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*The advice of JCVI is made with reference to the UK immunisation programme and may not necessarily transfer to other epidemiological circumstances*

## JOINT COMMITTEE ON VACCINATION AND IMMUNISATION

### Minute of the meeting on 07 February 2018

### Wellington House, Waterloo Road, London

#### Members

Professor Andrew Pollard (Chair)  
Dr Andrew Riordan (Deputy Chair)  
Prof Anthony Harnden (Deputy Chair)  
Prof Judith Breuer  
Dr Fiona van der Klis  
Alison Lawrence

Prof Adam Finn  
Prof Rob Read  
Prof Anthony Scott  
Dr Maggie Wearmouth  
Prof Maarten Postma  
Dr Peter Elton

#### Co-opted members

Dr Julie Yates (England)  
Dr Lucy Jessop (NI)

Anne McGowan (Wales)  
Dr Lorna Willocks (Scotland)

#### Medical Advisor

Prof Jonathan Van-Tam (DCMO)

#### Secretariat

Andrew Earnshaw  
Ruth Parry  
Jonathan Crofts

Dr Andras Donaszi-Ivanov  
Dr Mary Ramsay  
Dr Gayatri Amirthalingam

#### Invited Speakers

Dr Richard Pebody (PHE)  
Dr Katherine Russell (PHE)  
Dr Kevin Brown (PHE)  
Dr Sema Mandel (PHE)

Prof Paul Griffiths (UCL)  
Dr Sydel Parikh (PHE)  
Dr Helen Campbell (PHE)  
Dr Claire Hearnden (MHRA)

#### Invited observers from Devolved Administrations

Dr Anne Kilgallen (DHSSNI)  
Dr Syed Ahmed (Scottish Government)

Dr Richard Roberts (HPW)

#### Other invited observers

Dr Sandra Anglin (NHS England)  
Dr Suzanne Cotter (Eire)  
Dr Linda Diggle (Jersey)  
Jacqui Dunn (IoM)  
Dr Vanessa Field (NaTHNaC)  
Dr Darina O'Flanagan (Eire)  
Dr Dipti Patel (NaTHNaC)  
Dr Michael Edelstein (PHE)  
Prof Liz Miller (PHE)  
Prof Nick Andrews (PHE)

Dr Vanessa Saliba (PHE)  
Ruth Howlett-Shipley (MoD)  
Joanne Yarwood (PHE)  
Dr Sema Mandal (PHE)  
Dr Peter Grove (DHSC)  
Dr Ian Feavers (NIBSC)  
Dr Caroline Trotter (PHE)  
Dr Claire Cameron (HPS)  
Dr Yoon Choi (PHE)  
Cheryl Cavanagh (DHSC)

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## **Welcome**

1. The Chair welcomed all to the meeting. The Chair reminded members and observers that the papers provided for the meeting included information provided in confidence. Attendees were asked not to circulate the papers more widely or discuss the information provided with others outside of the meeting. Any requests for information should be directed to the Secretariat.
2. The Chair asked members to provide an update about any declarations of interest.
3. Apologies were noted from Prof Matt Keeling.

## **I. Minute of the October 2017 meeting**

4. The Minutes of the October 2017 meeting were agreed without change. The Committee agreed that the JCVI research prioritisation process should be made publically available.

## **II. Matters arising**

### Research prioritisation process

5. The Committee noted that the JCVI research prioritisation process had been shared with the National Immunisation Schedule Evaluation Consortium (NISEC) oversight group. The group is chaired by the DCMO, with oversight of research undertaken by NISEC that is considered a priority for the national immunisation schedule and that might otherwise not be funded elsewhere. The NISEC oversight group assess research priorities from proposals from a variety of sources including JCVI. The Committee noted that NISEC would provide an update to JCVI once a year on planned and ongoing research. The Committee agreed that it would be useful to regularly update the JCVI list of research priorities and make this publically available.

### HPV

6. The Committee noted that the HPV programme for adolescent girls was introduced in 2008 with the primary objective to prevent cervical cancer. Later evidence confirmed the important role of HPV in oropharyngeal (head and neck), anal and penile cancers, and led JCVI to review again whether a boys programme might be cost-effective.
7. JCVI agreed that it was clear there would be health benefits to males from a boys' programme but the latest PHE modelling results, reviewed in October, were borderline cost-effective. Much of the benefit from boys' vaccination resulted from the additional prevention of cervical cancer cases in girls. Most recently it had been announced that the pilot HPV programme for MSM in GUM and HIV clinics would be rolled out nationally.

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8. The Committee was reminded that it had issued interim advice on boys' vaccination for consultation during the summer, and stakeholder responses had been reviewed at the October 2017 JCVI meeting. The Committee noted work on the PHE impact and cost-effectiveness assessment was continuing, and JCVI was awaiting the outcome of the independent peer review of this work.
9. One major issue highlighted by stakeholders concerned that of equality. JCVI had acknowledged in the interim statement there were equality issues, but that as an expert scientific committee the Committee did not have the expertise to conduct an equality assessment. JCVI had therefore asked the Department of Health and Social Care (DHSC), which has the necessary expertise, to consider equality and report back to JCVI before it makes its final recommendation. *[Post meeting note: DHSC have since noted that its Equality Analysis will need to take into account the JCVI's final advice and will not therefore be completed until the JCVI's final advice has been received.]*
10. The Committee noted a letter from a legal firm had been received making a number of assertions with regards to the functioning of the committee in relation to the Equality Act.
11. The Committee considered some of the potential implications if there was merit in the claims made in the letter. It considered that there could be significant implications but agreed that, as an expert scientific committee, the JCVI is not equipped to fully consider equality issues in detail.
12. The Committee noted that guidance provided by the Treasury Green Book was considered best practice for cost-effectiveness methodology, and that the NICE HTA methodology, referred to in the JCVI ToR was based on the Treasury Green Book. DHSC indicated that as an independent committee JCVI could take a different methodological approach in making its advice, if it felt justified in doing so. The Committee noted the following points:
  - the HPV programme was driven primarily by the need to prevent cervical cancer;
  - it would be important to be mindful of additional analyses for the HPV question and the additional delay these might cause to the decision on HPV and boys; and
  - care should be taken in future cost-effective analyses in deciding what the base case should be and the Committee should be explicit on why this is chosen.
13. The Committee agreed there was merit to further consideration of the possible impact of equality requirements on its methodology. The Committee agreed that it needed to see the results of the independent peer review of the modelling work by PHE, and the additional analyses undertaken, before concluding its advice, and that legal advice should be obtained.

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### Horizon Scanning

14. The Chair asked members for vaccines they would be particularly interested in seeing information on from the annual horizon scanning exercise, which would be undertaken ahead of the June 2018 meeting. Committee members expressed interest in group B streptococcal, respiratory syncytial virus, healthcare associated infection and sexually transmitted infection vaccines. Members were also interested in research into alternative delivery mechanisms, and vaccines which would not require a cold chain.

### **III. Coverage**

15. The Committee noted coverage data from across the UK. Members noted a potential trend for lower coverage, and questioned whether there were specific factors involved in this. The work to offer vaccines on several occasions in teenagers was considered excellent, and the Committee noted that PHE was actively working on how to improve this in England through work with NHS England.

### **IV. Herpes Zoster vaccination**

16. The Committee noted feedback from the teleconference of the varicella/zoster subcommittee held on 24 January 2018. The subcommittee met primarily to consider data on the use of Shingrix® in immunocompromised individuals.

17. It was noted that Shingrix® gave very good results in immunocompetent individuals. GSK, the vaccine manufacturer in this case, had provided data on efficacy, immunogenicity and safety of the vaccine in a number of groups of immunocompromised patients. However the data presented to the subcommittee were focussed on efficacy in autologous haematopoietic stem cell transplant recipients.

18. The recipients were adults over 18 years who were immunised 50 to 70 days post-transplant. The primary endpoint presented for vaccine efficacy against Herpes Zoster in adults >18 years was 68.17%, Efficacy was also assessed stratified by age 18-49 and 50 years and over. In this study the overall efficacy was higher than the first objective of 50%, at 68.17%.

19. Efficacy data broken down by age in the over 50 years group was not available, including for those eligible for immunisation in the current programme (70-79 years). Members commented that in the absence of a breakdown of trial participants by age, it was reasonable to assume that many of the participants were at the younger end of the age group.

20. It was noted that recently in the US, the Advisory Committee on Immunisation Practice (ACIP) had made positive recommendations for the use of Shingrix® in people over the age of 50 years and stated a preference over the other (live) vaccine on grounds of efficacy.

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21. It was noted that it would be important that immunocompromised individuals received two doses of Shingrix®.
22. It was noted that modelling was being carried out to inform the potential for the use of Shingrix® in the wider UK programme, which may be available for a subcommittee meeting in May 2018. It might not be possible to address the question of long term duration of protection for a few years.
23. The Committee concluded that the efficacy of Shingrix® was good in the severely immunocompromised group studied. The majority of those who were eligible but contraindicated for live vaccine were likely to be less immunocompromised, so the evidence considered was likely to provide a conservative estimate of efficacy for this group. Although efficacy data in the immunocompromised 70 to 79 years age group were not provided, the efficacy in immunocompetent adults in that age group and the limited waning seen with Shingrix®, led the Committee to conclude that efficacy was unlikely to be influenced much by age. Given the information provided, the Committee also concluded that use of Shingrix® in the immunocompromised was highly likely to be at least as cost effective as Zostavax® was for the immunocompetent.
24. The Committee therefore advised use of Shingrix® in those contraindicated to live herpes zoster vaccines due to immunocompromising conditions or treatment, who would be eligible for vaccination under the current programme, so that they can gain a similar level of protection to those who are not immunocompromised. Vaccination in this group was particularly important, due to the higher incidence of herpes zoster. This advice was consistent with the original recommendation for vaccination of all adults aged 70-79 years with herpes zoster vaccine.

## **V. Pneumococcal vaccination**

25. The Chair advised the Committee that in October 2017 they had discussed evidence presented on the impact of a 1+1 schedule for pneumococcal conjugate vaccine in the UK. This had included a 1+1 immunogenicity study undertaken through the National Vaccine Evaluation Consortium (NVEC), and mathematical modelling of the impact of moving to a 1+1 schedule undertaken by PHE. The conclusion of the Committee had been that the overall impact for both 1+1 and 2+1 programmes was likely to be similar, and that a 1+1 schedule for the UK would be appropriate at this time.
26. Following publication of the Minute of the October 2017 meeting, charities and industry had written to the secretariat and DHSC, asking for additional information, and requesting a period of stakeholder consultation. The Chair indicated he had agreed that a consultation would be appropriate in this case, given the extensive interest in the issue. The consultation had been undertaken between the October and February meetings.
27. The Committee noted the stakeholder comments received, and a summary of the stakeholder comments prepared by the secretariat. The Committee noted requests to extend the consultation period had been received, citing a short notice period for the consultation, and the time available for the Committee to

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consider the responses in detail. The Committee agreed that it was a reasonable request, and that the deadline should be extended, and the Pneumococcal sub-committee should consider the responses ahead of the June 2018 meeting.

### Modelling

28. In response to a number of stakeholder comments, PHE stated that:

- force of infection, carriage prevalence and case carrier ratios in infants were derived from a longitudinal carriage study prior to PCV7 introduction which included a cohort of infants (contrary to assertions made by stakeholders);
- carriage studies in older children, following the introduction of PCV vaccines into the schedule, were not necessary for model parameterisation which was reliant on the carriage data from the pre-PCV study;
- additional sensitivity analyses had been undertaken or would be undertaken shortly, which would address comments of the stakeholders, including:
  - investigating the impact of a 0+1 schedule to consider a scenario of no effectiveness of a single dose in infancy;
  - changes to coverage - coverage in the model presented to JCVI in October used older GPRD data, which provided timing of vaccination by month, and this averaged 73% coverage for the booster dose, which was much lower than coverage for the UK ~91%;
- from 14/15 onwards a lower effectiveness against carriage for the additional serotypes covered by PCV13 has been evaluated to reflect the lower effectiveness of the vaccine against 19A which now comprises the majority of the vaccine-preventable carriage and disease (as serotype 3 is considered not vaccine-preventable in the model);
- any change which increased vaccine type carriage would reduce non-vaccine type carriage, with parallel changes in invasive disease;
- the modelling only took IPD into consideration as there were no good data on the serotypes responsible for non-invasive disease; and
- it would be reasonable to assume that the magnitude of impact on IPD predicted in the modelling would also apply to non-bacteraemic endpoints.

29. The Committee agreed that many of the comments received during the consultation had already been taken into account within the modelling undertaken. The Committee agreed that additional work may however be required, and the Pneumococcal Subcommittee should discuss the latest modelling before the next JCVI meeting in June 2018, including the full range of results from the sensitivity analyses.

### Incremental cost-effectiveness

30. The Committee noted concerns raised by stakeholders that an incremental cost-effectiveness assessment would be required to return to a 2+1 schedule. The Committee noted that correspondence with the Department of Health Analytical

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Team, had confirmed that such an analysis would not be required to move back to a 2+1 schedule if a decision was made to change the schedule to 1+1.

### Single priming dose

31. Taking all the evidence together the Committee agreed that a single priming dose should offer substantive protection, and that infants less than one year of age would also benefit from herd protection. Members cited research indicating efficacy of the priming dose of around 75% and PHE research which indicated single dose efficacy of 60%, with two dose efficacy of 80%. The Committee had considered that herd protection would provide good protection from vaccine type disease in infants, with additional protection from a single dose in case herd protection was not sufficient. The Committee noted evidence from recent analyses of waning of PCV7 which indicated no evidence of increased waning in the toddler single dose catch-up cohort compared to those getting a full 2+1 schedule.

### Rationale

32. The Committee discussed some of the common themes among the stakeholder responses received, including the need to explain the rationale behind the decision in a clear and straightforward way.

33. Committee members considered that the primary driver behind the decision to move to a 1+1 immunisation schedule was not the cost of the programme, as this was not a part of the Committee's remit. The Committee considered a 1+1 schedule would be very similar to the previous 2+1 schedule in terms of disease rates and was an important step to simplify the NHS immunisation schedule, and the needle burden for infants, without compromising population protection. The combination of herd protection and good immunological responses after the booster dose, with some protection offered by the first dose, would provide very similar protection to young children, with modelling predicting very little additional disease.

34. Members discussed application of the principle of minimum intervention to the immunisation program schedule. If the evidence indicated that similar results could be achieved with fewer doses, it was important to consider this from a public health perspective.

35. JCVI discussed the evolution of the pneumococcal vaccination programme. As the programme matured, at some point it would become logical to maintain the ecological effects with fewer doses within the population. Members considered it not a question of if, but when a reduction of doses would be appropriate. Based on the evidence presented, members considered that three doses were no longer necessary to protect against disease caused by vaccine type strains.

36. Members noted concerns raised by stakeholders, and wished to ensure that all responses were fully considered before final advice was provided to DHSC.

### Monitoring a change in programme and factors considered in changing advice

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37. JCVI members raised the possibility of pneumococcal carriage surveillance study to gather more information. However PHE experts agreed that IPD surveillance was a more reasonable and sensitive tool (due to the extremely low carriage of vaccine serotypes in children and the high case:carrier ratio of the emerging serotypes) to monitor the PCV programme. Monitoring carriage for vaccine serotypes would require sampling of tens of thousands of children. National surveillance already required serotyping of all invasive isolates through the PHE reference laboratory, and the Committee agreed that this service remained critical for monitoring the impact of the PCV programme.
38. Several stakeholders inquired about clarifications of trigger points for reconsidering the evidence and reviewing the impact of any schedule changes should a move be made to a 1+1 schedule. The Committee agreed that it was a complex picture which would need to be carefully examined to identify the effects of programmatic change over secular trends. The Committee agreed that it would continue to carefully review the trends in IPD across all ages.

#### Timing of the first dose

39. Some stakeholders expressed worries that young infants would be more susceptible to IPD before vaccination, and requested moving the first dose of PCV13 to week 8 from week 12. The Committee asked PHE to consider this point further.

#### Public consultation

40. The Committee noted a stakeholder call for a public consultation; the Committee agreed that public consultation was not an appropriate tool for an evidence based Committee such as JCVI.

#### MenC removal

41. Stakeholders and JCVI members raised the example of the MenC vaccination schedule changes, with cases of invasive disease being seen in infants. The Committee agreed that the removal of the MenC dose had been an important factor when considering the introduction of the MenB programme for infants. The MenB programme had prevented many cases of meningococcal disease in vaccine eligible infants, compared to a small increase in cases of MenC disease following removal of the infant MenC dose. Furthermore, the addition of the adolescent MenACWY programme to maintain herd protection against four meningococcal groups remained a critical part of the meningococcal prevention strategy, because of the indirect protection offered by the adolescent programme to all age groups, including infants. Members however felt that this underlined the importance of making it clear how the JCVI makes decisions.

#### Conclusions

42. The Committee agreed that their initial decision to advise a change to a 1+1 schedule from a 2+1 appeared to remain justified based on the scientific

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evidence presented. The Committee would however extend the consultation period, which was reasonable in the circumstances, to ensure that evidence that might impact on that advice was considered. Noting several stakeholder responses, the Committee agreed that further consideration and discussion was appropriate, and that the pneumococcal sub-committee should convene and discuss the stakeholder comments, and the latest modelling, ahead of the JCVI meeting in June 2018.

## **VI. Hepatitis B vaccination**

43. The Committee noted that in 2017 WHO reported on the findings of a systematic review of hepatitis B virus (HBV) vaccine schedules and effectiveness. This review had led to some changes in the recommendations from WHO, including dropping the reinforcing dose.
44. It was noted that a significant number of courses were given in adult schedules for occupational reasons or to protect people who were at risk for other reasons. PHE asked the Committee to consider endorsing their recommendation for removing the reinforcing dose for immunocompetent healthcare workers (HCWs); a single dose at 5 years after completing a full course of primary immunisation.
45. It was noted that protection probably persisted for up to 20 years. The Green Book chapter was revised in 2017 following the introduction of hexavalent vaccine, and taking into account WHO recommendations. It was noted that PHE temporary advice was that the reinforcing dose scheduled for 12 months could be deferred until 24 months and the HCWs' 5 year booster was not required.
46. It was noted that increased supply was expected in 2018, but there would still be shortages from one UK supplier. Stock management of vaccine supply would need to continue to the latter part of the year. It was proposed to manage the continued shortage in terms of the recovery plan by not boosting the backlog of HCWs.
47. It was noted from the systematic review that the majority of studies were carried out in high endemicity countries, although some had been undertaken in the USA and countries in Europe including Germany. These supported the view that duration of protection was likely to endure for 20 to 30 years following a successful primary course. In high endemicity countries there may be a higher tolerance for risk associated with the possibility of waning of protection.
48. The Committee noted concerns about immunogenicity in renal patients, and as such the PHE recommendation was only for HCWs. Post-exposure immunisation would still require a booster dose.
49. The Committee agreed with the PHE position that HCWs who have completed a primary course and have responded no longer require the booster at 5 years, and advised this.

## **VII. Rabies vaccination**

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50. The Committee noted that:

- in October 2017 WHO SAGE had formed revised recommendations regarding pre-exposure and post-exposure vaccination against rabies;
- management of immunosuppressed individuals and use of rabies immunoglobulin (HRIG) had also been considered;
- PHE had set up an expert group to consider these recommendations, and provide expert advice on UK use of rabies vaccine and immunoglobulin;

51. The expert group had advised:

- there was a lack of evidence for two dose intramuscular (IM) pre-exposure prophylaxis (PrEP) regimen;
- a three dose IM PrEP regimen should continue to be used;
- an accelerated three dose IM PrEP regimen could be considered with a booster at one year;
- the main emphasis on IM administration should continue, but two-site ID regimen (days 0, 7) would be an acceptable alternative to IM;
- no change to booster recommendations for those at 'continuous' or 'frequent' risk;
- travellers should have a risk assessment to determine need for booster doses;
- post-exposure treatment (PET) started/continued in UK should be via IM route;
- a four dose Essen regimen recommended on days 0, 3, 7 and 21-28;
- if PET started abroad, convert to appropriate point on Essen regimen;
- if IPC regimen completed abroad, give 1 further dose IM from day 2;
- individuals should be considered fully immune and only require 2 PET doses if have received documented:
  - 3 doses IM PrEP
  - 3 dose ID PrEP
  - 2-site 2 dose ID PrEP
- a precautionary approach for all immunosuppressed, with 5 vaccines and HRIG for all who fulfil the criteria for Groups A and B with a Category II or III exposure in a high or low risk country;
- antibody tests for all immunosuppressed individuals following a PET course;
- those not in Group A or B should be considered immunocompetent;
- immunosuppressed patients requesting PrEP should be counselled to avoid activities leading to exposure;
- if they still request PrEP, they must have antibody test to confirm response to PrEP;
- a risk assessment for all exposures before use of HRIG;
- HRIG may be appropriate for certain wildlife exposures in low risk countries;
- HRIG should be given to all exposures from confirmed rabid animal/bat;
- strengthen messaging on infiltration of HRIG at site of bite (+/- local analgesia where appropriate);

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- scratches (except severe lacerations) to be managed as Category II exposures, i.e. no HRIG required;
- no HRIG required for primate exposures;
- HRIG not required for bat bites in UK, but still used for bat exposures outside UK; and
- mucous membrane exposures should receive IM HRIG.

52. The Committee agreed that WHO were trying to provide a pragmatic regime for PrEP and PEP in endemic countries. The UK situation was therefore very different. With respect to the accelerated PrEP schedule, it was agreed that this was appropriate where vaccination was sought shortly before travel. Intramuscular (IM) rather than intradermal (ID) remained the preferred route of administration from the UK perspective. However intradermal vaccination was acceptable where undertaken by appropriately trained staff on the prescriber's own responsibility. For post-exposure treatment the simplest regime (Essen) seemed to be the most appropriate.

53. Regarding vaccination in immunosuppressed individuals, the Committee noted that the WHO recommendations were precautionary, and that no definition of immunosuppression had been provided. The Committee agreed that the simplest regime and categorisation would be appropriate given the number of individuals with immunosuppression seeking vaccination. After discussing the operationalisation of the recommendation, the Committee agreed that it was reasonable to categorise individuals into groups A and B, but where in doubt the individual should be assumed to be category B. It was also considered reasonable to test after the fourth dose and then assess whether the fifth dose was necessary.

54. The Committee did not agree with the recommendation for the two-site ID regimen (days 0, 7) as a PrEP schedule, and felt the current guidance on a three dose intradermal course should be maintained. Overall the Committee agreed with the remaining recommendations of the PHE expert group.

## **VIII. Meningococcal disease**

55. The Chair reminded the Committee that in February 2014 JCVI had advised that as Bexsero® would likely provide some protection against other serogroups of meningococci, including serogroup C meningococci (MenC), the dose of infant MenC conjugate vaccine offered at three months of age could potentially be removed from the schedule, particularly given the currently very good herd protection provided to infants by older children, and the low level of meningococcal C carriage in the population. However, the Committee had agreed that removal of the infant MenC vaccine could only be recommended once the programme of MenC vaccination in adolescents was established, so that herd protection would remain established in adolescents in the future.

56. The Committee had previously noted coverage data for meningococcal ACWY conjugate (MenACWY) vaccine in adolescents, with lower coverage seen in catch-up cohorts, and better coverage in the routine cohorts. There had also

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been a routine MenC vaccination programme for one year, prior to a move to MenACWY vaccine, with those vaccinated now around 17-18 years old. Although a large number of cohorts had now been vaccinated, it was important to note that some cohorts had low coverage.

57. The Committee was provided with an update on invasive meningococcal disease (IMD) epidemiology from PHE, the Committee noted that:

- there were 749 cases of IMD in the 16/17 epidemiological year compared to 811 in the preceding year;
- rates of meningococcal capsular group Y (MenY) IMD were remaining stable;
- there were fewer cases of capsular group W (MenW) IMD up to this point in the year than were seen up to this point in the preceding two years, with 7 cases in the 15-24 year age group targeted by the MenACWY vaccine;
- there had been increases in MenW IMD in the oldest age groups; and
- overall numbers of MenC IMD remained very low; although there were more cases in the most recent epidemiological year than in previous years, both in infants and in older adults.

58. Members questioned whether the small rise in MenC IMD in infants was associated with coverage in the adolescent programme or removal of the MenC dose in infants. The Committee also noted an increase of MenC IMD in older age groups as well as infants. Members considered the full impact of indirect protection against MenC disease might not be attained until two or three more cohorts had been offered adolescent MenACWY vaccine as part of the routine school programme, where coverage was high. The Committee noted that MenC carriage, although always uncommon, had not been increasing in the studies available.

59. The Committee noted that the number of cases of MenC IMD being seen in infants was of the same order as PHE had predicted might occur following removal of the MenC dose. The Committee agreed that removal of the MenC dose had been an important factor in introduction of the MenB programme, and the MenB programme had likely prevented many cases of meningococcal disease.

60. The Committee noted that in the Netherlands MenC vaccine was only offered at 14 months of age, and that MenC cases had remained stable over the last few years. MenW cases had been increasing in the Netherlands, with incidence doubling over the last year, and tripling in those less than 5 year of age.

61. The Committee considered whether the increase in disease in older adults, but not in younger adults, could be associated with the oldest MenC catch-up cohorts bringing rates down in younger adults. Similarly, cases of MenC IMD occurring in older infants could be associated with maternal antibody, due to the catch-up cohorts reaching childbearing age.

62. The Committee agreed it would continue to actively review MenC IMD in the UK.

## MenB

63. The Committee noted a presentation on capsular group B (MenB) IMD in England. The Committee noted that:
- to date in the 2016/17 epidemiological year, cases of IMD overall, and of MenB IMD, were lower than the previous epidemiological year;
  - the proportion of MenB IMD in under 5 year olds had also continued to decrease;
  - decreases of MenB IMD had been seen in all age groups except teenagers, young adults and older adults;
  - there had been an overall decrease in MenB IMD since the last epidemiological year, with 447 cases in 2015/16 and 396 in 2016/17 (provisional);
  - updated preliminary analysis (~2 years) indicated continued reductions in MenB IMD in vaccine-eligible infants, irrespective of vaccine coverage in the population
  - vaccine effectiveness against MenB IMD for the booster dose was 82% (-81% to 97%).
  - vaccine effectiveness of at least one dose was 43% (-11% to 69%); and
  - vaccine effectiveness of at least two doses was significant at 64% (4% to 84%).
64. The Committee noted the information presented and that the base case modelling parameters used to recommend the programme remained very close to the real life figures presented. The results presented on MenB IMD were very reassuring. It was further noted that a number of MenB IMD cases seen had been very mild cases, and it was possible this was another effect of vaccination.

## **IX. Polio containment**

65. Prof Paul Griffiths introduced himself in his roles of Chair of the National Certification Committee (NCC) for polio and Chair designate of the National Authority for Containment (NAC) of polio.
66. The Committee noted the current global position with the WHO Global Eradication Initiative having been launched in 1988 resulting in greatly reduced numbers of cases of paralytic poliomyelitis, with the number of endemic countries going from 125 to 3. The declaration of the eradication of wild poliovirus type 2 in 2015 was a significant milestone.
67. It was noted that the cornerstone of eradication was ensuring high national routine immunisation of children in the first year of life with oral polio vaccine (OPV) in endemic countries whilst maintaining high levels of immunisation coverage with inactivated polio vaccine (IPV) in polio-free countries. Withdrawal of OPV2 from OPV-using countries took place globally in April and May 2016 with a synchronised switch from trivalent OPV to bivalent OPV.

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68. The Committee noted the two committees in the UK charged with monitoring and reporting back to the European Regional Commission for Certification of Poliomyelitis Eradication (RCC) on surveillance and vaccine uptake in order to provide evidence of continued polio-free and low risk status (the NCC) and containment activities (the NAC).
69. The Committee noted the Global Action Plan to minimise poliovirus facility-associated risk (GAP III) and the progress in the UK towards establishing a GAPIII containment certification scheme (CCS) which would apply the principles of GAP III in the UK to be consistent with current procedures and legal provisions.
70. The issue of laboratories unwittingly holding potentially polio infectious material was raised. This has already been recognised by WHO and they had provided guidelines on tackling this. The NAC had considered the approach in the UK and suggested that the most productive way forward might be to contact laboratory safety officers requesting that they identify freezers in which potentially polio-containing materials might be stored.
71. The issue of carrying out serology (neutralisation tests) and having to therefore culture poliovirus was raised and it was noted that international regulations with regard to evidence of antibody titre in immunoglobulin products may be difficult to change in the short term.
72. It was noted that the six laboratories in the UK who had registered their intention to become polio essential facilities (PEFs) would need to justify holding and working with live poliovirus, and that use of vaccine strains or non-infectious virus like particles, where possible, would be encouraged.
73. The lack of clarity, at present, on the part of WHO with regard to the cessation of IPV immunisation post-eradication was noted. The committee did not expect IPV immunisation could be safely withdrawn even in the medium term.
74. PHE indicated that the key element of the surveillance work done by PHE was providing assurance that the UK is maintaining its elimination status. One of the criteria was to provide evidence of a surveillance system that would detect a case should it occur. In order to do this it was important to obtain stool samples from relevant patients and this is an ongoing challenge. Environmental surveillance in the form of testing of sewage samples has provided encouraging results and had picked up OPV on two occasions.
75. It was noted that it was more than twenty years since there has been a case of poliomyelitis in the UK and that clinical practice has changed; the Committee was asked to endorse a request from the PHE national polio reference laboratory to encourage clinicians to collect appropriate stool samples for enterovirus detection. This was agreed.

## **X. Influenza**

76. The committee received an update from PHE on the 2017/18 flu season so far

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and noted that:

- the season had started before Christmas with outbreaks in care homes and had been fairly intense over the Christmas period, peaking in January;
- GP consultation rates for influenza like illness had reached the moderate level of activity;
- the season had been busy in terms of the impact on healthcare services;
- peak activity for admissions for high dependency units (HDU) and intensive care units (ICU) had been the highest in the last six seasons;
- the majority of the burden in terms of hospitalizations has been in the elderly;
- significant excess all-cause mortality had been observed this season, mainly in the over 65 years olds, some of which would be attributable to flu but cold weather would also have been an important contributor;
- influenza A(H3N2), and B had been the major viruses in circulation but there had also been some A(H1N1)pdm09 circulating;
- the circulating A(H3N2) viruses are similar to last year's circulating A(H3N2) viruses, belonging mainly to the 3c2a and 3c2a1 subclades which is genetically similar to the 2017/18 vaccine virus strain, although it had been difficult to fully antigenically characterize the wildtype virus to be sure of the match;
- circulating influenza B viruses had mainly been of the Yamagata lineage which was included among the vaccine strains for the 2017/18 quadrivalent influenza vaccines but not in the trivalent vaccines;
- influenza vaccine uptake rates had been good, with slightly higher rates in the elderly and pregnant women compared to the previous season, and similar levels in the adult at-risk groups, although the number vaccinated had also increased in this group;
- in England uptake in the childhood programme had been higher than the preceding season in 2- 3 year olds and school-age children;
- four year olds received the vaccine in school for the first time and uptake had increased from 35% to 62%.
- in the devolved administrations peak GP consultation rates had reached the moderate range, except in Wales where rates had been in the high range;
- vaccine uptake in the devolved administrations was comparable to that seen in England for risk groups and slightly higher for children 5 years and above;
- early mid-season estimates of vaccine effectiveness (VE) against all influenza for the live attenuated influenza vaccine (LAIV) was encouraging though with wide confidence intervals, but VE estimates were lower for the inactivated vaccines in adults;
- overall, VE against influenza B was better with evidence of moderate protection than that against A(H3N2), where there was no significant evidence of effectiveness
- the end of season results would provide more precision;
- the UK mid-season vaccine estimates were in-line with those observed in Canada and elsewhere in Europe.

77. The Committee noted that the trivalent inactivated vaccine is likely to have

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performed relatively well against the predominantly lineage mis-matched circulating influenza B virus. The reasons for this need further investigation and could indicate there was some degree of cross protection or prior vaccination. PHE indicated it would be looking into this in more detail at the end of the season results and would report their findings to the Committee in June 2018.

78. The Committee noted that concerns around the low VE of the inactivated vaccine against H3N2 in the elderly remained. The Committee noted that, based on JCVI advice from October 2017, the adjuvanted trivalent influenza vaccine was to be made preferentially available for the elderly in the 2018/19 season. The quadrivalent inactivated vaccine would also be the vaccine of choice for the under 65 at risk groups, reflecting advice developed by correspondence for the Green Book.
79. The Committee noted that the UK LAIV studies on virus shedding and vaccine induced cell mediated immunity were underway. The Advisory Committee on Immunisation Practices (ACIP) would meet later in February to discuss the latest findings from the manufacturer on LAIV viral shedding. Other important dates include the WHO vaccine composition meeting for the next northern hemisphere season also in February and the ACIP meeting in June.

## **XI. Annual MHRA update**

80. The Committee noted a written report from the MHRA and a verbal update from an MHRA representative. The Committee noted the update on UK suspected adverse reactions associated with routine and/or commonly used vaccines reported to the MHRA via the Yellow Card Scheme between November 2016 and October 2017. The MHRA reminded the Committee that a report of a suspected adverse reaction to the MHRA does not necessarily mean that it has been caused by the vaccine, as many factors have to be taken into account in assessing the relationship between a vaccine and suspected reaction, such as the possible role of underlying or undiagnosed illness. The Committee noted that overall the MHRA had not identified any significant new safety issues in the period under consideration. The Committee thanked the MHRA for the update.

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<b>Prof Andrew Pollard (Chair)</b>
<p>Professor Pollard receives no personal payments from the manufacturers of vaccines</p> <p>He is Director of the Oxford Vaccine Group in the Department of Paediatrics, University of Oxford and has current research funding from the Bill and Melinda Gates Foundation, the National Institute for Health Research, the European Commission, Medical Research Council, Wellcome Trust, Innovate UK, and the Global Alliance for Vaccines and Immunisation. He chairs the scientific advisory group on vaccines for the European Medicines Agency and is a member of WHO's SAGE.</p> <p>Other investigators in the Department conduct research funded by vaccine manufacturers and the Department has received unrestricted educational grant funding for a three day course on paediatric infectious disease from Gilead, MSD, GSK and Astra Zeneca.</p>
<b>Prof Anthony Harnden (Deputy Chair)</b>
<p>Professor Harnden has no registered conflicts of interest.</p>
<b>Dr Andrew Riordan (Deputy Chair)</b>
<p>Dr Riordan has no registered conflicts of interest.</p>
<b>Prof Judith Breuer</b>
<p>Professor Breuer has no registered conflicts of interest</p>
<b>Dr Peter Elton</b>
<p>Dr Peter Elton has no registered conflicts of interest</p>
<b>Prof Adam Finn</b>
<p>Professor Adam Finn receives no personal payments from the manufacturers of vaccines.</p> <p>Professor Finn undertakes unpaid advisory work for Astellas on a klebsiella-pseudomonas vaccine.</p> <p>Professor Finn's Department receives funding for consultancy work from VBI vaccines on a developmental Hep B vaccine, and Bionet on a developmental pertussis toxin vaccine.</p> <p>The University of Bristol conducts research funded by GSK on meningococcal carriage, by Pfizer on pneumococcal carriage and transmission.</p>
<b>Prof Matt Keeling</b>
<p>Professor Matt Keeling has no registered conflicts of interest.</p>

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<b>Dr Fiona Van der Klis</b>
Dr Fiona van der Klis has no registered conflicts of interest
<b>Ms Alison Lawrence</b>
Ms Alison Lawrence has no registered conflicts of interest
<b>Mrs Anne McGowan</b>
Mrs McGowan receives no payments from the manufacturers of vaccines  Mrs McGowan's employer Public Health Wales develop educational materials with funding from Pfizer, Sanofi Pasteur MSD, Novartis, Astra Zeneca and Wyeth.
<b>Prof Maarten Postma</b>
Professor Postma has received honoraria from SPMSD (health economics) MSD (health economics), and is an advisor to companies on Rotateq and Rotarix vaccines.  Professor Postma works for the University of Groningen which receives grants from SPMSD and GSK for work related to influenza vaccines.  Professor Postma attends advisory boards unrelated to vaccines or vaccine industry  Professor Postma organized a conference which was financially supported by Pfizer relating to Health Economics.
<b>Prof Robert Read</b>
Professor Read receives no payments from the manufacturers of vaccines.  The University of Southampton receives CASE studentship awards from Novartis and GSK.
<b>Prof Anthony Scott</b>
Professor Scott receives no payments from the manufacturers of vaccines.  Professor Scott is Director of the Vaccine Centre and the Director of the Health Protection Research Unit at the London school of Hygiene and Tropical Medicine, which receives funding from PATH for research into whole cell pneumococcal vaccines. Professor Scott is also a scientific advisor to PATH on whole cell pneumococcal vaccination
<b>Dr Maggie Wearmouth</b>
Dr Wearmouth has no registered conflicts of interest
<b>Dr Lucy Jessop (co-opted member)</b>
Dr Lucy Jessop has no registered conflicts of interest

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<b>Dr Lorna Willocks (co-opted member)</b>
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Dr Lorna Willocks has no registered conflicts of interest
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<b>Ms Julie Yates (co-opted member)</b>
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Ms Julie Yates has no registered conflicts of interest
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