
JOINT COMMITTEE ON VACCINATION AND IMMUNISATION
Sub-committee on adolescent vaccinations

Minute of meeting held on Friday 27 January 2012
10.30am – 4pm
Wellington House,
133-155 Waterloo Road, London SE1 8UG

Members

Dr Anthony Harnden (Chair)	Dr Jenny Harries
Dr Alison Smith-Palmer (for Dr Claire Cameron)	Dr Mary Ramsay
Dr Dick Churchill	Pauline MacDonald
Professor Adam Finn – by phone for items 1, 2, 6 and 7	Dr Richard Smithson
Professor Andy Hall	Julie Thornton
Professor Kate Hunt	Professor Judy Breuer
Dr Mark Jit – from item 5	

Other attendees

Dr Nicola Steedman (Scottish Government)
Dr Phil Bryan (MHRA)
Dr Bridget King (MHRA)

DH

Dr Dorian Kennedy
Joanne Yarwood
Dr Karen Powell
Dr David Ishola
Dr Peter Grove

Secretariat

Dr Tom Barlow (minute)
Andrew Earnshaw (minute)

1. Welcome and introductions

1. The chair welcomed all to the meeting and asked all present to introduce themselves. Apologies were received from Professor David Salisbury (DH) and representatives from the Welsh Assembly and Northern Ireland Governments. The chair explained that the sub-committee had been convened to consider vaccinations for adolescents and to advise JCVI. JCVI and the Department of Health (DH) were grateful to all those participating in this new sub-committee.
2. The chair reminded members that it was important to complete the declaration of agreement to the JCVI Code of Practice and the declaration of conflicts of interests, including nil returns. Much of the written material provided in the papers was unpublished and had been provided in confidence and should not be circulated more widely nor discussed outside of the meeting.

2. Overview of the sub-committee (paper 12/1/1)

3. The sub-committee agreed the terms of reference and the general approach as set out in the paper but suggested that it would be important to consider measles and rubella immunity when discussing mumps immunity. In addition, the sub-committee could, in the future, review evidence on the impact and cost effectiveness of Hepatitis B and Human Papillomavirus (HPV) vaccination of adolescents. It was explained that further work is planned to re-evaluate HPV vaccination given emerging evidence of potential wider protection against non-cervical cancers, the possible availability of higher valency HPV vaccines, the possibility of two dose vaccination schedules and the possible vaccination of boys and men who have sex with men.

3. Possible pertussis vaccination for adolescents (paper 12/1/3)

4. The chair explained that JCVI had asked the sub-committee whether the available data on disease epidemiology, vaccine effectiveness and cost effectiveness suggested that a booster dose of pertussis should be introduced.
5. The committee noted that the UK schedule of pertussis vaccinations had very effectively controlled pertussis in childhood, and that the annual incidence rate continued to be low and stable with no increase in infant deaths. However, the epidemiology of pertussis in adolescents and adults was not well understood. Increase in cases in recent years in adolescents and adults in the UK and other countries had been seen and was probably due, in large part, to improved case ascertainment but there may also be real increases in disease incidence, due to waning of vaccine-induced and natural immunity. A higher pertussis positivity rate in samples tested in 2011 suggested that the recent increase in adult disease is likely to be real rather than due to improved case ascertainment. Despite improved case ascertainment there is still significant under reporting as pertussis outside of childhood is not well recognised and diagnosed.
6. In terms of assessing the need for, and impact of, a booster dose of pertussis vaccine, the sub-committee noted that there are limited data on carriage and routes of transmission of pertussis, on the duration of vaccine-induced and natural immunity and on the burden of disease in adolescents and adults. Without better data it would not be possible to assess the impact, effectiveness and cost effectiveness of alternative vaccination strategies. It was noted that research underway at University of Oxford would provide better data on the burden of disease and a study planned by the HPA would provide data on the burden of disease and also on routes of transmission.

7. The sub-committee agreed that advice on changes to the immunisation schedule would need to consider a range of vaccination strategies and take into account both direct protection of adolescents/young adults and indirect protection of unimmunised and partially immunised populations, particularly neonates. The sub-committee concluded that before firm advice could be provided further data and analyses would be required including:
 - on pertussis carriage and routes of transmission
 - on burden of disease
 - the duration of vaccine-induced and natural protection
 - epidemiological and economic modelling of potential vaccination strategies including vaccination of young and older adolescents, adults, pregnant women and cocooning to protect young infants.
8. The sub-committee agreed to return to this issue at a later date when the findings of the research and epidemiological and economic modelling are available.

4. Mumps vaccination (paper 12/1/4)

9. The chair explained that JCVI had asked the sub-committee to consider if the available data on disease epidemiology, vaccine effectiveness and cost effectiveness suggested that a booster dose of mumps should be introduced acknowledging there may be cohorts with sub-optimal measles, mumps and rubella protection.
10. The sub-committee noted that a number of significant outbreaks of mumps had been seen in the UK over the last decade. Cases had been mainly limited to unimmunised and partially immunised individuals, however more recently a significant proportion of infections were being confirmed in those who had received two MMR doses. However, generally mumps disease is less severe in immunised individuals. Mumps immunity from two doses of MMR provides good protection immunity but immunity wanes. Estimates of waning immunity vary, but it may be reasonable to assume that protection from infection falls to around 60% after 10-15 years. A number of outbreaks have occurred in young adults in universities probably due to the contact patterns in those settings as close contact may be required for infection of those with at least some vaccine-induced immunity. A resurgence of mumps may be expected in that population in future years due to the decline in MMR coverage during the last decade.
11. Four possible strategies were considered by the sub-committee:
 - moving the second MMR vaccination (at 3 years 4 months) to adolescence.
 - addition of a third dose of MMR in adolescence.
 - local provision of additional MMR doses during outbreaks

- improvement of MMR status checks and MMR catch up vaccinations of those unimmunised or partially immunised before school leaving.
12. The sub-committee concluded that any shift of the second MMR dose to an older age would be very likely to result in a significant proportion of younger children being unprotected against measles and rubella as well as mumps with adverse public health implications. A third dose of MMR in adolescence may be not be cost effective as the effectiveness of a third dose in those with immunity is uncertain. In addition, many of those that would be vaccinated may be fully protected against mumps, the severity of mumps disease may be lower for those that have already received two doses of vaccine, and there would be very little added protection against measles and rubella. Finally it may only shift the burden of disease to older age groups, due to waning vaccine-induced immunity. Due to the very limited evidence on the use of booster doses of MMR during outbreaks, it was concluded that no advice on this strategy could be provided.
 13. The sub-committee concluded that it may be most effective and cost effective to re-enforce current policy to check the MMR status of adolescents and offer missed vaccinations. This may be particularly important in coming years to prevent not only mumps but measles and rubella outbreaks in under-immunised birth cohorts. Communications to adolescents could highlight the severe nature of these diseases to young adults.

5. Possible targeted varicella vaccination for adolescents (paper 12/1/5)

14. The chair explained that JCVI had considered varicella vaccination relatively recently and concluded that universal varicella vaccination of children would not be cost effective but that targeted varicella vaccination of adolescents should be evaluated. JCVI had asked the sub-committee for advice on whether the available evidence on disease epidemiology, vaccine effectiveness and cost effectiveness suggested that a targeted vaccination against varicella should be introduced.
15. The sub-committee noted that most children under five years of age are infected (>65%) and develop immunity to varicella and this proportion has been increasing. However, a small proportion reach adolescence and adulthood without being infected and remain susceptible and few remain susceptible even after infection in childhood. Mortality and morbidity from varicella infection increases with age. A live attenuated vaccine is available that has a good safety profile and is effective particularly when two doses are given. Data are available on the concomitant administration with some of the other childhood vaccines. It is available as a single vaccine or a combination vaccine with measles, mumps and rubella.

16. It was explained that routine vaccination of all children had not been recommended by JCVI on the basis of epidemiological modelling. The modelling suggested that routine varicella vaccination of young children would prevent varicella circulation in children and re-exposure of adults to boost naturally acquired immunity. Natural boosting was considered important to reduce the risk of the emergence of herpes zoster in adults with latent varicella infection. A reduction in natural boosting could increase the incidence of herpes zoster in adults. However, a varicella vaccination programme targeted to susceptible adolescents would prevent infection in adolescents and adults for whom the disease may be severe but would still allow continuing infection in young children and therefore also boosting of natural immunity in the general population. A number of countries have targeted varicella vaccination programmes for adolescents.
17. The sub-committee noted that the effectiveness and cost effectiveness of a targeted programme is dependent on the identification of varicella-susceptible adolescents. Varicella infection is strongly correlated with immunity. However, as varicella infection in young children is generally mild, a clinical record of infection may be absent and recall of varicella infection by parents and particularly adolescents may be unreliable. The effectiveness and cost effectiveness of a programme would be reduced if a large proportion of the adolescents targeted had naturally acquired immunity. The HPA was recruiting subjects for a study to assess the prevalence of varicella susceptibility in adolescents and the reliability of parental and adolescent recall of infection. The study was expected to complete in Spring 2013.
18. The sub-committee considered that the HPA study would be an important component of a study on the effectiveness and cost effectiveness of a targeted programme. Better data is also needed for a cost effectiveness study on the burden of disease in adolescents and adults and that a systematic investigation of clinical records to obtain better data would be valuable. There are few data on the sequelae of severe varicella infection. However, better data may be available from the Intensive Care National Audit and Research Centre.
19. The sub-committee noted that the management of pregnant women either with known or suspected varicella exposure but with uncertain varicella history is healthcare resource intensive and in many cases unnecessary as prior immunity is subsequently established. As a targeted varicella vaccination of adolescents may significantly lower the number of susceptible women at risk of infection and the number of women where immunity is uncertain, this impact should be included in a cost effectiveness analysis.

20. The sub-committee agreed to re-visit this issue when the HPA had completed the study on the prevalence of varicella susceptibility and reliability of recall of infection and had assessed the impact and cost effectiveness of targeted varicella vaccination of adolescents.

6. Introduction of meningococcal C vaccination for adolescents (paper 12/1/2)

21. The chair explained that JCVI had issued recently a statement on the need for an adolescent booster dose of meningococcal C vaccine and had proposed that a relatively cost neutral approach may be to move one of the current infant doses to adolescence. JCVI had asked the sub-committee for advice on the optimal age to administer the booster dose of meningococcal C vaccine to adolescents.
22. The sub-committee was informed that following the introduction of the meningococcal C vaccination programme the incidence of meningococcal C disease had dropped and currently remains at very low levels with no clear evidence for an increase in disease. In contrast meningococcal Y disease, whilst at very low levels compared with historic levels of meningococcal disease, has been increasing in recent years with cases mostly in older adults. The incidence of meningococcal B disease has remained stable.
23. The sub-committee noted that vaccine-acquired immunity is relatively short-lived in younger children. Herd protection from the catch-up campaign when all those under 25 years of age were offered vaccine had lowered meningococcal C carriage in teenagers and young adults (the age groups where it was highest) and had kept disease at a very low level. However, as the catch-up cohorts get older, widespread meningococcal C carriage in adolescents is likely to become re-established and meningococcal C disease may increase. It is possible carriage may be increasing currently. Whilst no increase in disease has yet been observed, this may be due to an absence of invasive meningococcal C strains. It is difficult to determine when an increase in disease might arise. Moving a dose of meningococcal C vaccine from infancy to adolescence would re-establish direct protection of adolescents and herd-protection by preventing carriage. However, it may lower direct protection of young children possibly at a time when indirect protection is weak.
24. The sub-committee was presented with an unpublished illustrative simulation by University of Bristol of the possible changing age distribution of vaccine-acquired immunity and carriage. This was used to illustrate the main differences between three strategies: no change to the programme, introduction of a booster dose at age 12 years or at 15 years. It was acknowledged that the simulation was not based on rigorous modelling and could not be considered as an accurate or reliable source of

predictions. However, it was based on data on the waning of vaccine-acquired immunity by age and on carriage by age and therefore could reasonably differentiate the direct impacts of vaccination on each of the scenarios in general terms. Evidence from a published meta-analysis of meningococcal carriage suggests that prior to the introduction of vaccination the prevalence of meningococcal C carriage increased from about 12 years of age, peaked at about 19 years of age before dropping to low level at about 30 years of age. If no changes to the programme were made, this age profile of carriage would be expected to return. If a booster dose was introduced at age 12 years, this would reduce carriage in young adolescents quickly but may take several years to begin to influence carriage in older adolescents for whom it is expected to rise more sharply and to a higher level. A booster dose given at age 15 years would be expected to have faster impact on carriage. For this reason, considering the direct impact of vaccination alone, it may be more beneficial to vaccinate 15 compared with 12 year olds.

25. The sub-committee noted that the meningococcal C immune response of quadrivalent meningococcal ACWY vaccine was uncertain and may be inferior to the monovalent vaccine. In the absence of carriage data the impact of use of quadrivalent vaccine on meningococcal Y carriage is also uncertain. For these reasons the sub-committee agreed with the advice of the JCVI meningococcal sub-committee that the monovalent meningococcal C vaccine should be used as a booster dose.
26. The sub-committee, noting that there is uncertainty about when the expected increase in meningococcal C disease may arise, considered that a booster dose should be introduced as soon as practicable on precautionary grounds. It was noted that the suggested use was outside of the current market authorisations for the vaccines. Whilst no threshold for minimum coverage could be defined, high coverage would have the greatest impact. Coverage had been reasonably good in adolescents during the catch-up campaign. The vaccine could be given concomitantly with the current tetanus, diphtheria and polio (Td/IPV) booster. Evidence that would be discussed later in the agenda suggested that the booster would probably most effectively be delivered in schools. Whilst a booster dose at age 15 years (school year 11) may be optimal given that it may have a larger immediate impact on carriage, issues around implementation of a booster dose at that age need to be considered and would be discussed later in the agenda. An alternative strategy that would have a similar impact on carriage would be to introduce routine vaccination in younger adolescents with a time limited catch-up campaign for older ages, although this option would be more costly overall. It would also be important to review new carriage data that may be available later in the year, which may inform scheduling considerations. It was noted that the cost needed to be formally assessed (although it was suggested that

the change would be close to cost neutral in terms of vaccine doses purchased).

7. Implementation issues (paper 12/1/6)

27. The chair explained that JCVI had asked the sub-committee to advise on the scheduling and delivery of, and data collection on, the Td/IPV booster, any additional adolescent vaccinations and checks of vaccination status.
28. The sub-committee noted that the information collected through the call for evidence from interested parties was selective and likely to be biased. Nevertheless, a number of key messages could be derived and knowledge gaps identified:
 - the HPV vaccination programme for girls had been delivered very successfully, supported by the resources made available for extensive promotion and planning. However, adolescent boys may be less receptive to vaccinations than girls and the same may be true for some ethnic and other groups. Therefore additional adolescent vaccination programmes will need to be sufficiently well resourced to achieve high coverage levels and achieving higher coverage may be more challenging. Attitudinal research in order to understand better adolescent attitudes to vaccinations and how they may change with age and manage potential health inequalities in relation to adolescent vaccinations would be valuable.
 - schools-based vaccination programmes generally achieve significantly higher coverage than GP-based programmes. GP practices could play an important role in the delivery of missed vaccinations, identifying under-immunised adolescents or adolescents outside of the education system and calling them for missed vaccinations. However, for such a mixed delivery model to be effective, accurate and timely data transfer of vaccination records is vital. A systematic review of different adolescent immunisation delivery models could be valuable.
 - currently recording of adolescent vaccinations is poor and data on the coverage of the Td/IPV booster is very poor. Improvements in data recording and collection systems are needed in order to manage and evaluate adolescent vaccination programmes effectively and make adjustments to improve their delivery.
29. The sub-committee agreed that the available data strongly suggest that immunisation programmes for adolescents are likely to be more effectively delivered when based in schools compared with other settings. Expanding immunisation activity in schools could have wider benefits in terms of improving health education, particularly for boys who are less likely to routinely access health and health promotion services at this age. It would be vital to work in partnership with schools and to obtain the views of the Department of Education (DoE) to assess better the practicalities and inform the design of an expanded adolescent vaccination programme

delivered in schools particularly on age and timing to ensure disruption to education is minimised. However, as GPs are often seen as trusted health advisors they could have an important role to play in communicating the benefits of immunisation programmes to adolescents and parents. In addition, they may be more readily able to deliver missed vaccinations or offer vaccination to adolescents who are outside the education system or are in harder to reach groups. It was noted that even if adolescent vaccination programmes were delivered outside of schools this could still have an impact on education as adolescents may need to visit GP practices or clinics during school or study hours to receive vaccinations.

30. The sub-committee noted that the impact of the proposed changes to the structure and delivery of health and social care services on the delivery of adolescent immunisations is uncertain. However, the shift of responsibility of public health services into Local Authorities could mean that adolescent vaccination programmes could be more easily aligned with planning by Local Education Authorities.
31. The sub-committee agreed that Child Health Information Systems (CHIS) are key to data recording, however there is little consistency in their functionality and the way they are used. In some areas records are not maintained beyond five years of age or may even be destroyed. Until improvements are made to these systems and their maintenance and use, data would continue to be of poor quality and not fit for purpose to monitor adolescent vaccination programmes. It was noted that a working group had been formed by DH to support the transition of CHIS through and beyond NHS restructuring and to define more rigorously the systems needed to support immunisation and other health programmes. Patient held records, including electronic records (e.g. as a phone application) to supplement CHIS and GP records could be extremely beneficial.
32. The sub-committee noted that attitudinal research on parents' and childrens' attitudes to immunisations and the setting they are given would be important. Unpublished research conducted in preparation for the implementation of the HPV vaccination programme suggests that schools-based programmes may be better received as they may be less disruptive to parents and adolescents and adolescents gain peer group support. However, the evidence is biased to girls and there is little known about gender differences in adolescent attitudes to immunisation. Research on adolescent attitudes to immunisation may be available from the MRC Social and Public Health Sciences Unit. Professor Hunt would make enquiries about releasing that work to the sub-committee.
33. The sub-committee concluded that the Td/IPV booster could be delivered over a range of ages and would probably be most effectively and cost

effectively administered at a defined age, possibly in school year 10, and concurrently with the meningococcal C booster, possibly combined with a check of MMR and other immunisation status. However, this advice is pending discussions with DoE and further work to determine the costs of this arrangement compared with current costs and the capacity of current school nurse resources to deliver more immunisations, particularly should JCVI recommend influenza vaccination of school children. Implementation would also be influenced by the timing of possible changes to contracts with GPs and the vaccine manufacturers. Until more was known about the potential impact, it would not be advisable to add further vaccinations within or around the current HPV vaccination programme as this may adversely affect this highly successful programme.

8. Next steps and any other business

34. The sub-committee agreed to meet again in the late autumn when progress had been made on the areas identified. The chair thanked all the participants and closed the meeting.

Annex A – Conflicts of interest

Possible pertussis vaccination for adolescents (paper 12/1/3))

Member	Interests	Action
Judith Breuer	Non-personal, non-specific Sanofi-Pasteur MSD	The member was able to participate in the discussion and to vote
Pauline MacDonald	Personal, non-specific GSK	The member was able to participate in the discussion but not to vote
Mary Ramsay	Non-personal, non-specific GSK	The member was able to participate in the discussion and to vote

Mumps vaccination (paper 12/1/4)

Member	Interests	Action
Judith Breuer	Non-personal, non-specific Sanofi-Pasteur MSD	The member was able to participate in the discussion and to vote
Pauline MacDonald	Personal, non-specific GSK	The member was able to participate in the discussion but not to vote
Mary Ramsay	Non-personal, non-specific GSK	The member was able to participate in the discussion and to vote

Possible targeted varicella vaccination for adolescents (paper 12/1/5)

Member	Interests	Action
Judith Breuer	Non-personal, specific Sanofi-Pasteur MSD	The member was able to participate in the discussion but not to vote
Pauline MacDonald	Personal, non-specific GSK	The member was able to participate in the discussion but not to vote
Mary Ramsay	Non-personal, non-specific GSK	The member was able to participate in the discussion and to vote

Introduction of meningococcal C vaccination for adolescents (paper 12/1/2)

Member	Interests	Action
Adam Finn	Personal, non-specific Pfizer and Novartis. Non-personal, non-specific GSK, Pfizer and Novartis	The member is able to participate in the discussion but not to vote
Pauline MacDonald	Personal, non-specific GSK	The member was able to participate in the discussion but not to vote
Mary Ramsay	Non-personal, non-specific GSK	The member was able to participate in the discussion and to vote

Implementation issues (paper 12/1/6)

Member	Interests	Action
Judith Breuer	Non-personal, non-specific	The member was able to

	Sanofi-Pasteur MSD	participate in the discussion and to vote
Adam Finn	Non-personal, specific Sanofi-Pasteur MSD	The member is able to participate in the discussion but not to vote
Pauline MacDonald	Personal, non-specific GSK	The member was able to participate in the discussion but not to vote
Mary Ramsay	Non-personal, non-specific GSK	The member was able to participate in the discussion and to vote