some of that work has been going on with the cost-effectiveness working group. We think that that should be made public so that everyone can see it and understand how far they have got.

Q74 Chair: What weighting would you give to those factors when the JCVI addresses cost-effectiveness? We start from the principle that they are, as you said, quite difficult to quantify. We tend to measure things that can be measured, which are not necessarily the most important things in life. The JCVI has to make an assessment somehow or other, so what weighting would you give to such factors as peace of mind, the preference for giving priority to children and so on?

Linda Glennie: The cost-effectiveness working group has started to look at that, and that is one of the reasons why we would like to see the conclusions published. That would mean that it can be scrutinised publicly and, if it looks like it will make a difference, taken forward. There has been other work done already. NICE looked at value-based assessment and putting a premium on severity. There is work in the background that has already been done on that, to which the Committees could refer. There is already a body of work. The thing about the peace of mind benefit is that there is not a lot of research on that. It is something where the Government could fund

a study that could do the definitive piece of work to make that into something that could be measured.

Q75 Chair: I accept that you could measure it; I am asking about the weighting that should be given to it in coming to an assessment. Do you have any views on that?

Vinny Smith: On the specific things that I highlighted there, there is a much bigger model behind this. It is very difficult to go through each one, but on the specifics, in terms of the discounting issue we simply think that that should be fair. That means going from a discount rate of 3.5% down to 1%. We would advocate for that change.

On peace of mind, no one really understands that well, so I do not have a figure for that, but it is worth having a look at what model could help express the value everyone places on that. If you thought about it like insurance, everyone around this table probably has home insurance or different types of insurance for things that you do not necessarily have happen to you, but you still get a value from the insurance and you still place a value on it. We think that that should be looked at properly. It should be economically modelled and included in this.

On public preference, I think we have to wait and see what the working group has come up with. We do not have those figures here today. In terms of weighting, I do not think we have a figure for you today, but the working group should be looking at those figures and coming up with something.

Q76 Dr Whitford: Going back to our previous section on awareness, my anxiety about the peace of mind weighting would be about giving an over-reassurance to people, saying, “That is fine.” That is exactly what we were talking about in the previous section—the danger of peace of mind, in that the parent does not recognise what is happening and is less aware of the other types of meningitis. I am not sure that that one is all in the positive column. I think you would have to look at the danger.

Linda Glennie: I can see that there is a tension there, and the fact that 820,000 signed the petition—most of those were not people whose children had had meningitis. They were people who feared that their children could get meningitis. Repeated Department of Health studies, going back more than a decade—probably two decades—have shown that meningitis is the disease that parents fear the most. From the point of view of fear, you might have a higher rating. From the point of view of being able to provide absolute reassurance for a meningitis vaccine, as you say you would not be there yet. The Men C vaccine came in and it was fantastic, and it prevented just about all Men C, but from the point of view of a parent whose child still got meningitis, the reassurance can never be complete. As you said, you still do need to maintain a level of awareness among the public.

You could come up with a system for measurement that would balance fear and the absolute level of reassurance that a vaccine can provide. For example, people are not as afraid of measles as they perhaps ought to be, but the vaccine provides very good protection. So you would have different scores for different diseases and different



vaccines, but it is something that could be looked at properly by people with all the data, not just by meningitis charities that know a lot about meningitis.

Vinny Smith: We are not trying to pretend that this is easy in any way. I think it is going to be very hard to do well, but it is too important to put in the “too hard” box. We have to find a way to look at things that we think will affect the model and are important, even if then the balance of argument discounts them. It will still be progress that we have looked at it.

Dr Whitford: It is just very specifically the peace of mind rating and not the disability rating that I was talking about. Thank you.

Linda Glennie: *indicated assent.*

Q77 Paul Scully: At the beginning, you talked about how you needed to see the data and how things are working through. What weight are you putting on the ability to get this vaccine out to wider age groups of children? At the moment, if you look at the early years, you already have a vaccine programme going on, so you have the early years attending their GPs on a regular basis. The older they get, you have to start calling children in, which then causes issues in itself. What reflections do you have on that?

Sue Davie: We totally accept that this would not just be part of a normal programme. Across the UK we have seen, when we have brought in other vaccines, how catch-up programmes are done and things like that. We have an amazing system in the UK, both in terms of vaccination programmes and surveillance programmes that are critical.

We do acknowledge that. It is about us trying to see how we can support that and understand how best that can be worked. As part of a 10-point plan that we have put forward, part of that has to be the supply availability, from the perspective that for lots of reasons this cannot just be everybody in one go for the under-fives. The earlier that that is understood could play into how the programme could be achieved.

Linda Glennie: I would also point out that the original cost-effectiveness model that the JCVI considered when it made the recommendation that an infant programme should take place showed that the catch-up campaign for children below the age of five, alongside the infant programme, would have been cost-effective had the discount rate at the time been 1.5%. Reforming the unfair framework under which cost-effectiveness analysis happens could actually make that formula work, even with the data that we have already got.

Q78 Dr Wollaston: We are covering meningitis, but also septicaemia and early intervention for septicaemia. You will be aware of the number of reports looking at the importance of early intervention. Part of cost-effectiveness is what you might displace, or what else you could spend the money on. Even if we looked at the revised cost-effectiveness formula, do you have any concerns that we might be missing an opportunity to save more children's lives

by investing that same amount of money in better early intervention programmes across the NHS? I am interested in your thoughts.

Linda Glennie: The idea behind the principle of cost-effectiveness analysis is that you are buying health and that there has to be a level playing field. Obviously, we have found it difficult to accept in the case of the original consideration of meningitis vaccine, when it did not get in. If the framework is reformed so that you are buying health in quality-adjusted life years, you do not necessarily have to say, “If we have a meningitis vaccine we won’t be able to have extra education into early recognition of sepsis.” It does not have to be a direct trade-off. You don’t have to choose between a measles vaccine and a meningitis vaccine—it is just down to what meets the threshold. We want better education about sepsis and better prosthetics for children who will still get the disease if the vaccine does not cover them. We don’t want acute hospital services to suffer because there is a meningitis vaccine. That is not what we are saying.

Q79 Dr Wollaston: So you would reject its being an either/or scenario. But if you look at the cost of a catch-up programme—the stand-alone investment from the NHS—there is this consideration as well: would we save more children’s lives if we invested in better early intervention, as a number of reports recommend? You are saying that it shouldn’t be either/or.

Linda Glennie: The principle behind it is that you’re buying health—the health budget is there to buy health—and you don’t necessarily have to trade one thing specifically for another. As long as your analysis shows that your intervention meets the threshold, you are not displacing things that would be better.

Q80 Dr Wollaston: There is another trade-off that has been raised in an academic paper published in *The British Medical Journal*. It is that sometimes parents make a trade-off when it comes to vaccinations if they are concerned about the number that their children might be having. Do you have any concerns that we may see a shift towards some parents not having vaccinations for their children? Have you looked at that?

Linda Glennie: We know that parents fear this disease more than they fear most others. We know that uptake of Bexsero so far has been really good, and we hope that that will continue. That is one of the reasons why it is so important to look at the evidence that we have got for the infant programme. If vaccines did not work, there is a danger of making people more sceptical about them.

Q81 Dr Wollaston: My point is, although parents are obviously very fearful of meningitis, what if it means that there is a trade-off and they stop taking up other vaccinations? Say, for example, they made a trade-off whereby they would not have the MMR vaccination—have you factored that in as a possible risk when you looked at including this in the programme?

Sue Davie: When you see the different meningitis-related vaccines that have been introduced over the years, I don't think that that is the situation. People see them as vaccines that they want. We have certainly not seen any impact on making choices about other vaccines, even now, when there are multiple injections at one visit. The research was done before Bexsero was brought in to look at parents' tolerance of that. We consider it highly unlikely that parents would make such a trade-off. Clearly, we want to make sure that it's an effective vaccine.

Chair: Thank you very much indeed. We now have to move on to our second panel, but I thank you all for coming this afternoon and for your evidence. As I always say at the end of these sessions, if there is something you felt you did not get a chance to say and is important to our looking at this, please feel free to send us that evidence in writing, and the Committee will be happy to look at that before we move to a debate. Thank you very much for your attendance.

Examination of Witnesses

Witnesses: **Dr Simon Nadel**, Consultant in Paediatric Intensive Care at St. Mary's Hospital and Imperial College London, **Dr Helen Bedford**, Senior Lecturer, Institute of Child Health, University College London, **Professor Richard Moxon**, Emeritus Professor of Paediatrics, University of Oxford, and **Professor Simon J Kroll**, Professor of Paediatrics, Imperial College London, gave evidence.

Chair: Good afternoon to our second panel of witnesses, Dr Bedford, Professor Moxon, Professor Kroll and Dr Nadel. Thank you very much for your time this afternoon. We know that you are all busy people, and we are grateful to you for coming.

Q82 Paul Scully: Thank you for coming to speak to us today. The petition talks about vaccinating children up to the age of 11. We heard evidence earlier about other groups supporting vaccination up to the age of five. Do you agree with the petition, or what are your thoughts on the age at which children should be vaccinated?

Dr Bedford: It is no surprise at all that the petition has so many signatures, because this is obviously a horrible disease that frightens parents a lot, but whatever age you choose to cut the vaccine off, there are going to be cost implications. That is clearly the next most important group in terms of the number of cases, but these are difficult decisions to be made by people who are better able to make them than I am.

Professor Moxon: I have a conflict to declare to you: I hate this disease and have been very involved in the development of vaccines against it. For me, any one case of meningitis is one too many, but, as we have heard, there are cost implications. I hope that the Committee understands the nature of cost-effectiveness. It has become a gateway—an absolute. If you fail on cost-effectiveness, the vaccine is not given, yet cost-effectiveness is a model and is full of uncertainties.

I will not go over the fact that certain things are not included—there is discounting and so on—but I don't think the uncertainty aspect is clearly understood. We do not



hear confidence limits around it, we hear only that it is or is not cost-effective. The model is used as a gateway. One thing I would like to feel could be considered is the fact that it is not an absolute but one of the things that is used in coming to a policy decision. I am not a policy maker; I am not qualified to be one. I am a scientist. That is the point I would like to make about cost-effectiveness analyses.

When the pneumococcal conjugate vaccine was assessed by the United States scientists—by their own admission they are very clever—they came out with figures on the QALYs of 80,000 per dose of pneumococcal conjugate vaccine. When it was introduced and turned out to be so stupendously effective, down came the CE to 8,000. As you know, the rough dividing line for a QALY is 20,000 or 30,000. That is what happened over a few years from the time they made their estimate to the time it was introduced. They had the facts to put into the model, and that drove it down tenfold.

Q83 Paul Scully: Thank you. We will return to the cost-effectiveness model in a minute, but perhaps first we can hear from Professor Kroll and Dr Nadel.

Professor Kroll: To respond to your question as you asked it, you asked whether we agreed with the proposition that the group that should be particularly considered was the group up to the age of 11. With the understandable anxiety that everybody should be protected, it is sometimes easy to lose sight of the hard facts. The data we have, which is regularly published by Public Health England, is that as we know, the greatest burden of this disease falls on the under-ones. We are delighted that the vaccine has been introduced there. The next most-affected tranche are the under-fives—the one to fours.

To respond to a question that was put to the previous panel by the Chair, the numbers are approximately comparable. In fact, in the ones, twos, threes and fours, the annual number of cases is a little more than the number of cases in the under-ones, and in older children, in each of the conventional slices of age, the figures are very considerably less. Although it is odious to introduce a threshold, if one had to be introduced it would be logical to push it up to the under-fives in order to get the most benefit for further investment in the vaccine.

Dr Nadel: Thank you for inviting me. As has been stated, every case of a disease that is preventable by a vaccine is a tragedy and difficult for everyone to come to terms with. I agree that the burden of the disease is among the under-fives, but still, there are cases in older children. The case for immunising adolescents is based on the fact that if you can achieve herd immunity and stop the transmission of the disease, that eventually will have a greater benefit. A catch-up campaign to cover the most at risk while the herd immunity aspect comes into play would probably be most effective.

Q84 Paul Scully: Can I ask the same question that I asked before about GPs? When you are doing a catch-up campaign, is the time to bring children in to see GPs factored into your thinking? At the moment, the one-year-olds are already being captured within an overall vaccination programme.

Dr Nadel: I am a paediatric intensive care doctor.

Paul Scully: I appreciate that.

Dr Nadel: I know that there are very good mechanisms in the UK for achieving effective catch-up campaigns if there is a short, sharp public health and professional awareness campaign. I know it has been achieved for other vaccines, so I have no doubt that that could be achieved for this vaccine.

Q85 Dr Wollaston: Professor Moxon, you said in your opening remarks that you have been involved in the development of vaccines against meningitis. Have you been involved in the development of this particular vaccine?

Professor Moxon: Yes.

Q86 Dr Wollaston: Could you set out what your involvement was?

Professor Moxon: It goes back to 1995, when a tool in science became available, which was complete genome sequencing. It quickly led to the idea that since we were having real problems with a vaccine against the B strain, one could use the complete genome sequence as a sort of telephone directory to be able to interrogate that information and find vaccine antigens. The sequencing was done by one group and Rino Rappuoli of Chiron Vaccines. That group and my group got together and we had a consortium, which, in the three or four years from 1996 to 2000, identified a number of promising vaccine antigens. The company then took these forward in this extraordinarily complex business of formulation and of testing for toxicity and so on in the pre-clinical phase, and of course then there was another phase of testing the vaccine in infants, toddlers and adolescents, but mostly in the young, and that altogether took 17 years.

Dr Wollaston: Hence the cost.

Professor Moxon: I was there at the beginning, and I am still here.

Q87 Dr Wollaston: Thank you for clarifying that. I understand there are still uncertainties about the effectiveness of the vaccine. The figures we have been quoted are around 73% in lab testing. How long is it likely to take before we really understand the effectiveness?

Professor Moxon: That is a very good question. The way I would know whether you are or are not protected would be to take some of your blood and, crudely—it is not much more sophisticated—put your blood into a test tube with meningococcal bacteria and see whether you killed the strain. That was the only practical way to be able to estimate the effectiveness of this vaccine, because the disease is rare and it would have meant years of a multi-centre extremely expensive trial of the vaccine to get what is called effectiveness in the field. So we go in with a solid scientific base of estimating the efficacy. Now, with the roll-out in the UK, which is a wonderful thing



that the UK is doing, because this vaccine is being looked at with the possibility of other countries using it, we will have to see what the outcome is in the field. As you know, there has been a decline in cases of meningococcal disease in the UK, so we will not get the results as fast as we would like. The estimates are that it will take several years before we get a clear answer. Another difficult factor is that in many of the cases of meningococcal disease you do not get the bug cultured, so you cannot do the sophisticated analyses that you would like, to find out some of the information about whether the vaccine just did not cover the strain, or whether it was what we call a true vaccine failure. So it is complicated.

I would say that we have got at least five to 10 years, unless we come up with some clever ways of being able to estimate effectiveness in the field. Mary Ramsay, who is going to talk later, is a specialist in this area, so I hope you will ask her about the cost-effectiveness timing.

Q88 Dr Wollaston: Yes, indeed; thank you for clarifying that. There is also the issue of so-called herd immunity, although perhaps community immunity would be a better term—

Professor Moxon: I love that term much better, otherwise it sounds like we are cows or something.

Dr Wollaston: It is very difficult to persuade parents of the benefit of that, whereas community immunity is much more understandable. But it is an important point, because so much of this depends on that. Are you able to give the Committee any of your thoughts on how soon we might know about its effectiveness in inducing a community immunity?

Professor Moxon: I do not know, but I do know that the way we have to do this is by implementing the vaccine in a population that would allow us to measure carriage and, from that, to be able to estimate the drop in acquisition rates of the organism, which would translate into prevention of disease. The idea here is that you would cut down the spread, then people who would be vulnerable to the disease would not actually get the bug, so you have intervened.

As someone said earlier, it is really important to know that the target here is not the kids who are most vulnerable to disease—the young—but the adolescents and young adults, who have a very high carriage rate. If you measure the carriage rate in infants—the people who are most likely to get the disease—it is very low. I know that is a paradox and confusing, but that is the way it is. So you protect others by going to where carriage is at its highest, which is among teenagers and young adults.

Q89 Dr Wollaston: In which case, I know you made your point about cost-effectiveness, but would it be more cost-effective, if we were going to have more money for a programme, to extend it among teenagers rather than in the one to five-year-old group?

Professor Moxon: I will fall back on my point that modelling those things is very complicated, so I cannot give you an answer, but what we know from other spheres,



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such as the pneumococcal example, is just how incredibly efficient immunising can be in dropping carriage, spread and disease. In the American experience, for example, children were immunised with a pneumococcal vaccine; grandparents were not given the vaccine, but the drop in pneumococcal pneumonia was stupendous. So it is very effective.

Q90 Dr Wollaston: Professor Kroll, do you want to come in?

Professor Kroll: Yes. If I can respond to one aspect of your question, I want to draw a clear distinction between primary prevention and prevention of transmission. The immunisation of adolescents will have the impact of primary prevention in adolescents, and may have a theoretical—devoutly to be wished for, but uncertain—effect through community immunity on very small children. The immunisation of very small children will have a primary protective effect on very small children. That is the issue that is central to our thinking at present. So if we want to prevent the disease in very small children, we should vaccinate very small children.

We could also achieve—perhaps achieve—the same and more by vaccinating teenagers, but that is an uncertainty. What is quite clear is that a vaccination programme involving the one to fives will have the same anticipated impact as it might have on the under-ones. If there are uncertainties about the efficacy of the vaccine in under-ones, you could apply that *pari passu* to the older children, but that is a primary prevention issue and I would not, personally, want to endorse a programme of protecting young children solely by embarking on a teenage programme to avoid transmission.

Q91 Ben Howlett: I want to get into the nitty-gritty of cost-effectiveness. Do you think the methods for assessing the cost-effectiveness of vaccines should be changed, and in what way should they be changed?

Professor Kroll: If you are addressing that question to me, I am not qualified to answer.

Dr Nadel: I am not qualified to answer, but—[*Laughter.*] As has already been stated, it is a very complicated model. I am not 100% sure that it takes into account—what has been said is that it does not take into account the long-term effects of an illness that occurs in childhood on a child who may live for the next 60 or 70 years. That is the problem with discounting: all the health benefits are felt to be accrued up front, but it does not take into account the long-term effects. That is the issue.

The other issue is the societal costs, which have started to be addressed—the effects of a child who dies, a child who is severely disabled or a child who is maybe not so severely disabled, but has long-term educational problems. We know that an issue with meningococcal disease is that a large proportion of children can have psycho-educational, psychological and behavioural problems for many years into the future. Those effects are an issue for the child, but also for their wider family. We know that the healthcare costs of families with disabled children are extremely high. There is

also the divorce rate in those families. The other costs, which are hard to take into account, of having a disabled child are enormous and may not be fully taken into account by a cost-effectiveness model.

Q92 Ben Howlett: So to be explicit, you do not think that JCVI is giving enough weight to those additional costs?

Dr Nadel: I do not know about the machinations of the JCVI—I am sure that you will hear about that later—but I think that often those costs are underestimated.

Q93 Ben Howlett: Hopefully this is a question that you might be able to answer. Are there any other factors that you think the JCVI should take into account when making recommendations about vaccines?

Professor Kroll: There is an issue about the changing scenery when a vaccine is introduced that does need to be taken into account. We have a situation now where, thankfully, we have embarked on vaccinating the youngest children. As I said earlier—and as I think we are all well aware—the largest burden of the disease falls on the under-ones. I am sure we all anticipate that, once we are vaccinating the under-ones, the incidence of the disease will go down.

There is a consequence of the incidence of a disease going down for those who are not protected. If we set aside the issue of community immunity, which I think is irrelevant in the context of vaccinating very small children, as the rate of the disease goes down, we face a situation in which doctors are to some extent de-skilled and the public are de-skilled. There is a reduced perception of the possible danger of this disease, and cases in older children are even more likely to be missed in their early stages.

As part of my own practice—I know the same is true of Simon Nadel—I see the most awful cases of meningococcal disease presenting and the ghastly consequences in survivors. We see that in our own practice and both of us—if you don't mind me speaking for you here, Simon—are asked regularly to assist the courts with cases where it is considered that care has been sub-optimal.

I would like to emphasise that this is not to demonise the doctors. In many cases, it is not that the care from GPs has been grotesquely inadequate. It is simply a reflection of the fact that in any case that develops to such an awful extent so quickly, there is an understandable concern that things could have been done better and that, had they been done better, the outcome would not have been as terrible as it was. Frankly, often that is the case. My concern—I do not know how this is to be factored into the deliberations of JCVI, but I hope it would be—is that as the medical cases get rarer, the legal cases will, if anything, increase because there will be more opportunities for cases to be missed.

You do of course get to a point where you have made all reasonable and all practical attempts to reduce the incidence of cases to a minimum. Vaccines are not 100% effective, and short of a programme which vaccinates everybody, and indeed

vaccinates everybody repeatedly, it is undoubtedly going to be the case that there will be either vaccine failures or unvaccinated individuals. So cases will continue to occur, and one of course acknowledges that.

The goal, which I am sure we all aspire to, is to reach the point where, pragmatically, the most cases are prevented within a resource-limited health economy, and at the same time the best education package is put in place, and is continually reinvigorated, that makes sure that we have reached a minimum point. My concern at present is that with vaccination only in the under-ones, we have not fulfilled the first part of that. An emphasis entirely on education—doctor education, patient education, parent education—runs the risk of saturation and almost going as it were over the top and down the other side: that there are so many posters, so many leaflets, so many exhortatory communications from the Department of Health that in the end people become overloaded and saturated.

I think if we recognise, as I am sure we all do, that prevention is by far the most important thing, we can go further than we have, and that by having gone the part way that we have, we have actually created a next step which has become more important, which is to deal with an equivalent number of children in a relatively small slice, in terms of numbers.

I know that everyone here is aware that we are talking about a catch-up campaign. We are not talking about massively increasing a primary vaccination programme which will continue year after year. We are talking about a tranche of four years of the birth cohort receiving vaccination so that we can protect up to the age of five, so that as the years roll by, of course, those who move into that age range are already protected through the infant programme. So it is a one-off cost—a substantial cost, of course, but one that I think will have a very substantial impact.

Chair: We are going to ask you both a little about raising awareness and about diagnosis, so I will bring in Philippa Whitford.

Q94 Dr Whitford: We heard from the parents last week, again, as I mentioned earlier in this session, about awareness, and particularly the number of parents who thought, “Well, it can’t be meningitis—my child has been vaccinated.” Do you think that the Government needs to change anything about its approach, and should it be using some of the contacts that are already there, such as midwife, GP, et cetera, both to raise awareness but also to keep it in proportion—what the child is covered for and what they are not covered for?

Dr Nadel: The Government is actually doing quite a lot. There are some NICE guidelines regarding sepsis that are due to be published in July, which I think will address a lot of the issues in all age groups regarding early recognition and early management of children and adults and infants with suspected sepsis, which incorporates meningitis and meningococcal disease. So I think that will be an important step forward.

While not wanting to disagree with Professor Kroll, I don’t think you can have too much information, because the aim is to try and capture all those populations that are

difficult to reach. So I think the more health education awareness that is available from both the Government and the charities; I don't think that could be seen to be—

Q95 Dr Whitford: The charities mentioned the red book. Do you think that is a particularly useful place—

Dr Nadel: There are various mechanisms whereby awareness can be improved. The red book is one method; public education videos; the internet; social media. There are many ways to access those groups which are most vulnerable and most at risk.

Q96 Dr Whitford: The children may not, obviously, be with their parents when they get ill. They could be in nursery, childminder, school etc. I wonder if any members of the panel feel there should be a particular programme of educating staff, childminders, teachers of young children, so that they are aware, because obviously by the time the parent comes to pick up the child—

Dr Bedford: It is an issue of raising awareness among everybody, but there has to be a balance between making people so over-anxious that it almost takes away the joy of having children, and making them aware. It is not just about meningitis, because there are lots of other serious diseases. It is about making people more aware of a seriously ill child per se.

Q97 Dr Whitford: There was a big fixation on the rash and rolling a glass—that has stayed in parents' minds. Unfortunately, that is already quite far down the line. Touching on Dr Nadel's interest in septicaemia, do you not think coming up with those more generic signs of the sick child and knowing what to do can empower parents and, if it is a formal part of their training, teachers and childminders?

Dr Bedford: Yes, that is important. We did a piece of work funded by Public Health England to inform the content of the leaflets about meningococcal B vaccine. The parents were very aware of meningitis, but they didn't have awareness of the symptoms and didn't know about septicaemia. Meningitis is top of mind, but in terms of how it presents, many mentioned the rash but were much less aware of the other symptoms.

Q98 Dr Whitford: That was my impression. Do you think the Government need to do more to encourage parents to take up the existing vaccine? What is the take-up rate of Men C, which has been around long enough that it has become routine and not high profile, and Men B?

Professor Kroll: The uptake of Men C vaccines was very high. The impact of that vaccine has been extremely gratifying.

Q99 Dr Whitford: And has it stayed high?

Professor Kroll: My understanding is that it has, although Mary Ramsay, who is speaking later, will tell you. What I do know—this is PHE data—is that the uptake of Bexsero has been extremely high. There has been a 95% uptake of the first dose, and I think it is in the mid-80s now for the second dose. My understanding is that that lower figure for the second dose simply reflects the fact that it is the second dose; it comes later, and the vaccine has not been in for very long yet. This is a vaccine that has been very enthusiastically taken up by families.

Q100 Dr Whitford: Dr Bedford, did you want to make a comment about uptake?

Dr Bedford: The UK vaccination programme is the envy of the world. It has a very high uptake, and most of the under-immunisation is more to do with access than people refusing vaccines; there are some pockets where people have difficulty accessing immunisation for whatever reason.

Q101 Dr Whitford: As Dr Wollaston raised before, we have had issues of parents rejecting vaccines. It is not as if every vaccine is taken up.

Dr Bedford: In this country, a very small proportion of parents reject immunisation.

Q102 Dr Whitford: That is for meningitis, but obviously we had an issue with MMR for years.

Dr Bedford: That is a whole different topic; we won't go there.

Professor Moxon: We should be very humble about communication. It is a very difficult thing, and when we are talking about awareness—there has been a lot of discussion about that—there are limits to what we can get across. I would also like to say that the charities should get huge congratulations for what they have done to promote information about meningitis, septicaemia and this whole area. They have played an incredibly successful role.

Q103 Helen Whately: We know that quick treatment of meningitis can literally be the difference between life and death. We also heard last week how one child saw several health professionals before she was diagnosed and treated. Could a member of the panel give a brief insight into some of the difficulties in diagnosing meningitis?

Professor Kroll: The first thing I would say is that we are using “meningitis” as a shorthand term. For this particular disease, we should be saying “meningitis and septicaemia”. That disease starts as a blood-borne infection, through the bacteria carried at the back of the throat. The early stage is the invasion of the bloodstream and



the accompanying systemic inflammatory response. It is a very non-specific sort of illness, with fever and unwellness of a rather unspecific kind.

The tempo of the illness, depending on the state of the defences of the host, or the child, may then be towards meningitis or towards septicaemia. The faster illness, the more terrifying illness, is towards septicaemia, where the blood-borne load of bacteria builds up rapidly to a very high level and the host response to that gives rise to the awful side effects.

The appearance of the rash is the first, if you like, specific warning sign that something very serious is afoot that is widely recognised by health professionals and by parents, thanks to the efforts of the charities and the Department of Health in various leaflets. That may happen at any time from eight, 10 or 12 hours onwards into the illness, but before that you have an illness that is very hard to diagnose.

The classic features—well, not the classic features, but the features that have been emphasised as possibly helping doctors—will include severe limb pain, for example. But when parents go with their small children to a doctor saying that the child is very irritable, has a high temperature and says their legs hurt, tragically far too often a diagnosis of straightforward viral infection is made. Of course, often that diagnosis would be correct, but in cases of meningococcal septicaemia making that diagnosis loses hours.

In truth, I think that an emphasis on the earlier and earlier signs and symptoms of septicaemia will inevitably mean that more and more children who do not have these very serious infections will be brought to medical attention and will be passed on up the chain, if you like. That is a problem—that very major resource problem could, of course, be solved by a vaccine, which would reduce the incidence of septicaemia and meningitis caused by this organism. But it is a very difficult thing to diagnose and the illness happens very quickly, so that within hours you can be in a stage where Simon Nadel is much more involved as a paediatric intensivist.

Professor Moxon: Babies, particularly, do not show the danger signals in the way that older people do, and this is a really important part of our difficulty in making the diagnosis. I will be absolutely frank—to me, as a physician, I think early viral illness, for example, and meningococcal sepsis are indistinguishable. You just can't make the call; later, yes, maybe, but it's the very nature of newborns and young children that they do not show the danger signals in the way that older children and adults do.

That makes it so difficult. You have got a febrile, unwell child that cannot speak for itself and it's really, really difficult. And the pace of the disease, which has been mentioned all along—you know, you've only got a few hours in which you've got to make the right call.

Q104 Helen Whately: Clearly, you are the clinicians with the expertise in this area and I am not, but you could help me on this, because I am a bit confused. I have seen, for instance, from an excellent leaflet from Meningitis Now a set of symptoms described that we know some of the parents had seen in their children, and they appeared to be different from just a

child having a cold or flu—cold hands and feet, for instance, springs to mind for me. Is there not some set of symptoms that might make clinicians suspect that something might be a case of meningitis or meningococcal—

Dr Nadel: May I? I do not want to interrupt everyone, but, as has been stated, it can be impossible very early on in the disease to tell the difference between a viral infection and an invasive bacterial infection, which is what meningococcal disease is. As the disease progresses, it becomes easier to tell. One of the main things that doctors and health professionals are going to do, or should be doing, is what's called safety netting, which is saying, you know, "I don't think your child's that ill. If their symptoms persist or get worse, come back or go to the emergency department", or whatever. And as the disease progresses, there are specific signs that would tell you that this child is more likely to have something else rather than a trivial viral infection.

In the early stages it can be very difficult, but there are signs, such as heart rate, breathing rate, colour of the skin and general appearance of the baby, if we are talking about babies, that should alert a health care professional and, more importantly, the parent to say, "This is not what I'm used to in my child" or "This is not what I'm used to seeing when other children have similar diseases." Those more specific aspects can be emphasised as being more indicative. There is no 100% certainty, but there are certainly symptoms and signs that are more indicative.

Q105 Helen Whately: Given the difficulty of diagnosing meningitis, I know that the NICE guidance recommends that when bacterial meningitis or septicaemia are suspected, treatment with intravenous antibiotics should be started. Do you know how good the compliance is with this recommendation; how well known it is and how much is it put into practice?

Professor Kroll: We were both on the Committee that wrote those guidelines so we would like to say 100%. If I may step back for a second, I will come back to that question.

I think there is an issue of denominator, which is important to bear in mind. When histories are given and stories are told of children who have had these terrible illnesses and parents are asked to recall the features that their child showed, they produce the sorts of things you have mentioned. Cold hands and feet is an example and reflects a shutting down of the peripheral circulation. What you do not hear is the very wide experience, particularly among experienced GPs, of the large number of children who present with influenza or other illnesses who will also have cold hands and feet as a result of the closing down of the skin circulation to bring up the temperature. You will remember, I am sure, the chattering teeth and feeling freezing, which is what that is all about with many infections.

The specificity of the science is very low. If you can prevent most of the cases with a vaccine, then of course the specificity will change because most of the cases will not be caused by meningococcus and will be caused by a virus. The reflex that we see all too frequently at the moment is that parents of children who have ended up being diagnosed too late with meningococcal septicaemia will have been told it was a virus because viral infections are so much more common. It is the specific signs, such as

maybe peripheral limb pain, that it would be reasonable to add to the list of the sort of thing that should warn people, but you can understand why the rash is one of the first ones to pick because it really is unlike a commonplace viral infection.

Coming to your question about the recommendation, the answer is that it starts with the absolute entry words: “when it is suspected.” That is not when it is suspected by a parent; it is when it is suspected by doctors and I am afraid there is, in my view, too high a barrier at present to that suspicion being translated into action. There is a tendency to diagnose trivial infection in children who do not have any specific signs, but have a fever, with not much else to show and are very irritable. If all those children were given antibiotics and admitted to hospital, there would be an outcry in some quarters, but it would certainly prevent a lot of cases. Getting the balance right is really difficult and on the whole the cases you hear about are the cases when that is missed, but I don’t think that is because of insouciance on the part of doctors. It is recognising the fact a great many children with those signs and symptoms don’t have invasive bacterial infection.

Q106 Dr Whitford: In the light of the condition’s impact—when speaking to the families we heard about the disabilities that some of the surviving children are left with—do you think, Dr Nadel, that investment would be better spent on awareness and the structures for earlier diagnosis of septicaemia of children in general? A month or so ago, we had the tragic case of young William Mead who was not diagnosed with septicaemia. While we are talking about meningitis, there is that bigger problem.

Dr Nadel: When you say the money would be better spent, you mean rather than on a vaccine campaign.

Q107 Dr Whitford: Yes.

Dr Nadel: The two should go along together. Clearly, the campaign of immunisation against a disease that causes both sepsis and meningitis allows the opportunity to inform and educate the public about both conditions. I do not think they are mutually exclusive at all. I think they are complementary in many respects. As has been stated previously, there are many other causes of sepsis apart from meningococcal infection. The NICE guidelines have been developed for sepsis on account of the parliamentary ombudsman decision that that needed to happen, because sepsis as well as meningitis is under-diagnosed and under-recognised.

In answer to your question, I think that there has to be an education campaign along with a vaccine campaign—to do both.

Q108 Dr Whitford: Do you think that there should be a change in approach to assessing young children? In my past as a medic, certainly sick children were very frightening, in that they look absolutely fine until they completely keel over. Obviously, what we have heard with some of the cases that come up is the difficulty for someone on the phone, using a computer algorithm—I would always want to see the whites of their eyes. Do you think that there are basic rules that we maybe need to lay down for dealing with a sick child?

Dr Nadel: It is really difficult to assess anyone over the telephone. There is a whole organisational issue around NHS 111, and all those helplines, so to speak. That is a whole other issue.

Q109 Dr Whitford: But particularly with regards to children, in that they cannot say—

Dr Nadel: Yes, particularly with regards to children. But on the other hand, as has been mentioned, you cannot completely paralyse the system by having everyone with a child with a bit of a snotty nose and a temperature going to see the emergency department or the GP. I think clear guidelines and algorithms that are evidence-based may be very helpful. The bottom line is always, if there is concern, please attend a GP, A&E, or other healthcare professionals who can be very useful—advanced nurse practitioners, pharmacists, other sources of information.

Dr Bedford: This is very challenging, but I think it is also about encouraging parents to trust their instincts. A lot of parents are very scared about making a fuss or taking up people's time and—I don't know quite how you do this—in those early weeks and months we need to encourage parents to use their instincts.

Q110 Chair: That is an interesting response, because we received some evidence from parents that when they had said, “This is not like my child. The child has gone downhill very quickly”, they were not always listened to by the professionals. Is that an issue? You know your own child—some parents, of course, get worried, we all do, even when there is no need to worry—but is it your experience that parents' views of their own child are not always given proper weight?

Professor Moxon: Absolutely. It is one of the things, having taught medical students over many years, you really try to get over to training paediatricians: listen—because when parents feel that things are not right, in most cases if you do not listen to them, you will make a mistake. It is a hugely important issue, and I would agree entirely that the training does not emphasise enough that sense of listening and taking it on board, but also because parents then feel, “Oh gosh, I am being pushed back, I am being a nuisance. What I think, because I am not a doctor, doesn't count”—but it does. It is part of training paediatricians and doctors to get that balance right.

Q111 Chair: You said earlier, Professor Moxon, that if we extend vaccination, and meningitis cases get fewer and fewer, that raises even greater issues about raising awareness among both parents and health professionals, because they will see so many fewer cases. How do you think that we can best raise that awareness, particularly among GPs, who often see children first? Of course they see a lot of viral infections, but they may see—hopefully, as we go through—many fewer examples of meningitis.

Professor Moxon: That is a good point. I must say that I would rather have a disease become vanishingly rare, and therefore a problem, and then we have to deal with it. In a way, we are having to address this issue with other diseases.



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As we know, because many parents have not seen polio, diphtheria and many of the preventable diseases, they think they are not there. Then we are in danger of falling back into a situation where people do not give vaccines because they have heard of many more side effects from vaccines than they have of cases of disease. It is a very complicated issue but, as I say, I would rather have a vanishingly rare case of meningitis and deal with that issue. It is a general educational issue about immunisation.

Again, I would have to say we should be very humble about our ability to communicate. As a public health profession—and I speak for myself, not others—it is so difficult to deliver evidence and have people take that evidence on board, rather than their beliefs, listening to whatever Mr McGonagall down the road say. That is often how we make decisions, not on an evidence base. This is a very complex issue and I would not begin to say that I can see solutions to it, but I would rather have very few cases of meningitis and face that problem.

Q112 Chair: Thank you. I will not go into my rant about the fact that we don't teach people in school to assess risk properly. It is a failure in our education system.

Professor Moxon: But you are right.

Chair: I am old enough to remember measles and how bad it could be. You now see people thinking it's not so bad. Hopefully, we will get to that stage with other diseases in time. I thank you all very much for coming along today. Your evidence has been very useful to us and has enlightened us on a number of issues. We are extremely grateful to you for your time.

Examination of Witnesses

Witnesses: **Professor John Cairns**, Professor of Health Economics, London School of Hygiene and Tropical Medicine, **Professor Andrew Pollard**, Chair, Joint Committee on Vaccination and Immunisation (JCVI), **Dr Andrew Riordan**, Chair, JCVI meningococcal sub-committee, and **Dr Mary Ramsay**, Consultant Epidemiologist and Head, Immunisation, Hepatitis and Blood Safety Department, Public Health England, gave evidence.

Chair: May I welcome our last set of witnesses, Professor Cairns, Dr Riordan, Professor Pollard and Dr Ramsay? We are very pleased to have you with us this afternoon. As you probably heard, we have had some very useful evidence on this issue. We now want to get your take on it. I will ask Sarah Wollaston to begin the questioning.

Q113 Dr Wollaston: So much of our discussion of this has centred around the issue of cost-effectiveness and the formula that is used. Thank you, Professor Pollard, for your letter of 23 February, in which you suggested that it is not the JCVI that sets that formula, and that there are discussions going on at the moment in the Department of Health.

Could the panel clarify what this means, who makes decisions about cost-effectiveness and on what are they based? Having heard from the previous witnesses and the families about what they feel should be further taken in, could you give us your views on how you come to your decisions and why?

Professor Pollard: Perhaps I could start by setting the context of what JCVI is. JCVI is a group of public health experts, doctors and lay members, including several paediatricians, parents and members of the public. From the perspective of the petition on MenB, we are quite well informed and to some extent sympathise with the sentiments there.

The committee, it should be remembered, starts from the position of looking at the diseases that are important for us as doctors and parents and also for public health. The reason why MenB is on the list at all, is that for the last few decades it has been the most important infectious cause of death in childhood that we have. For that reason it has been a priority that the UK has wanted to address.

The process that we go through is first to look at how many cases there are and to look at the burden of disease for the families as well as for the health system. Then, with the information that there is about the vaccine, we look at its likely effectiveness. You heard that very nicely described in the previous session. We have that uncertainty with this vaccine because we could not do trials to look at impact before the vaccine could be recommended, so we had to use data from the laboratory to try to define that, which leaves us with some uncertainty. Clearly, we look very carefully at the safety of the vaccine. We are fortunate that the regulators do a lot of that work before it ever comes to the committee to look at.

The final bit of the process is that we look at the cost-effectiveness, because of the terms of reference of the JCVI. The cost-effectiveness uses the health technology assessment methodology from NICE because that is what our terms of reference say. We have to fit into that framework as required by the Department of Health, which is the final arbiter.

The modelling to work out the cost-effectiveness is done by a combination of health economists and modellers at Public Health England and, as in this case, at the London School of Hygiene and Tropical Medicine. They have independently looked at this to assess the likely cost-effectiveness of this particular vaccine fitting in with those rules. That process involves a lot of work to try to understand the likely impact of the vaccine and how this particular infection is transmitted to work out the framework for the model in order to look at the likely effect of the vaccine.

All those costs—the current burden of disease on the health system and the quality of life issues—need to be factored into the model, as well as the cost of the vaccine and the current burden on the NHS. That is all put together with evidence that already exists in the literature and experts' opinions. My colleague Andrew Riordan has, for a number of years, chaired the sub-committee on meningococcal disease. They were responsible for trying to assess which parameters were the most plausible to put into the model based on what was published and, where there was no information, by

taking the best available evidence. That group worked extremely hard over a number of years.

It is important to remember, in the context of where we are with cost-effectiveness and this question over which age groups could be vaccinated, that, over that period of time, we have seen very borderline cost-effectiveness. At one point, the model really looked like it was not cost-effective to use the vaccine even for infants, where the highest rates of disease occur.

As we have been through the iterations of the model, and taken advice from stakeholders, including the charities, to try to improve it, we went from the point of it being considered not cost-effective to it being just cost-effective, which is where the model ended up when we came to the final decision. It was just cost-effective for infants. Really, in the other age groups, with the data we have at the moment, it does not meet the criteria set through the HTA methodology.

Q114 Dr Wollaston: You wrote in your letter that there was a Department of Health co-ordinated committee meeting over the past 12 months or so. Would, perhaps, Professor Cairns and Dr Ramsay be in a position to tell us where we are with that? Is that looking into the factors that we have heard about from our other witnesses throughout this inquiry—the issues that they feel should be given greater weighting in the formula?

Professor Pollard: Yes. The JCVI asked the Department of Health if they could relook at the methodology because I think a lot of things came up, particularly with model. Questions were raised about whether the way that the models are put together is really fair. John Cairns was then asked to chair a committee that has been meeting over the past 18 months or so.

Q115 Dr Wollaston: Clearly, the model that you use will influence whether you say it is cost-effective or not, so you will need to go back a step. I was just wondering whether Professor Cairns could come in and comment on the very many points that have been made to us about what should be given greater weighting.

Professor Cairns: Let me give you a bit of information about the working group. The Department of Health working group to advise the Department of Health and, in due course, to inform JCVI decision-making processes goes under the rather clumsy title of “Cost Effectiveness Methodology for Immunisation Programmes and Procurement”. We call it CEMIPP. It sounds ungainly. We first met in September 2014, and we had our 13th meeting in January earlier this year. Currently, I am drafting a final report that should be circulated across members of CEMIPP next week.

One important date in our diary is the 1 June meeting of JCVI, where we will be presenting the report to JCVI. We will also, of course, present it to the Department of Health. I know there is a lot of interest in this report, to say the least, and in whether we are going to consult regarding the contents of the report. All I can say is that that is not, I believe, a decision for CEMIPP. Once we have agreed among ourselves and

finalised the report, we will give it to the Department of Health and they must make a decision as to how they best want to handle the report.

Q116 Dr Wollaston: Will that take into account many or all of the points that have been made during the course of this inquiry?

Professor Cairns: Yes. Let me explain briefly what the working group is trying to do. We are asking a very basic question: are the methods that are deemed appropriate in evaluating health technologies by NICE appropriate for vaccination and immunisation, or are there specific characteristics of the vaccination and immunisation programme that suggest we need to adapt our methods? That is the basic question we are trying to address.

While I do not feel I can give the detail of our report, because it has not been finalised yet, we have identified some areas in which you can make an argument that immunisation is somewhat different. But overwhelmingly, we are moving in the direction that most of the methods that are appropriate for other health technologies are also appropriate for vaccination.

Q117 Helen Whately: May I follow up with you, Professor Cairns, on the report—as far as you can talk about what is in it—and particularly the discount factor? We heard that the discount factor makes a great difference; it is 3.5% for vaccinations, as opposed to 1.5% for public health, which makes all the difference to the cost-effectiveness. Is that being considered?

Professor Cairns: Certainly the discount factor or the discount rate is a major item of consideration.

Q118 Helen Whately: Given the complexity of how that is calculated, is it possible and sensible to try to put all these factors into a formula or cost-effectiveness model that then becomes very complex and hard for anyone to really understand and interrogate? Should there in fact be a role for judgment, as well as an assessment of cost-effectiveness?

Professor Cairns: I certainly believe there should be scope for deliberative decision making. I don't believe everything can be fitted into a single formula; in fact, I don't know any health economist who does maintain that. In assessing cost-effectiveness, we try to bring as many of the quantifiable aspects into account as possible, but there will always be elements that must remain for experts of different descriptions to discuss and deliberate on. So it is not formulaic, but we do try to provide an evidence base for decisions and we feel it is very important that decisions are taken on a consistent basis. Once you have agreed on a set of rules, those rules should be transparent to everyone, and the processes should be transparent, then applied, but that does not rule out other factors being brought into account.

Q119 Helen Whately: This is my final question. We heard that peace of mind should be taken into account. Is that included in your work?

Professor Cairns: We have had extensive discussions on peace of mind, so that will certainly be part of our report.

Dr Riordan: Can I comment on—

Chair: We are a bit short of time, so I will bring in the next questioner.

Q120 Dr Davies: I want to explore the efficacy of the vaccine itself in a bit more detail. You have already discussed the fact that there are uncertainties in terms of its duration of protection and its efficacy in protection against invasive meningococcal disease—its ability to prevent molecular epidemiology changes, for instance. What kind of further investigations are needed, and how long might those take?

Professor Pollard: I am going to suggest that Mary addresses that, because she has been involved in monitoring the programme that is rolled out at the moment.

Dr Ramsay: As Richard Moxon said, this is a very rare disease, so it is very difficult to do things in a formal study type of way. We are doing very similar work that we did when MenC was introduced, because there were similar issues about that, although we had more similar vaccines. It is really about monitoring the programme once it is in, so once we vaccinate a large number of people, we should see quite large effects.

We are literally following every single case as it is confirmed, to work out whether or not the child was vaccinated. We are also trying to get, if we can, the strain of the bug that caused the organisms sent to our laboratory in Manchester, which is a world-leading laboratory, to test the bug to see if it is one that is matched to the vaccine or not. We are doing that monitoring in real time, and depending on how effective the vaccine is, what the rate of disease is and what the number of children vaccinated is, we are going to get early indications of the short-term protection within the next year or two. It will take longer to tease out exactly how effective it is in the long term, and whether there are any changes in the population of the organisms circulating because of the vaccine.

All of those things are being monitored very carefully and very closely, and one of the reasons the vaccine has been used in this country is because we are very good at doing that. We have a track record of doing that, and based on our track record for MenC, a lot of countries copied our experience and started to introduce MenC because we have done that evaluation and shown how effective the vaccine was.

Q121 Dr Davies: Has there been any progress on the carriage study that the joint committee recommended should be carried out among adolescents?



Professor Pollard: There are two stages. The first stage was to have a look at the strains that are being carried at the moment. That is taking strains from studies that have previously been conducted. That work is carrying on and is expected to report this year. The reason why it is important to do that first is that that then tells us how many teenagers need to be vaccinated in order to evaluate the impact of the vaccine. I imagine that that next stage is going to be fairly critical, but it will be set by the results of the first stage and that evaluation. I do not really want to have to say any more on that now.

Dr Ramsay: That work has already started, and there should be some preliminary results about the strains that are being carried at the moment by early next year, which will allow us to then plan a study. You could spend a lot of money doing a very big study and miss the point, and that is what we do not want to do, so it is very important that we plan the study on the basis of as much evidence as we have.

Q122 Dr Davies: My final question, for now, relates to lessons learned from meningitis C vaccinations—or other vaccinations, in fact. In terms of reducing the number of cases of meningitis C in the population, did we see a big increase in other strains causing disease, and is that possible in this instance?

Dr Ramsay: There was a theoretical possibility that by reducing MenC, we would see an increase in MenB or other strands. We have not seen that at all. In fact, MenB continued to go down, even when we introduced the MenC vaccine, so we saw a major reduction in MenC followed by MenB. Meningococcal disease sort of behaves a bit randomly; it is quite difficult to predict whether that was down to anything. They are not cause and effect; it was just a coincidence, I think, that MenB went down.

It is theoretically possible that this vaccine, because it is a different kind of vaccine and has particular antigens from the surface of the organism, could potentially leave a gap for other organisms to increase. That is part of the long-term monitoring. It is very important. We did not see that with MenC, and we are hopeful that this will not be an issue. There is always the potential to change the vaccine as well, in the way that we do for flu, over a longer timescale, if something like that was to happen.

Professor Pollard: We would not expect to drive any of those changes of replacement in the infant programme, because infants do not carry this bug very much. In the teenage programme, I think it would then become much more important to be monitoring that issue, where there is a lot of carriage of the bacteria.

Q123 Ian Blackford: I want to go back, if I may, to a question that Sarah asked, and the answer about the discount rate. Exactly why did you choose the discount rate that you did, and what drove the rate that you used? Secondly, how did the JCVI reach a view about the price of the vaccine to make it cost-effective, in order that it can affect as many children as possible for the NHS?

Professor Cairns: The discount rate that is currently being used is the same discount rate that NICE use in their health technology appraisals. Do you want to know why they choose that rate?

Q124 Ian Blackford: Yes, it would be interesting.

Professor Cairns: Well, it is based on a discount rate presented in the Treasury Green Book, which is a guide to evaluation across the public sector.

Ian Blackford: Okay. That's clear. Thank you.

Professor Pollard: And your other question was?

Q125 Ian Blackford: My other question was about what price the vaccine would have to be in order to be cost-effective for the NHS and in order that it could reach the maximum number of children.

Professor Pollard: The answer to that depends on the scenario. We do not know exactly how effective the vaccine will be and we do not know exactly how many cases there would be if we did not vaccinate, so we have a range of prices that are presented. That information is then given to the Department of Health to choose—not to choose, but to look at what the most plausible cost-effective price is, which is then used in the tender process that the Department of Health uses.

First of all, we take a price that is our most plausible estimate. For the under-ones, we take a figure where we are expecting to have high vaccine effectiveness but we are going to cover a large number of strains. We have taken a seven-year average for the number of cases that we would expect there to be, and a discount rate of 3.5%. That is our cost-effective price.

Then there is an uncertainty analysis, which says, “Well, what if things were a bit more pessimistic than that? Would we still have a positive balance? Would we be in a position where the Department of Health could be investing in a vaccine that didn't even get above zero pounds per dose?” That uncertainty analysis just looks at these more pessimistic scenarios.

The infant programme meets both those criteria. It has a price in a range above zero even after the uncertainty analysis is done. The Department of Health then takes those figures and that goes into the negotiations; as you know, we do not get involved in those or know what the price is.

Dr Riordan: But that price was significantly lower than the list price of the vaccine to make it cost-effective.

Professor Pollard: Yes. The prices range from a matter of a few pounds a dose up to almost £20 a dose with the different scenarios, and the most plausible one is somewhere in the middle of that.

Q126 Chair: We heard evidence from families affected by this that the lifetime costs associated with the care of survivors of this disease are not adequately considered as part of the JCVI assessment. Can you tell us what weighting you give to those costs at the moment?

Professor Pollard: One of the issues is the discount rate, which you have heard discussed before. Of course, there is a concern that by using a 3.5% discount rate, you do not give due weight to those costs for the whole lifetime. On the point about whether the quality of life costs are looked at appropriately, we have the best evidence that there is and that is in the model, but the committee was concerned that we might be underestimating those.

NICE does have a quality adjustment factor that you are allowed to use. We have not used it previously for vaccines, but we did in this case. Within that quality adjustment factor, we took account of the concern we had that we were underestimating the QALY losses as a result of the disease. We also took into account in that number the public awareness and fear about meningococcal disease, the fact that it is a vaccine specifically for children, and also the innovation of having this new technology—this new type of vaccine. All of those things went into the quality adjustment factor that was used, and that fits in with the NICE guidance on the use of it.

So, as I understand it from the health economists, the number that is used is at the top end of the range that is normally used by NICE, and so it seems to me that that was the best we could do within the rules to take account of those issues. I don't know whether you want to say any more about that, Andrew.

Dr Riordan: We also included some information on the impact that the disease has on family members—something that has been mentioned before. A study from the charities was given to us as part of the stakeholder comments that came in to help us make the model as good as it could be and add in as many factors as we could to try to ensure that we caught everything. As Professor Pollard says, we then had this quality adjustment factor to try to make sure that, if there were things we had missed out, we included those too. We tried to put as many things as we were allowed to within the rules into our cost-effectiveness analysis, and that just about made the vaccine cost-effective for the infant programme.

Q127 Chair: You say that you went as far as those rules allowed. Do you think those rules are adequate at the moment, or do they need to be changed? Does the weighting need to be changed?

Dr Riordan: That is why there is now a working party to look at those. We had quite robust discussions, as you might expect, in the sub-committee, because we wanted to be sure that we had done the best we could to look at these vaccines. It is a really important disease and clinicians like myself and Professor Pollard, who have seen hundreds of cases, do not want to see any more if we can afford not to. So we tried within the rules to make that assessment as good as it could be, hence the trigger for a view of those assessments, particularly for immunisations, because some of those things did seem to be not quite as fair as they could have been proved—

Chair: I think Dr Ramsay wants to come in.

Dr Ramsay: Some of the things that the charities are talking about are not actually allowed to be included. Those are the more social costs—the cost of families’ out-of-pocket expenses and those sorts of things. That is one of the rules that we follow, because again it is the same as NICE. So there are issues about whether we should be taking into account the broader social costs—costs to the family and to society more widely—but you would need to do that across the whole health sector, and that is something that of course does not happen at the moment. But again I think that is something that CEMIPP has considered briefly.

Q128 Chair: Are you considering that, Professor Cairns?

Professor Cairns: Almost certainly, as it is another aspect. I believe we have investigated the range of topics very thoroughly. It may be that some people will disagree with our judgments, inevitably, but I hope there will not be anybody saying we have missed anything out from our deliberations.

Q129 Chair: Do you have any idea when your report will be made public? You are finalising it now. I will not hold you to an exact date, but a rough timetable might be good.

Professor Cairns: I do not, because that is a decision for the Department of Health. I would anticipate that it will be made public, but I would not know when.

Chair: I will not hold my breath, then.

Q130 Dr Whitford: Obviously some previous immunisation programmes have reduced the risk of not just the disease they immunise. We heard from witnesses last week that Bexsero has some impact against meningitis C. Is that the case? How good would that coverage be? Is there any potential to stop using the MenC vaccination and replace it with Bexsero, which would cover both?

Professor Pollard: That is a great question. The vaccine covers meningococci. The capsule, which is the sugar coating on the outside, does not really take account of that. So in theory it will have some activity against all of the different strains.

Q131 Dr Whitford: Including W?

Professor Pollard: Including W. The problem is that it does not cover all strains and it probably will not be quite as effective as other vaccines like the C vaccine. In fact, the C strain that caused all of those problems in the '90s is not covered at all well by the MenB vaccine. Therefore, I do not think we would have been able to control that epidemic in the 1990s with this vaccine.

Q132 Dr Whitford: So it could not replace the MenC vaccine.

Professor Pollard: It will cover some C-strains, but it would not have covered the particular one that caused problems at that time.

Q133 Dr Whitford: Therefore it would not be as good as the MenC vaccine.

Professor Pollard: Yes. It is difficult to think that we would be able to stop that programme.

Q134 Dr Whitford: Right. So that is not some way of contributing to the cost effectiveness.

Professor Pollard: We already took out one dose of the MenC vaccine in infants, but that was because of herd immunity—community immunity—because we have now got that dose in adolescents. It is a complicated picture, unfortunately.

Q135 Chair: May I go back to the question of whether a vaccination programme for adolescents should be undertaken? You reported in March 2014 that there was insufficient evidence to make a recommendation and you recommended further research. By October 2015, your minutes show that a proposal had been submitted in the Department of Health and was being reviewed. Why did it take so long to get the proposal to that stage?

Professor Pollard: I am not involved in writing the proposal so I do not know why it took so long, but I think there were several meetings to discuss what the right approach was.

Q136 Chair: Sorry, just for clarity, those were meetings between—

Professor Pollard: Sorry, with the Department of Health, to discuss the approach. I think because first of all we had to formulate what the right question was, that caused some of the delay and then obviously the scientists had to get together to put the proposal together and submit it. Do you want to add anything else to that?

Dr Ramsay: Going back to the point made earlier, we do not want to do the wrong study. It was about scoping the precise nature of that study and the size of the study, because it will be a big study if it is done. The other slight complicating factor was that at the same time we had this increase in MenW in teenagers. We introduced a vaccine in teenagers that would change the dynamics of carriage in teenagers, so we had to re-plan how you might potentially use the vaccine—the Bexsero vaccine—in teenagers.

Q137 Chair: Is this study now under way? Do you know when it is likely to be finished?

Professor Pollard: It is not under way yet. First of all we need the report of that initial bit of work looking at the strains. We are hoping that report may come sometime this year, in which case it would then be possible to say how many adolescents you need to vaccinate in order to make an assessment. Then obviously the Department of Health would have to put out a funding call for that.

Q138 Chair: So how long is this likely to take altogether? Can anyone give us an idea? The issue has been raised with us on a number of occasions.

Professor Pollard: Once the data are available to know what this programme looks like, it is just a matter of how long it would take for the Department of Health to put out a call and for people to then write a proposal to do the work. I would hope that they would perhaps ask Public Health England to scope that and run that. It will take quite a lot of planning before that can be up and running.

Dr Ramsay: Realistically we are talking about three years at the minimum.

Q139 Chair: Three years from now? So that's five years altogether from your recommendation that this should be done to actually getting it done.

Dr Ramsay: I think so, yes.

Q140 Chair: What would you say to people who say, "That's a heck of a long time to even get a study done, never mind implementing the results of that study"?

Professor Pollard: Doing this evaluation is not something where you give a vaccine and you have got the result immediately. You have to give the vaccine and then look at the impact that that has either on disease or on carriage of the meningococci, and you cannot do that in a short timeframe. We are probably talking about vaccinating, in one approach, maybe 20,000 adolescents. It is not a small programme to set up and plan and deliver.

Q141 Chair: I absolutely accept that. What I am a bit concerned about is the amount of time it has taken to even get a proposal. Is the delay with the Department of Health or is it elsewhere? It has taken from March 2014 to now, and nothing seems to have happened. That is two years out of your five-year timetable.

Dr Ramsay: It is a combination of factors. The main delay is a genuine scientific delay in deciding what the right scientific question is and what the right way to answer it is. There are processes that have to be gone through that introduce an intrinsic delay. You have to tender openly for a competitive study. People have to have the opportunity to bid for that, which will have to be worked into the thing. You also have to plan to vaccinate a school's worth of teenagers. You have to be able to go into the school and vaccinate teenagers and take swabs before and after. It is of its nature quite a large study that needs a lot of planning, and I think that the delays so far have been largely scientific.

Q142 Helen Whately: Dr Ramsay, I have a question for you. I think you will have a perspective from your role as head of immunisation in the hepatitis and blood safety department at Public Health England. Can you give a view on whether there are trade-offs made between vaccinations on the basis of cost-effectiveness, or is it the case that all those that are cost-effective mean that a programme can be delivered?

Dr Ramsay: So far, yes. The NHS has that in its constitution. The JCVI recommends a vaccine, and that vaccine is cost-effective. It is the state's duty to implement it. As far as I know, we have not ever said, "Let's do this vaccine and not another one." The cost-effectiveness is looked at across the whole health sector and not purely within vaccines, so we do not have to rob one vaccine to get another vaccine in.

In relation to trade-offs in terms of acceptance, which people were talking about earlier on, my experience of working in vaccines for over 20 years is that people worry about introducing a new vaccine and whether that puts people off the old vaccines, but that has not been my experience at all. Bringing in a new vaccine actually tends to reinvigorate people's attitude to vaccination in general. They know there is a new meningitis vaccine out and they turn up and get their other vaccines at the same time. We obviously monitor coverage very carefully, and we know that our coverage is high, and seems to be very high, for this new vaccine. It doesn't seem to have put parents off, so I don't think there is a realist trade-off.

There is clearly a workload issue for general practice, and we have to handle that in the best way we can. That is why we try to make our schedule as sensible as possible—we don't have children coming back every week and that sort of thing. I wouldn't say that there is a trade-off between vaccines.

Q143 Helen Whately: Thank you. Professor Pollard, I see that you chaired the NICE meningitis guidelines development group. Do you have a view on the question I asked the previous panel about how effective compliance with those guidelines has been and what might be done to raise compliance?

Professor Pollard: I largely agree with the comments made by the previous panel. One of the difficulties with the drive to have more children get their antibiotics—this balance required when you end up giving antibiotics to lots of children who didn't have severe diseases—is that it becomes a problem because we then have this balance between giving out lots of antibiotics and so driving antimicrobial resistance, which is clearly a major concern for us all, and preventing very rare cases of disease in the face of the floods of children with viral infections who come through primary care and into emergency departments. That is the difficulty.

If the education is to make sure that people with meningitis get antibiotics, that is fantastic—that's what we need—but the problem is that the default position is that you end up giving a lot more antibiotics to people who don't have it. There is then a real risk that you flood hospitals and primary care with more and more children who don't have serious illness. In the discussion about cost-effectiveness, where is the cost-effectiveness analysis of that? We need to look at the amount of money that

would be spent on that. Perhaps it would be better spent on vaccinating more children against the disease we are trying to prevent.

Q144 Helen Whately: Is there any insight into the extent to which antibiotics are given when meningitis is suspected, as it says in the guidelines? Do we know whether that is actually happening?

Professor Pollard: I don't have evidence, I just have the anecdotal experience that, when people suspect it, they give antibiotics. The problem and the failures arise when people have not suspected it. As you heard from Simon Kroll, a lot of the time that is because these diseases look exactly the same as viral infections and you cannot recognise them—we are just no good at identifying it in the early stages. Once it has reached the point where it is obviously meningococcal disease and people are suspecting it, then antibiotics need to be given. There is still some education needed there, because there are missed cases that get to the courts, as you heard. Those cases are not forgivable—they need to be dealt with—but we don't want to be giving antibiotics to everyone who has a viral infection. That would be a disaster for the health system.

Q145 Dr Wollaston: The petition we are considering calls for vaccinations up to the age of 11, and we have heard others calling for vaccination up to the age of five. I have been looking at the position statement on Bexsero that you published in March 2014, in which you have a table of the epidemiological data on the number of cases, which, as you pointed out, were already showing a decline, even before the introduction of the vaccine. On the age groups you included, there is one chart for under-ones and another chart for one to five, but there is no breakdown of the risk within that. If you are considering cost-effectiveness, do you have the data for, say, one to two or two to three? Is that something you would consider?

Professor Pollard: That is a really important question. As we heard, on cost-effectiveness we looked at the under-ones and then at one to four-year-olds, which includes up to their fifth birthday. There were about the same number of cases in those two groups, but obviously the under-ones is only one year, while the other group covers three years of children. Overall, you would need about 4 million extra doses to vaccinate that group between one and four years of age.

Q146 Dr Wollaston: Can I pick you up on that point? The chart I have in front of me implies that there are very many more places in the under-one group than there are in the whole cohort between one and four years of age.

Professor Pollard: Can I just check what you're looking at? The Y axis there—is that per 100,000? Because you have three times as many people, or four times as many, depending on what age you go up to—

Dr Wollaston: So in total, that's the—

Professor Pollard: We have looked at the cost-effectiveness of those two groups: the under-ones, which was just cost-effective, and the other group, which in some

scenarios was cost-effective, but not once you factored in uncertainty. That is why we didn't make a recommendation.

To come to your question about breaking this down into different age groups, most of the cases, and the deaths, in that one to four-year-old group are in the one to two-year-olds. That would be the age group, if you were going to extend it, that would have the biggest benefit from this being extended to them. We have thought about that since then and I have recently written to the Public Health Minister to ask whether she would like us to look at that age group specifically, because we haven't done before. She wrote back to me last week and said that she would like us to reconsider that age group, so we will look at that at some time in the near future.

Q147 Dr Wollaston: Thank you. That was really just to find out whether you have definitely looked at those different breakdowns in those groups up to the age of five.

Professor Pollard: Yes, I can give you last year's figures.

Dr Wollaston: That would be really helpful.

Professor Pollard: In fact, I don't have them on this one, but you probably have them.

Dr Ramsay: There were 101 cases in under-ones and, I think, 79 cases in one-year-olds. Then it fell down to about 20 or 30 in each of the age groups after, so the one to two-year-olds are by far the biggest proportion—so 101, then 78 in one-year-olds, 29 in two-year-olds, 20 in three-year-olds and 12 in four-year-olds. It goes down dramatically.

Dr Wollaston: Thank you for clarifying that.

Professor Pollard: When we introduced the programme, one of the thoughts that we had was that once the programme is introduced, effectively, over time, everyone under the age of two will be vaccinated. So by May next year everyone under two will have received the vaccine anyway. It is just a matter of time before you get the issue, as we didn't do a catch-up campaign.

Q148 Dr Wollaston: On the availability of the vaccine, which is also an important consideration, can you give us any update on what you think the future availability of the vaccine would be? Would there be sufficient supply? Even if it was your recommendation to extend it to older children, would the supply be available?

Professor Pollard: The BBC said no, but I don't know whether Mary can answer.

Dr Ramsay: I think there are currently supply constraints in the private market, but obviously it would be up to the company to find vaccine. We do need to prime the system; you can't just suddenly say all one-year-olds can start coming in until we have got the vaccine out there. There would be a lead-in time, so even if the company was able to make or find some more vaccine for us to do a catch-up, there would



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definitely be a lead-in time for us to get vaccine in and out to general practice. We obviously wouldn't want children turning up until there was vaccine there.

Professor Pollard: Everyone up to the age of 12 months would have been offered the vaccine.

Q149 Chair: One last question—you may not know the answer to this but if you do, it would be helpful. I understand that Ireland has recently agreed to begin a programme of vaccination for Meningitis B and has chosen to vaccinate those under one year old. Do you know whether they had before them the same sort of evidence you had, or whether there was any new evidence that led them to reach the conclusion that that was the right thing to do?

Professor Pollard: I don't know what evidence they looked at, but I do know, from talking to people on similar committees around the world, that the majority who have looked at this have come to the conclusion for their population that the vaccine isn't cost-effective. The reason for that is that we and Ireland have some of the highest rates of disease in the developed world, so we just reach cost-effectiveness because of our high rates of disease. As soon as you go to other countries with slightly lower rates of disease, it is not cost-effective. Everyone is looking here; if the vaccine works very much better than expected, they can go back and look at their models again. But to my knowledge, no one else has been able to find cost-effectiveness.

Chair: That's great. Thank you all very much indeed for coming and I thank all the witnesses we have heard this afternoon. It has been very informative for the Committee. We are grateful to all of you for your time and, as I said to the first panel, if there is anything you haven't had a chance to say that you feel is important, please feel free to send us that in written evidence. Thank you all very much.